Employers' perspectives of accounting graduates and their world of work: software use and ICT competencies

Abstract
This study investigates students' learning needs to prepare them for workplaces characterised by rapidly changing information and communication technology (ICT) requirements. Interviews enabled employers to give their perspectives on the types and extent of software used by accounting graduates, their required workplace ICT competencies and the extent to which graduates met employers' ICT competency expectations. Overall, employers' expectations of graduates in the workplace are higher although they have mixed views about their ICT competencies. It remains essential for graduates to have a sound foundation of accounting skills. Graduates need to understand how transactions move through the accounting process so that they can evaluate the reasonableness of accounting information. The study highlights where enhancements can be made to courses. These findings can be used by accounting educators in the planning and delivery of accounting programs to ensure that accounting graduates have the essential ICT competencies required for their future careers.

Keywords: accounting, employers, generic skills, ICT competencies, software

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Introduction

Change is an unavoidable reality in all spheres of life. Technology is, and will continue to be, one of the fundamental drivers behind this change as it fosters global businesses, improves firms' performance, accelerates economic growth, and redefines the necessary workforce skills (ACCA, 2016; Bughin et al., 2017). Structural changes in information and communication technology (ICT)[1] have become the new normal for the accounting profession, both for employers and employees (Rebele & Pierre, 2019). Employer expectations need to be considered in designing university learning programs (Duncan-Howell, 2012). Employers require business graduates to be able to use software for decision making (To et al., 2019). Although ICT competency is vital to accountants' careers, research into relevant ICT education issues is sparse (Apostolou et al., 2013). To equip accounting graduates for a future of accelerating technological change, university educators need to keep abreast of ICT developments and have an awareness of the tasks and technologies that graduates will face in the workforce. Business students have demonstrated reluctance to learn business software when they do not believe such software will be used in the workplace (To et al., 2019). The information gained from employers in this study can be used by university educators not only to motivate accounting students in their ICT learning but also to design relevant learning programs. Universities rarely have a common framework regarding 'what to teach' and 'how to teach' ICT skills to accounting students. Consequently, ICT skills are taught through either accounting or IT departments (IAESB, 2018). A survey of heads of departments and directors of teaching involved in accounting courses at Australian and New Zealand universities showed unanimous agreement that the accounting curriculum needs to be reshaped to be relevant in the digital age (Birt et al., 2019).

This study responds to calls for regular surveys of employers regarding the required ICT competencies of accounting graduates due to the continually changing ICT environment (Al-Htaybat et al., 2018; Spraakman et al., 2015). It seeks to address the following issues: What are accounting employers' views of the ICT commonly used by graduates and their levels of ICT competency? The study addresses crucial matters for accounting educators as they seek to equip graduates for workplaces dominated by everchanging ICT demands. The topic is of interest to accounting educators globally as it provides current insights into what accounting graduates can expect as they enter employment. Educators can review their current programmes in light of the study's findings to ensure that their programs are designed to enable students' development of necessary ICT competencies.

A qualitative research design was employed to answer the research question. A focus group with four employers[2] and semi-structured interviews with 18 employers enabled the generation of an in-depth understanding of employers' expectations for accounting graduates' capabilities regarding ICT software knowledge and use. Employers identified commonly used software. Thematic analysis led to the generation of clusters of insights which addressed the research question. Additionally, the OECD (2000) definition of

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[1] ICT has been defined as 'digital technologies designed to collect, organise, store, process and communicate information within and external to an organisation' (Ritchie & Brindley, 2005, p. 160).
[2] The term employer is used in this paper to mean a person who has involvement in the recruitment and/or supervision of accounting graduates. They may be a principal, partner or an employee in their organisation.

competency encompassing knowledge, skills and attitudes provided a framework for analysing employers' views and gaining further insights.

The study found that Microsoft Excel, Word and Outlook, along with accounting software and internet searching, were most commonly used by accounting graduates in their first year of employment. Employers had high expectations regarding the level of ICT competency that they expected from accounting graduates. Employers outlined the different skills they required for the various types of software and the extent of competency they had observed in graduates. Additionally, employers spoke of competencies beyond ICT that graduates needed. Employers differed in their opinions regarding how well graduates were prepared for the workplace.

Contribution

Prior research into the required ICT competency of accounting graduates has taken a predominantly quantitative approach, using questionnaires (Dzuranin et al., 2018; L. Lee et al., 2018; Winstead & Wenger, 2015). Some studies have focused on specific ICT skills while others have mentioned ICT along with a host of other skills. This Australian study obtains a nuanced understanding of employers' views of the software used by graduates, the ICT competency required by graduates, and the observed levels of graduates' ICT proficiency.

The main contribution of this study is to provide current detailed information about the expectations of employers regarding the ICT competencies they require of new accounting graduates. Both educators and employers have their specific role to play to improve the skill levels and competency among accounting graduates (Chaffer & Webb, 2017). While there are a variety of Massive Open Online Courses (MOOCs)[3], where students can gain various ICT competencies, academic institutions need to navigate these waters carefully if they wish to stay relevant and prepare graduates who have good technical skills and are employable.

The recent amendments to International Education Standard 2 (IES 2) (IAESB, 2019) require a greater range of ICT competencies for accounting graduates. Therefore, the insights from this study both timely and relevant for accounting educators. While the Standard lists the competencies required, it does not tie the competencies to the types of software commonly used by graduates. The study helps put 'flesh' on the 'bones' of IES 2 by providing accounting educators with current information about what employers expect from accounting graduates and the extent to which accounting graduates are currently meeting those expectations. In light of a recent UK study that found a mismatch between the ICT competencies required of accounting and finance graduates in job advertisements compared to the literature (Osmani et al., 2019), it is opportune to gain greater insights from employers. Accounting educators will be able to review and revise their existing programs using the findings from this study. Additionally, the provision of

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[3] Examples of MOOCs are Coursera, Linda, EdX and Udemy.

up-to-date information from employers can be used by accounting educators to help motivate students to expand their ICT competencies (To et al., 2019).

A secondary contribution of the study is the analysis of the employers' views according to the competency components of knowledge, skills and attitudes (OECD, 2000). These dimensions of competency are similar to the IAESB's (2019) view of competency as the integration and application of (a) technical competence, (b) professional skills, and (c) professional values, ethics and attitudes. This analysis provides useful information for accounting educators in comparing their current programs with the requirements of employers.

The remainder of the paper is structured as follows. Literature is reviewed on the changing ICT environment and its impact on accountants, along with studies of accounting graduates and ICT competency. An explanation of the research approach is provided. The findings and discussion provide answers to the research questions while comparing and contrasting the findings with those of prior literature. The paper finishes with conclusions, limitations and future research suggestions.

Literature review

There is no doubt that as accounting graduates start their careers, they are expected to exhibit appropriate competencies (Bunney et al., 2015; Stephenson, 2017). Competency is often discussed in a job-related setting (Woodruffe, 1995). When someone is described as competent, they are seen to have the ability to consistently, efficiently and effectively produce results that contribute to organisational goals (Teodorescu, 2006). The IAESB (2019, p. 9) describes professional competence as 'the integration and application of: (a) technical competence, (b) professional skills, and (c) professional values, ethics and attitudes'. Palmer et al.'s (2004) review of competency studies of auditors and accountants considered knowledge, skills and abilities. This study draws on the OECD (2000) definition of competency comprising knowledge, skills and attitudes as a framework to analyse the interviewees' responses. These aspects of competency are also found in later research on competencies (Brophy & Kiely, 2002; Draganidis & Mentzas, 2006). The OECD definition has been adopted because it provides an appropriate framework for nuanced insights. Additionally, Palmer et al. (2004) note that a key step in competency studies is in 'identifying knowledge and skills needed to meet professional responsibilities' (p. 891).

Studies have revealed differing opinions between students, academics and employers regarding the desirable competencies for accounting graduates. One survey of accounting employers revealed their perception that university accounting programmes were not always aligned with market expectations (P. Pan & Perera, 2012). Additionally, discussions with employers revealed accounting graduates had gaps in their skills (R. Jones, 2014). Bayerlein and Timpson (2017) investigated how well Australian undergraduate accounting degree programmes developed accounting graduates' knowledge to meet the needs and expectations of the accounting profession. They came to the shocking conclusion that accounting graduates were unlikely to have the competency needed for current accounting practice.

Requirements for accounting graduates to have ICT competency are promulgated by accounting professional bodies and accrediting organisations. For instance, CPA Australia and CAANZ (2020) evaluate the appropriate incorporation of ICT across the curriculum. Accounting programmes seeking AACSB (2018) accreditation require that 'both faculty and students [are able] to adapt to emerging technologies as well … [as gain] mastery of current technology' (p. 27).

The workplaces that accounting graduates are entering are rapidly transforming due to new technologies (such as FinTech industries, bitcoin and blockchain, cloud computing, digitalisation of data, eXtensible business reporting language (XBRL), data analytics, big data, internet of everything (IoE), artificial intelligence (AI) as well as drone technology, and mobile technologies). Such technologies are shaping the style of business decision making and the producing of performance reports by corporations (Dzuranin et al., 2018; G. Pan & Seow, 2016; Rîndaşu, 2017). Digitally enabled businesses pose a plethora of 'information literacy' challenges for the accounting industry (Bhimani & Willcocks, 2014). At the same time, accountants can translate these challenges into opportunities if they have a clear understanding of the new business models and if they develop the required skills and capabilities (Gould, 2017). A recent ACCA report notes that accountants need to address both skills and technology gaps (Lyon, 2020).

Technological changes are a central theme that shapes accountants' professional identity. Gould (2017) identified four drivers in technologies likely to bring a new dimension of challenges to accountants: manual bookkeeping to artificial intelligence, cloud-based accounting, accounting with big data, and handling and integrating non-traditional financial information. The International Accounting Education Standards Board (IAESB, 2018) reached similar conclusions and identified three broader areas of challenges for the accounting sector: cybersecurity, outdated accounting systems, and the changing role of the accountant along with job mobility. Even though professional accountants and auditors are theoretically well informed about the benefits and threats of ICT, Rîndaşu (2017) observed a fourth challenge: accountants do not possess sufficient ICT competency for digital accounting. As a result of these four challenges, today's employers are looking for accounting graduates with well-developed ICT competency and university educators need to ensure learning programs are tailored to ensure graduates have the required competencies.

The importance employers place on accounting graduates' ICT competency is well documented. A survey of accounting employers showed that 87% agreed ICT skills were either quite important or very important to career success (Oliver et al., 2011). Interviews with accounting professional bodies and employers also showed the significance they place on technology competence for accounting graduates (Tempone et al., 2012). A study of the impact of outsourcing on new hires at public accounting firms found employers ranked ICT competence as the third most important skill after analytic and creative thinking (Chaplin, 2017). Content analysis of accounting job advertisements further demonstrated employers' demands for ICT competence in Australia and New Zealand (Tan & Laswad, 2018) as well as Canada (Uwizeyemungu et al., 2020). Despite acknowledging the importance of ICT skills, a recent study of accounting educators and professional associations confirmed continued concerns about the incorporation of ICT

competencies into accounting programs (Kotb et al., 2019). The study noted ICT competency was considered crucial to accounting programs and the accreditation process further hindered their inclusion in programs. Employers have rated competency in financial analysis, the Microsoft Office program and financial accounting knowledge as the most important competencies required in accounting graduates (Aryanti & Adhariani, 2020). Ballou et al. (2018) contrasted the views of professional accountants and academics regarding what should be emphasised in the accounting curriculum. They claim that the accountants want a greater focus on data analytics, unstructured business problems and writing and communications.

Students have demonstrated mixed views regarding the importance of ICT skills after graduation. Coady et al. (2018) found that accounting employers gave a higher rating to the need for ICT proficiency than the ranking given by graduates. Likewise, Aryanti and Adhariani (2020) found employers ranked competency in the Microsoft Office suite as the second most important competency after financial analysis, while students rated competency in the Microsoft Office third in importance after accounting and financial accounting, and financial reporting. A study of US students found that using accounting software was rated sixth in importance out of 47 skills required for a successful accounting career (Krikorian et al., 2020). Regarding ICT competencies, accounting students gave a higher rating to the importance of computer literacy, technology competence and decision modelling than the priority they perceived was given to such topics in their programs (Krikorian et al., 2020). In contrast, a study based in Hong Kong found business students gave a low rating for the need for ICT competency relative to other competencies required of business students (Chan & Fong, 2018). G. Pan and Seow (2016) lamented that some accounting students believe that it is reasonable to wait until after graduation to gain fundamental and in-depth ICT knowledge. However, when business students believe that they will use the technology in their future careers, they have a greater willingness to learn advanced business applications at university (To et al., 2019).

The IAESB's (2019) recently released revisions to its International Education Standard 2 (IES 2) reveals the specific ICT technical competence required of students completing higher education before entering the accounting profession.
    (a) Explains the impact of ICT developments on an organisation's environment and business model.
    (b) Explains how ICT supports data analysis and decision making.
    (c) Explains how ICT supports the identification, reporting and management of risk in an organisation.
    (d) Uses ICT to analyse data and information.
    (e) Uses ICT to enhance the efficiency and effectiveness of communication.
    (f) Applies ICT to enhance the efficiency and effectiveness of an organisation's systems.
    (g) Analyses the adequacy of ICT processes and controls.
    (h) Identifies improvements to ICT processes and controls.

These revisions add significantly to the 2015 IES, which had three points. Two points from the 2015 IES were similar to (b) and (g) in the 2019 Educational Standard. The third point from the 2015 IES was to 'use information technology to support decision making

through business analytics'. This point made specific reference to the use of analytics and has been expanded in point (d) in the 2019 Educational Standard.

Beyond the educational standards, researchers have sought to gain an understanding of the differing ICT competencies expected of accounting graduates. Chen et al. (2009) surveyed recruiters on their views about the ICT skills they expected in accounting graduates. Six types of software were required: financial spreadsheets, business graphics, word processing, presentation, audit software and tax preparation software. Several competencies were also expected: small business systems, database management systems, computerised accounting packages, evaluation of an entity's ICT assurance needs, and communication software (email, file transfer, web browser). Dzuranin et al. (2018) surveyed accounting academics and asked them to prioritise the accounting software that should be taught to students regarding data analytics. Microsoft Excel was given priority by 79% of respondents, followed by audit analytical software packages (for example, IDEA, ACL) (8%), data visualisation packages (for example, Tableau, Qlik, Microsoft BI) (7%), and database software (for example, Microsoft Access) (4%). The high necessity for Excel competency is consistent with findings in a study by Spraakman et al. (2015). L. Lee et al. (2018) surveyed accounting practitioners and concluded that Excel was the most important and frequently used software by new graduates. Additionally, a survey of US accounting educators revealed their concerns over students' inadequate Excel competency (Ramachandran Rackliffe & Ragland, 2016). One study asked accounting students to rate their competency in 36 different aspects of ICT. The top five highest levels of perceived competency (in order) were: emails, Internet searching, word processing and presentation technology and spreadsheets (Strong & Portz, 2015). In a survey of supervisors, the top five Excel functions (from a list of 37 functions) expected of accounting new hires were identified: use Excel to enter basic mathematical functions (add, subtract, multiply, divide, etc.); perform basic formatting in Excel (bolding, underlining, numeric formatting etc.); manage worksheets and workbooks (e.g., adding, removing, renaming, moving, etc.); use Excel to sort, subtotal and summarise data; and use absolute and relative cell addressing (Bradbard et al., 2014).

Accounting practitioners confirmed that Adobe Acrobat, PowerPoint and accounting/ERP software were frequently used in various areas of accounting and at different experience levels. While both data analytic skills and data visualisation skills were deemed important, data analytic skills were given more weight (L. Lee et al., 2018). Winstead and Wenger (2015) surveyed academics and accountants about their desired level of ICT competency. Both groups agreed on the need to be proficient in the use of accounting software and on the necessity for high levels of proficiency in using computers. These researchers also found that practitioners were not overly concerned about proficiencies in understanding data sharing technologies and XBRL. Furthermore, their results showed that accounting practitioners were satisfied with lower levels of proficiency in using technology for problem-solving, understanding e-commerce and safeguarding accounting records.

Rai's (2012) survey identified 16 ICT skills as valuable in the Australian context of accounting work:

> [E]mail, communication software, electronic spreadsheets, antivirus
> software, backup and disaster recovery tools, operating systems, firewall,

internet search tools, tax software, word processing, user authentication systems, client-server technologies, accounting software, time management and billing tools, and wireless and digital technologies (p. 3636).

It can be seen that questionnaires are commonly used in studies seeking to understand the ICT competencies of accountants. The New Zealand study by Spraakman et al. (2015) may be differentiated from prior studies as it used interviews with employers to gain insight into the ICT knowledge and competency required by management accounting graduates. Twenty firms were represented in that study. All firms used enterprise resource planning (ERP) systems. While there was consensus that some exposure to ERP systems was useful, no particular system was identified as skills can be transferred between systems. Further, all respondents declared that using Excel was an essential ICT competency but respondents differed in the level of competency that they believed to be ideal. The findings indicated that intermediate competency was needed in Excel, Word, PowerPoint and Outlook. While the study by Spraakman et al. (2015) identified different software used by graduates, more details were provided about Excel and ERPs compared to other software. However, the study did not seek employers' views about the adequacy of graduates' competency. The current study, therefore, supplements prior research by discerning the level of competency required for the most commonly used software as well as disclosing the extent to which employers are currently satisfied with accounting graduates' ICT competency and areas of ICT skill deficiencies.

The literature review reveals that accounting graduates are entering workplaces characterised by continual technological change. There is no doubt that accounting graduates require ICT competency to enable them to pursue successful careers. IES 2 (IAESB, 2019) highlights that accounting graduates require intermediate competency in ICT across a number of domains. Surveys of employers reveal the weight they place on ICT competency, yet they provide limited details regarding the software used by accounting graduates and the competency expected by employers. Research is sparse on the extent to which employers are satisfied with accounting graduates' ICT competency. This study focuses on accounting graduates in their first year of employment as it is not known the extent of training they may initially receive. However, as graduates continue in their employment it would be expected that they would receive training in more advanced ICT skills (Jackling & De Lange, 2009). This study aims to address these research gaps through the overarching research question: What are accounting employers' views of the ICT commonly used by graduates and their levels of competency? This question is explored through the following research questions:

RQ1.   To what extent are various software programs used by accounting graduates in their first year of employment?
RQ2.   What types of ICT competencies do employers expect accounting graduates to possess when entering the workforce?
RQ3.   To what extent do accounting graduates meet employers' expectations regarding their ICT competencies?

The findings are then analysed to answer the fourth research question:

RQ4.   What areas of ICT competencies need to be improved in current university accounting programmes to enhance accounting students' learning outcomes, so that they are adequately prepared for their first year in the workplace?

Research method

This study takes the constructivism approach to qualitative research which sees reality as being socially constructed (Creswell, 2014). The researcher takes the role of a 'facilitator of multi-voice reconstruction' (Lincoln et al., 2011, p. 101) and creates a tapestry of the differing viewpoints of participants. The personal, subjective perspective of participants and the interviewer enables a distinct and receptive understanding of everyday experiences (Kvale & Brinkmann, 2009). A qualitative approach was most appropriate for this research given that the research aimed to explore employers' views, and these views could not be known beforehand and were not derived from existing theories. Flick (2013) observes that qualitative studies are well suited for comparison between cases and he recommends that such comparison is suited for a small number of cases.

A preliminary schedule of interview questions was prepared that addressed the research questions. This schedule was used with a focus group of four people involved in the employment of accounting graduates. The purpose of the focus group was to understand their views regarding the ICT competencies they desired in first-year graduates and their observed areas of shortfall. The information from the focus group was then used to refine the preliminary interview schedule. A total of 22 people from 16 organisations participated in the study. The 22 participants comprised the four people in the focus group in addition to 18 individual interviewees. Six of the individual interviews were in person and 12 were by telephone. Interviews averaged 25 minutes and took place in 2018 and 2019. The number of study participants aligns with Mariampolski's (2001) recommendation for at least 15 interviews when conducting qualitative interview-based studies [4].

The 22 participants comprised 14 from public practice, four from government, two from industry and two not-for-profits (NFPs). The spread of organisations provided a variety of viewpoints. Convenience sampling was used. The four focus group participants and two of the interviewees were known to the researcher. Sixteen interviewees were recruited by referral. Interviewees were selected who had current involvement and knowledge in the recruitment of accounting graduates. It was necessary to have such interviewees as they were also familiar with the work of the graduates and were in the best position to be able to evaluate the adequacy of their ICT competency. To maintain confidentiality and differentiate between quotations from the participants, each participant was assigned a number followed by a letter to indicate the type of organisation: P for public practice, N for NFP, I for industry and G for government. Further details of the interviewees and their organisation types are provided in Appendix 1.

All participants signed a consent to be interviewed and interviews were audio-recorded. A professional was used to transcribe the interview recordings into documents. The accuracy of the transcription process was checked by the researcher listening to all the audios and comparing them against the transcriptions. At the same time a memorandum was written which highlighted points of interest regarding the research questions.

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[4] Guest et al. (2006) found 10 interviews were sufficient to generate meaningful themes.

An inductive approach following principles derived from grounded theory was used to analyse the focus group and interview transcripts (Cho & Lee, 2014). The purpose of the analysis was to make 'sense of the data collected' and provide a structure to understand meaning and significance for the interviewees, researcher and readers (Parker & Roffey, 1997, p. 214). Such an approach does not commence with pre-held theoretical concepts so as to preclude theory dominating empirical data (Strübing, 2007)[5]. A thematic analytical approach was chosen to investigate the project's data. King et al. (2018) define themes to be recurring or distinctive characteristics of the interviewees' experiences and opinions. Thematic analysis allows the research to focus on key issues, and the purpose is not to generalise but rather to understand the complexity of the issues for each participant (Creswell & Poth, 2017). The objective of the analysis was to extract apparent and underlying themes from the interview data, which capture significant aspects and inform the issues studied. Guest et al. (2011) contend that thematic analysis is the most useful approach to illustrate the complexities of meaning from textual data. For the current research project, thematic analysis enabled a constant focus on answering the research questions. NVivo was used for the project's data storage and to facilitate the analysis. One researcher coded and analysed the data. The first round of coding was used to identify and group the employers' views according to different types of software. Other emerging topics were also coded. After the first round of coding, transcripts were checked to ensure that codes had been consistently applied. Accuracy and consistency of coding was further enhanced through an additional reading of each transcript to discern the differing and similar points of views regarding RQ1 to RQ3 for each type of software. The approach to coding provided a means to compare and contrast employers' views and to and to find out about topics that were not part of the interview schedule.

To assist in synthesising the findings, tables were prepared for each major software program that was used by accounting graduates: Excel, accounting software, Outlook, Word, the Internet and PowerPoint. This ordering follows the significance of the different software indicated by the employers. The tables provide illustrative quotes which answer the first three research questions. Column one of the tables addresses RQ1, columns two and three address RQ2 and column four addresses RQ3. Not all interviewees expressed definitive opinions about each category of software and the opinions expressed were subject to interpretation by the researcher. However, while reviewing the interviewees' responses it became apparent that for some issues, responses clustered into two groups: the dominant view and the alternative view. Responses were classified as a dominant view when the majority of interviewees' comments reflected such a view about the issue under discussion. Responses were classified as an alternative view when the number of interviewees expressing such a response was less than the majority of interviewees' comments.

Findings and discussion

The findings and discussion provide answers to the first three research questions according to the major types of software mentioned by employers. For each type of software, summary comments and illustrative quotes are provided in Tables 1 to 6. These comments show the extent each software is used (RQ1), the level of skill and specific

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[5] The framework of the three components of competency was not introduced into the research project until the findings were analysed.

competencies required in using the software (RQ2), and the employers' perspectives of graduates' proficiency in using the software (RQ3). The employers provided further insights beyond competency in the six commonly used software programs and these are included in the sub-section entitled 'Other competencies'. Following this sub-section, the fourth research question is addressed which outlines the ICT competency shortfalls that accounting educators need to address.

Microsoft Excel

In answering RQ1, most employers shared that Excel was used extensively, as can be seen in quotes in Table 1, Column 1. Further examples are E9's remark that 'you do the majority of your work in Excel' and 20G stating that 'most firms use Excel'. The dominant use of Excel has been identified in prior studies (Dzuranin et al., 2018; Howieson et al., 2014; L. Lee et al., 2018; Spraakman et al., 2015). A couple of employers felt there was too much emphasis on using Excel. 22G said that 'unfortunately, people think that spreadsheets are the be all and end all … [however] it's just a tool'. 20G added that accountants used Excel like a 'pocketknife' particularly when an accounting package did not exactly fit an organisation's needs. Notwithstanding these views, 20G also saw Excel competency as the number one skill required of graduates as 'most firms use Excel in one shape or form'.

Regarding RQ2, some employers required intermediate skills. The dominant view was the expectation of strong Excel competencies as shown in Table 1, Column 2. Another example is 6P expressing that graduates should be able to 'use Excel to the best of its ability'. 22G defined intermediate skills as knowing 'how to do complex formulas'. Spraakman et al.'s (2015) study of the ICT competencies required of graduates working in management accounting concluded that they needed intermediate skills in Excel. The specific Excel competencies required are shown in Table 1, Column 3: basic formula, Vlookups, data sorting, table outlining, IF statements, consolidating and linking worksheets, pivot tables and graphs. Similar competencies to the current study were outlined by Spraakman et al. (2015). Ragland and Ramachandran (2014) reported public accounting employers' expectations regarding new hires' use of 30 Excel features, noting that producing graphs was rated 6th and pivot tables were rated 10th. In contrast, a survey of Hong Kong employers found that lookups and pivot tables were the most highly regarded Excel competencies (C. B. Lee et al., 2018). 22G remarked that the use of pivot tables tended to 'over complicate things … then if there's an issue or something doesn't make sense, you can't easily point to, "Oh, that's the problem"'. 22G expanded on their alternate view that graduates required only basic Excel competency:

> I wouldn't care if you had the simplest Excel skills in the world, but if you logically set things out so someone can easily follow what you're doing and gives a summary that meets your needs, that's all I'm after.

A few employers did not require graphs and/or pivot tables. 10P did not require pivot tables or graphs, while 12P only used pivot tables and graphs 'occasionally'. For 14P graphs were used 'a lot' and pivot tables 'from time to time'. 2P wanted pivot table competency but was not concerned about graphs. Similarly, for 18I graphs were not used a lot, rather there was greater use of 'more analytical things like the formulas and the

lookups and pivot tables and filtering'. Prior studies have also noted the importance of graphs and pivot tables (Ragland & Ramachandran, 2014; Spraakman et al., 2015).

21G emphasised that they would like to see graduates with some competency in Excel modelling as it was 'critical for accountants'. 7P provided insight into how the graduates would undertake cashflow modelling:

> They should be able to use a pivot table. So, in their first year they'll be getting to help pull some … sort of raw data together. We need them to have good Excel logic skills … distinguishing between data input pages and other parts of the Excel document … I think their Excel skills need to be fairly in-depth.

There certainly has been no decrease in the Excel competency required by employers. In fact, it may increase in the future as 19G declares, 'I wouldn't be surprised in the not-too-distant future we'd be saying Excel's a given and [we would] want some graduate skills in something like Power BI'. 5P, 21G and 22G all mentioned the current use of business intelligence tools. L. Lee et al. (2018) found that employers wanted graduates to have competency in data analysis and data visualisation. However, they placed a greater emphasis on competency in data analysis.

While it was expected that graduates would have sound Excel skills, the importance of data integrity, formatting and presentation was also expressed. Several employers provided more detailed information about these skill sets:

> [The] formatting functions under Excel, [are] very important for me because for a graduate I would be expecting them to download stuff from a package with integrity and to actually format it … because the look of the report's important (16N).
> It's more about that thought process. How to break down that data to then generate the formulas ... But you need to know how to get the data that you want in a meaningful way so that then people can enter it and spit it out. And people can't think like that. They can't – that's probably the weakness. [If] they don't know the Excel skills, you can look that up; but they don't know how to break down the data and how to think logically through it (14P).

19G reiterated that graduates needed to be able to 'take large amounts of data and turn it into concise information', which is further explained by 22G:

> I think the real value … is about knowing how to display it … how do you wrap that up into a digestible bit so that whoever's looking at it can understand what you're doing?

Spraakman et al.'s (2015) study also identified the use of Excel for analysing problems and subsequently presenting the results to managers. Graduates need to appreciate how Excel is used in conjunction with other pieces of software. 16N explained the importance of an 'understanding of Excel and how it relates to any package'. This knowledge is critical as 'usually each package uses an import and export function to Excel'.

Regarding RQ3, employers expressed a range of viewpoints regarding the adequacy of graduates' Excel competency as shown in Table 1, Column 4 with some being satisfied while the majority desired greater competency. Additionally, several had observed a range of Excel competence among graduates. 8P states, 'It depends on the team members. Some have excelled at that. Others it has been a little bit short.' Likewise, 9P had observed 'some are very good at it, [and] some have had minimal exposure'. 14P found competency was 'at a basic level'; however, ideally they would prefer advanced competency. 18I would like graduates to be 'be a little bit stronger in Excel'. In contrast, 17I was very satisfied. Yu and Churyk (2013) also found that overall employers were not satisfied with their interns' levels of spreadsheet skills. US accounting professors were also dismayed about their students' Excel competency (Ramachandran Rackliffe & Ragland, 2016).

18I bought up an interesting observation about the timing of when Excel should be taught to students to ensure that it is integrated into other subjects so that it is not 'all forgotten and it needs to be relearnt or retaught'. Additionally, consideration needs to be given to the number of times students are exposed to different ICT throughout their degree.

The various aspects of competency can be seen in employers' discussions concerning Excel. Graduates need knowledge of Excel functions and its relationship to other software. They require skill in using Excel so data is logically set out so that it can be analysed and then presented in a useful format for users. An attitude of attention to detail and a user focus will help in identifying errors and producing useful output.

Table 1 *Microsoft Excel*

Extent of use by graduates (1)	Level of competency required (2)	Specific competency required (3)	Proficiency of graduates' skills (4)
We do a lot of Excel spreadsheeting for our work (11P). They'll use predominantly Excel (18I). We still have a lot of dealings with Excel (8P). Excel skills are becomingly increasingly more important (13P). It's a very heavily used tool (7P).	*Dominant view* Need to have a very high understanding of Excel (16N). Need to have strong … Excel skills (14P). Mastering of Excel spreadsheets is a pretty key thing … having a high level of Excel skills (12P). *Alternate view* If you can generally know how Excel works or get it to add up numbers or things like that, then that's all you need (10P).	*Dominant view* Basic formula, Vlookups, data sorting, table outlining, IF statements, consolidating, linking worksheets, pivot tables and graphs. *Alternate view* Several did not use pivot tables and/or graphs.	*Dominant view* They could be a little bit stronger in Excel (18I). Excel skills are not great when they come in (3P). Getting into how powerful Excel is as a tool and being able to use it effectively … that's pretty lacking (21G). Graduates have trouble implementing financial mathematics in Excel (18I). *Alternate view* Most of the ones we've employed recently have been fairly good (12P). Have some experience with Excel, better than what I've seen in the past (16N). Most of them have adequate skills with Excel (11P).

Accounting software

Regarding RQ1, Table 2, Column 1 shows that virtually all employers wanted graduates to use accounting software. Boulianne (2016) asserts that accountants make 'intense use' of ICT through accounting software (p. 305). 5P affirmed that 'If they're going into some sort of accounting firm … [they] need to have the skills to be able to pick it up and work with it.' The exception was 9P who stated, 'we wouldn't use a lot of it in forensic'. Employers in public practice typically mentioned accounting software used by small and medium businesses such as MYOB, QuickBooks/Quicken, Attaché, Reckon and Xero. Some industry and government employers made mention of different ERPs. They did not expect graduates to have exposure to ERPs; only the common accounting packages. Various studies have highlighted graduates' use of accounting software (L. Lee et al.,

2018; Spraakman et al., 2015; Winstead & Wenger, 2015). Dunbar et al. (2016) noted that the use of accounting software was the second most commonly listed competency in job advertisements for accounting graduates.

In relation to RQ2, (Table 2, Columns 2 and 3) employers varied in their expectations of graduates' competency in using accounting software. Some were concerned with general knowledge and the ability to generate reports whereas others wanted graduates to be able to process transactions. These alternate views can be seen in the following statements by 10P and 7P. 10P was concerned about reporting and said that graduates needed to be able to:

> Produce reports out of those packages. But I don't really need you to know how to do a journal entry or a cash receipt or a cash payment in the likes of Xero, because of course we're not doing them, we're just interrogating the data. So, being able to produce reports and maybe from a report being able to drill down to some of that information inside of the report.

7P stated a different emphasis: they wanted graduates to be able to process transactions and have:

> at least the ability to do data entry for sales and purchases, both on a cash and accruals basis of accounting, and to be able to reconcile a bank account and to be able to print out the generic reports and do the reconciliations [bank, debtors and creditors].

The two different types of competency required by accounting graduates in using software are also seen in different studies. A survey of predominately public accountant employers found they required moderate levels of proficiency in using accounting packages to create reports (Winstead & Wenger, 2015). In contrast, Spraakman et al.'s (2015) study found employers of management accountants want graduates to have intermediate competency in using accounting software to be able to process transactions. G. Pan and Seow (2016) went further noting that 'Accountants are expected to know not only how to use basic accounting software to manage data, but also have a solid understanding of critical technological components that drive information systems' (p. 168).

Several employers spoke of graduates learning to use the accounting software 'on the job', so they did not require detailed knowledge of accounting software. 8P explained:

> I prefer graduate staff members to be wanting to give things a go and be happy to look and explore and click on the menu items and see what they do and try to work it out, as opposed to following a strict step-by-step process … What I'm looking for is that problem-solving skill of how they can find something new and work out what the end result needs to be.

11P was more concerned with knowledge than skills. They wanted exposure to several accounting packages so graduates could have an understanding that different software is 'actually doing the same thing'; however, they 'just all look different'. This was preferred to 'knowing how to use a system'. Howieson et al. (2014) found a strong expectation

across all employers that graduates had developed 'basic practical accounting skills such as bookkeeping and [they had] familiarity with … [at] least one electronic bookkeeping system' (p. 268).

Regarding RQ3 (Table 2, Column 4) generally, employers found that graduates had adequate skills in using accounting software, although a few described graduates' exposure to accounting software as insufficient. A further issue that came to light when discussing accounting software was the need for a good understanding of debits and credits so that when they are using accounting software, graduates can envision what it should 'look like when it comes out the other end' (18I). 22G elaborated:

> They just don't understand how to unpack those debits and credits really quickly and say, 'Well, if it impacts that, the other side's got to impact this, that means that, that impacts that.' … while you might get rid of the repetitive, low, mundane tasks, there still has got to be that core concept there, of understanding why and how it's actually doing it.

7P and 12P expressed similar sentiments about graduates' lack of understanding of accounts underneath the software with 7P adding that graduates 'don't understand how business works'. 19G added there was a need for a system's view which entails understanding a process and how 'it fits into the broader picture'. Furthermore, 12P believed that the current graduates had a lesser 'understanding of debits and credits' than prior graduates. This lack of knowledge limited graduates' ability to 'properly do data analytics, … pinpoint the problems and also recommend improvements' (7P). 11P emphasised 'if you want to be an accountant or an advisor … you need to understand what's happening behind the scenes of any interfacing program… you still need those fundamentals'. 10P had 'no problems' with graduates use of accounting software.

Comments received from Winstead and Wenger's (2015) survey revealed employers' concerns about weaknesses in the fundamentals of accounting. 18I presented the dominant contrasting view, which described graduates' skills as 'sufficient' in 'understanding how that ERP's [Enterprise Resource Planning] working in the background and understanding subsidiary ledgers versus control ledgers'. Employers observed that the rapidly changing technology environment was reducing opportunities for graduates to spend time doing bookkeeping in the first few months of their position. In the past, such work would have helped them build a solid understanding of accounting fundamentals. Accounting students perceived they had moderate levels of proficiency in using accounting software (Strong & Portz, 2015).

The competency components were discerned as the employers discussed accounting software. Graduates require knowledge of the functions of accounting software. Having a knowledge of debits and credits and how data flows through accounting software is needed to be able to identify errors in output. Employers were divided regarding whether graduates needed skills in using accounting software for reporting or using accounting software to process transactions. As graduates would have on-the-job training in accounting software, especially when they are required to use packages for large organisations, they need an attitude of willingness to learn and explore so they are able to gain further skill in using accounting software.

Table 2 *Accounting software*

Extent of use by graduates (1)	Level of competency required (2)	Specific competency required (3)	Proficiency of graduates' skills (4)
In public practice there's a fair chance that they could be exposed to any accounting package (5P). They'll use predominantly Excel and then ERP accounting packages (18I).	A good working knowledge of accounting software (14P). If you can get your head around a particular package, it's a good foundation to then learn other packages as well (13P). We don't necessarily expect proficiency in a software program (2P). If they were at least familiar with it (11P).	An ability to look or produce reports (12P). [It is] more about reporting and checking whether or not that reporting is correct (2P). Had opened it and entered a couple of transactions and done a bank rec[onciliation] (11P). Most of the knowledge that they will gain … to use Oracle, they'll get on the job (17I).	*Dominant view* The last three we hired, two of them were good at it (12P). We've got no problems (10P). I think it's fine (18I). People coming out of university now are far advanced to the people that actually work here (15N). *Alternate view* [A]ctually less than we expected (11P). Fifty, fifty (8P).

Microsoft Outlook

In answer to RQ1, Table 3, Column 1 shows that skills in Outlook were described as 'a given' by the respondents. In Uwizeyemungu et al.'s (2020) study of job advertisements for accountants, email skills appeared in only a small number of advertisements which may also indicate they are 'a given'. Rai's (2012) research ranked email and communication as the essential ICT skills for accountants. Spraakman et al. (2015) also noted a need for Outlook.

In terms of RQ2, Table 3, Columns 2 and 3 show that basic skills were required. 8P outlines competency such as knowing 'how to open an email, send an email, view their calendar, add things to the calendars … [and] view and share others' [calendars]' add attachments, [and] save attachments'. Additionally, graduates should be able to set up subfolders so they can manage their inbox and workflow (17I). Management accounting graduates were expected to have intermediate competency in Outlook (Spraakman et al., 2015).

Regarding the level of graduates' competency (RQ3), there was consensus that graduates were capable of using Outlook. 13P pointed out, 'There's a lot of efficiencies that can be gained from a really strong understanding of Outlook and it's probably not something we see a lot of graduates have a strong understanding.' A study of accounting students found them rating their competency in using emails as the highest ICT competency among 36 items (Strong & Portz, 2015).

The competency components of knowledge and skill were identified with regard to the use of Outlook. Graduates required knowledge of Outlook and its functions and skills in setting up folders and filtering as well as using Outlook efficiently. Given that graduates were generally capable in the use of Outlook, aspects of attitude did not arise.

Table 3 *Microsoft Outlook*

Extent of use by graduates (1)	Level of competency required (2)	Specific competency required (3)	Proficiency of graduates' skills (4)
A given (5P and 7P).	The base skills, Email skills and your diary, et cetera (16N).	Filtering, organising meetings and using a calendar (18I).	Very proficient at Outlook (15N). [They have] been growing up with emails (8P).

Microsoft Word

Most of the employers remarked that graduates used Word extensively (RQ1, Table 4, Column 1), with 13P emphasising that skills in using Word were 'definitely an expectation'. Spraakman et al.'s (2015) study observed the use of Word for report writing. Lee, Kerler et al.'s (2018) study found that Adobe Acrobat was regarded as the second most important software/tool for new accounting employees. None of the employers in the current study made mention of Adobe Acrobat when discussing software used by graduates. A study of Canadian accounting job advertisements identified only one advertisement out of 171 mentioning 'document processing software' (Uwizeyemungu et al., 2020, p. 119). According to a small group of the employers, graduates were not required to use Word extensively. The two industry employers did not put an emphasis on the use of Word.

Regarding RQ2 (Table 4, Columns 2 and 3) employers wanted a basic to intermediate competency in Word. The essential skills employers emphasised regarding Word centred on formatting. A number of employers commented that their firms provided templates, so a detailed knowledge of Word was not required. 9P was concerned with 'attention to detail and going through to make sure it's all consistent, and it's all the same size and it's all aligned correctly'. 12P wanted graduates to 'know how to use templates and not break them'. However, there were administration 'teams that can help with that, so they tend to get lazy' (14P). 7P outlined competency in Word as being able to 'make a document look

appealing'. While most employers spoke of basic to intermediate Word skills, however, 14P, stated graduates 'need to have strong Word … skills'. A study of management accounting employers found they wanted graduates to have intermediate skills in Word (Spraakman et al., 2015).

Many employers were satisfied with graduates' Word skills (RQ3, Table 4, Column 4). Similarly, C. G. Jones (2011) noted that employers were satisfied with graduates' ability to use word processing. Accounting students rated their own competency in word processing as high. It was deemed to be the third most highly rated competency from a list of 36 items (Strong & Portz, 2015). In the current study, a small number of employers commented on the lack of Word skills. 10P observed:

> This is where they're a little bit lacking ... basic things like … making a page break … they just press return until the words go on to the next page … Setting up tabs, they just keep pressing the tab button until they get it to line up with what they want, rather than putting their own tab up on the ruler. Yeah, so some of the basic use of Word they don't seem to understand how to do at all.

7P had noted a 'lot of them lack formatting capability'. This issue may stem from not approaching the work from a 'general business understanding' and thinking how report will 'end up in the client's hands' and how the client might respond to the report. Furthermore, 14P expressed concerns about 'headings, … subtitles, … automatic formatting of the contents, table of contents, headers and footers, [and] page numbering'.

In relation to the competency elements, a moderate level of knowledge was required about Word as many organisations use templates and some have administrative staff that could assist with documents. However, skill was needed in regard to using templates effectively and having appropriate formatting. A client focused attitude was needed so that client needs were considered when preparing their documents.

Table 4 *Microsoft Word*

Extent of use by graduates (1)	Level of competency required (2)	Specific competency required (3)	Proficiency of graduates' skills (4)
Dominant view Word is used extensively (19G). We just have to use it all the time (21G). Write lots of letters (10P). *Alternate view* We don't do a lot in Word (18I). We don't really do much in Word (17I) Least used package (16N).	Not in a complex matter (19G). In terms of what we do, we don't need to do anything fancy (17I). A pretty fundamental use of Word (19G). A basic understanding if not an intermediate understanding of Word (13P). I'd say intermediate (22G). Being able to do the basic stuff (8P).	How to format Word so that you can have it in a nice simple, clear format but with maybe headings and … subtitles and then an automatic formatting of the contents, table of contents, headers and footers, page numbering (14P). It's not really a big deal. We have our templates … and styles guides (15N). Primarily around setting up tables, formatting (22G). Formatting. So, being able to work with margins … Being able to change the fonts, colours, sizes (8P).	*Dominant view* No problems with [the use of] … Word to a proficient standard (11P). Fine (22G). [Have you been happy with their skills in using Word?] Yes, yes (8P). *Alternate view* It'd be great if they had better Word skills. It's probably a pretty big weakness (14P).

The Internet

Several employers had specific comments to make about searching on the internet (RQ1, Table 5, Column 1). 14P stated that graduates 'need to know how to research on the internet'. Rai's (2012) study found internet searching to be the seventh most important ICT skill for accounting graduates (from a list of 30 ICT skills). It has been stated that 'Accessing the Internet is now a generic skill, such as reading, writing and basic mathematics' (Spraakman et al., 2015, p. 418). It may be a 'taken for granted' competency as, in Uwizeyemungu et al.'s (2020) study of job advertisements for accountants, Internet skills appeared in only a handful of advertisements.

Regarding competency required in internet searching (RQ 2, Table 5, Columns 2 and 3) 15N commented that graduates were required to 'navigate through websites and research and different things on the internet'. While employers were generally satisfied with competency in internet searching (RQ3, Table 5, Column 4), nevertheless, 20G expressed concerns that graduates needed to refine their internet skills:

> Graduates know how to use Google … I will argue that they do have an issue in knowing the terminology and tricks in Google. So, subtract to remove keywords from searches, plus to add things, putting things in quotation marks to ensure you've got a string match and things like that. Doing semi-colon, full stop, or if you want to only search Australian domains … Those types of tips and tricks they don't seem to know. So, I find at times if they are searching for things, they will be searching, but they won't necessarily be getting the results.

In Strong and Portz's (2015) study of accounting students' perceptions of their ICT competency, they rated their expertise in internet searching highly.

Regarding the competency elements for internet research, it appears that general knowledge of search functions needs to be supplemented with skill in refining searches to locate the appropriate information. Employers did not specify elements of attitude required for successful internet research; however, it is suggested that perseverance needs to be combined with skill and knowledge.

Table 5 *The Internet*

Extent of use by graduates (1)	Level of competency required (2)	Specific competency required (3)	Proficiency of graduates' skills (4)
Commonly used.	Find required information.	Know how to research on the internet (14P). Navigate through websites and research and different things on the internet (15N).	*Dominant view* Most of them know how to do that (12P). They have got that (15N). *Alternate view* They do have an issue in knowing the terminology and tricks in Google [for searching effectively] (20G).

Microsoft PowerPoint

Responses to RQ1 (Table 6, Column 1) regarding the use of PowerPoint were surprising as the majority of employers did not frequently use PowerPoint. For instance, 14P stated it was used 'from time to time'. L. Lee et al. (2018) emphasised the importance of PowerPoint skills, including them in the top four ICT skills required of graduates, noting that such skills become more important as one progresses in their career. Only two employers spoke of heavy use of PowerPoint. The level of competency required (RQ2, Table 6, Columns 2 and 3) was 'a basic understanding' (13P) as there were online resources 'to get them up to speed if required.' The use of templates simplified the use of PowerPoint. 18I stated, 'There's generally a template that's been set up already for whatever we want to use it for.' 17I added, 'We tend to find a PowerPoint that's been used before and delete the data out of that and use the bones.' In Spraakman et al.'s study (2015) employers required intermediate competency in PowerPoint.

Graduates' competency in using PowerPoint (RQ3, Table 6, Column 4) can be seen in 17I's comments, 'We haven't noticed any issues with people using that.' Accounting students rated their competency in presentation software as their fourth highest ICT competency from a list of 36 items (Strong & Portz, 2015).

Regarding the competency elements for using PowerPoint, like competency with Word basic knowledge was required together with skill in adapting previously used PowerPoints or using templates. Elements of attitude were not expressed given the low level of PowerPoint usage.

Table 6 *Microsoft PowerPoint*

Extent of use by graduates (1)	Level of competency required (2)	Specific competency required (3)	Proficiency of graduates' skills (4)
Dominant view PowerPoint [is used] from time to time (14P). There'd be no pressure on them to use PowerPoint (15N). Probably not a great deal (17I). PowerPoint [is] not [used] so much (21G). *Alternate view* We do a lot of it (9P). We do a lot of presentations (22G).	A basic understanding (13P). Have an awareness of … PowerPoint (8P).	Using templates.	We haven't noticed any issues (17I). I've been happy with the way they've been able to do what was needed (8P).

Other competencies

In discussing the various software used by the accounting graduates the employers mentioned other aspects of competency that went across several areas of ICT or were tangential to ICT competency. The employers had a desire for graduates who were computer savvy and this was summed up by 14P, 'They just need to have a very strong familiarity with software and computers. In terms of, they feel comfortable using it … So, their ability to quickly learn technology … That's probably the key.' 5P observed there was a need to learn 'a lot more programs very quickly' compared to the past pace of learning. Learning to use new software has been deemed essential for employees (Janvrin & Weidenmier Watson, 2017).

There is a growing interest in big data (Sledgianowski et al., 2017) and it is suggested that the rise of big data will have a significant impact on accounting (Warren Jr et al., 2015). Several employers mentioned the need for graduates to have exposure to data analytics. 19G stated, 'the accounting graduate of the future will be more doing the analysing than the collating'. 9P suggested, 'There would be benefits if universities had a module that addressed maths skills for data analytics and also considered future proofing regarding artificial intelligence.' Additionally, 9P described the 'number one skill' as being 'comfortable with data sets and … being able to analyse them quickly and

efficiently and notice anomalies'. In L. Lee et al.'s (2018) study employers also mentioned their desire for competency in analytics. While Dzuranin et al.'s (2018) study suggested the use of specific audit analytic software and data visualisation packages, the employers in the present study did not recommend any particular software for these purposes.

Employers stressed the importance of being able to identify something incorrect. 4P gave an example of a graduate that could not explain the reasoning behind a particular accounting number. 2P commented, 'there's not a sensibility or awareness' of the expected numbers before those numbers are relied upon. 20G expressed the need, 'to be able to interpret what is true and what is not, to be able to evaluate the truth of the information you have retrieved and then … implement it'. 5P also mentioned adaptability and a sense of something being wrong: 'I guess – it's the ability to adapt. It's the ability to assess whether something's reasonable or not … when you can understand the accounting concepts and principles that are set behind it.' Such ability was linked to 'an understanding of some basic levels of business' (16N). A survey contrasting the views of public accountant employers and academics found both groups expected proficiency in 'understanding business cycles in an electronic environment', with academics placing a greater emphasis on the proficiency than employers (Winstead & Wenger, 2015, p. 18). Both groups also required proficiency in 'the ability to comprehend business needs and envision ongoing business problems'; however, this was at a slightly greater level than 'understanding business cycles in an electronic environment' (Winstead & Wenger, 2015, p. 18).

Many employers provided valuable insights into both generic and technical skills that would help graduates to be equipped for the workplace. Communication and problem-solving competency were common refrains in the current study and in prior research (Almeida & Fernando, 2017; Bunney et al., 2015; Chaffer & Webb, 2017). Sometimes they were linked together; for instance, 14P emphasised the 'need to be able to problem-solve and communicate'. 5P spoke of the need for 'well-rounded' graduates:

> [W]ho can talk to people, communicate with them, engage with them, work out what they need, work out what their problems are that need solving and build a path for them to solve their problems.

22G gave greater weight to communication than technical competency stating that while the Microsoft Office suite was a tool, they had concerns about, 'how you use it and how you can communicate it … If you had two graduates that came out and one could communicate, and one had better skills, I'd take the communication skills every time'. In terms of written communication 'attention to detail' was vital as P9 remarked on ensuring consistent fonts and alignment noting, 'It's the final 2% that makes it.'

The link between communication and ICT skills can be seen in the following quotes:

> Communication [is about] being able to present … concisely, whether it be data visualisation through graphs or … around data analytics … You're actually going in and analysing data to gain insights (19G).

> The skill isn't so much the technical ability to punch numbers into a spreadsheet; it's how to think about what an output looks like and will the output actually achieve what you're trying to achieve (22G).

ACCA (2016) similarly suggests that technology is changing the expectations placed on accountants and they must be able to 'look beyond the numbers', to interpret, explain and provide insights' (p. 10). Likewise, Birt et al. (2018, p. 14) state that, while technical proficiency was required, graduates 'must be able to infer the meanings of data and be able to correctly understand what the data are telling them about the business'.

Employers spoke of critical thinking and analysis skills that went beyond using software. 7P spoke of the need for 'a huge problem-solving strength'. 8P rated problem-solving more highly than 'the actual knowledge of the application'. These findings of the current study are at odds with those of Bui and Porter (2010) who found academics had higher expectations than employers about the independent thinking and problem-solving skills required of accounting graduates.

R. Jones (2014) declared that 'establishing professional credibility with colleagues and clients is a vital part of the transition process for new entrants into the accountancy profession' (p. 539). Similarly, employers in the current study wanted graduates 'with a greater propensity for people skills' (8P). 9P stated that they would like to see graduates who were 'comfortable' in interactions with clients to get their point across and 'be assertive enough but not too assertive that you're aggressive'. 20G echoed similar sentiments and would like to see competency in writing 'without upsetting people'. 21G did not believe staff were prepared to deal with 'confronting or conflicting conversations'. They described 'people skills' as 'very critical' due to the need to 'build a trusting relationship with your client because you're providing them with essential life changing advice or services'. 12P emphasised that 'being able to interact with stakeholders' was a key skill required of graduates. P5 noted that 'clients are getting savvier all the time because there's a lot of stuff that they can do' so because of automation and outsourcing an accountant needs to be 'well-rounded' and able to 'talk to people, communicate with them, engage with them, work out what they need [to] work out what their problems are that need solving and build a path for them to solve their problems'.

The issues of automation and outsourcing were also identified. P6 added that because 'everything can be done online there's less and less need for [routine accounting work] … because people can do their own tax returns and the software does a lot'. P14 said 'software will do more and more'. Accounting firms are embracing outsourcing (Chaplin, 2017). Rebele and Pierre (2019) further observe that outsourcing along with the technology advancements is significantly influencing the workplaces of accounting graduates. 14P voiced similar concerns, stating that graduates need to:

> be aware … [that] they're competing on a world basis … a lot of accounting practices have offices based in India or the Philippines or those types of areas. So, you're recruiting a graduate who is competing with a like person who has graduated, say, from a Philippines University, trained in accounting, has a similar type of degree. Sometimes they may have even gone to Australian

universities, and are costing one fifth of the price of a graduate here and will pump out and work hard because they have different values over there too.

Many of the employers mentioned attitudes that would help ensure graduates' success. 8P stated that 'technical skills rate a little bit lower because we can teach technical skills'. 8P wanted graduates 'who can go and get something done' and who were 'willing to stretch beyond the comfort zone'. 11P was looking for 'enthusiasm and excitement' to work in their chosen field. 19G made mention of belonging to 'a values-based organisation' and wanting to 'get the right match of people with the values'. If someone had 'the drive and desire and ambition' it was possible to 'get their skills up to speed'. Similarly, 22G said, 'you're looking for smart people and engaging people … If they've got the right attitude, that's what you're looking for. The other stuff [technical competency] you can teach'. 7P was concerned about graduates' willingness to learn. He said there were 'lots of battles in terms of trying to get young people to have a depth of knowledge on anything and have the patience to actually learn a topic thoroughly and learn it well'.

The three elements of competency appeared in the employers' discussions regarding other competencies. Knowledge was required of business as this could be used for developing skills in interpreting data and identifying errors and abnormalities in data. Solid ICT skills provided graduates with an enhanced framework for problem-solving. 7P provided a counterpoint that graduates' knowledge did not necessarily translate into skills. They observed that graduates and those who had recently completed professional accounting exams had the 'ability to pass an exam' but it did 'not relate to their ability to actually do the content in any practical sense'. Skills were needed in communication to be able to provide information that met clients' needs.

A number of aspects of attitude were identified in the other competencies mentioned by employers. The term being 'comfortable' was used by several employers. Graduates needed to feel comfortable about numbers, using data sets, accounting concepts, technology and learning new software. Graduates also needed to be comfortable interacting with clients and have confidence to communicate their point of view. Adaptability was another key attitude.

ICT skill deficiencies that accounting educators need to address

This section addresses RQ4. Educators cannot rest on their laurels. 8P states, 'as IT changes and evolves there'll be far more knowledge, skills required in that regard in things we haven't even thought of yet'. E14 comments that universities need to focus on 'teaching people that can adapt and can problem-solve and interpret data'.

This study lends support to the benefits of integrating ICT skills throughout the accounting curriculum, rather than in standalone subjects. The timing of ICT competency development and the opportunities given for using software at multiple points during a program need to be considered by accounting educators. While employers of accounting graduates place a strong emphasis on the need for graduates to have well-developed ICT skills, nevertheless these skills need to be combined with a thorough knowledge of accounting principles and an understanding of business concepts. An awareness is needed

of how different software packages may be related. For instance, data is often imported to or exported from Excel.

Employers often perceive that graduates appear to lack the ability to analyse data to provide value-added information. At the same time skills in data analytics are required of accountants (Ballou et al., 2018). Graduates need to be able to break down data into meaningful components and think logically about the components.

Graduates often fail to identify errors and contradictions in outputs. When using accounting software, understanding how information flows through the accounting system is essential to evaluate the reasonableness of outputs. Such knowledge relies on appreciating the accounts that underlie the accounting software. Rebele and Pierre (2019) state that technical competence in accounting provides a foundation for students to think critically and effectively communicate about technical accounting issues. It is crucial for graduates to be skilled in not only using technology but in generating outputs that are understandable and useful to users. Graduates should be mindful to consider reporting through the eyes of users so that formatting is consistent and superfluous data are eliminated. Accounting graduates will benefit from being comfortable with technology and being willing to explore and self-learn various software features. ICT competencies need to be combined with communication and critical thinking skills so that graduates can produce meaningful reports.

Integrating knowledge, skills and attitudes to develop accounting graduates' ICT competencies requires careful planning. Graduates need knowledge of business practices and accounting fundamentals including debits and credits. They then need to be able to draw on this knowledge of the use of software to think logically about data and analyse it for expected outputs. Knowledge of software features needs to be supplemented by skills in using software. Skills are required in interacting with clients, communicating effectively, critical thinking and problem-solving. When graduates combine such skills with ICT competencies, they will increase their effectiveness. In workplaces characterised by continually changing technology, graduates' adaptability and the willingness to learn new technologies are vital elements for success.

Conclusion

This study goes beyond merely reviewing commentaries on the competencies required of accounting graduates due to changing technology (Bressler & Pence, 2019). It addresses the need for accounting educators to investigate technology used by businesses (Apostolou et al., 2019). Like R. Jones (2014) (whose interactions with a panel of employers enabled him to uncover subtle differences compared to the majority of the literature) this study's interviews also brought nuanced understandings. Employers did not limit their conversations to ICT in isolation, but instead spoke about other competencies required for using ICT successfully.

The key contribution of the study is the comprehensive insights into employers' expectations regarding accounting graduates' ICT competency. In light of the expanded ICT competencies outlined in IES 2 (IAESB, 2019), accounting educators around the globe are interested in up-to-date detailed information from employers regarding the ICT

competencies they expect of accounting graduates. The first research question identified the common software used by accounting graduates. Most employers stated that accounting graduates regularly use Microsoft Excel, Word and Outlook, accounting software and internet searching.

The second research question addressed the types of ICT competencies that employers expected of accounting graduates. Exploring ICT competencies through the dimensions of knowledge, skills and attitudes provided additional insights for educators and is a second contribution of the study. It was found that the importance of Excel competency for graduates, revealed by prior studies, has not waned (Dzuranin et al., 2018; Spraakman et al., 2015). In fact, it appears that employers require accounting graduates to have more than intermediate skills in using Excel. There is a growing demand for knowledge and skills in data visualisation using tools such as Excel's Power BI. Employers value graduates' ability to be able to think logically about data and turn it into concise, useful information. Some employers placed a greater emphasis on that competency than on Excel aptitude. Employers continue to require graduates to have exposure to accounting software. Alongside moderate skills in the use of accounting software, it is helpful for graduates to understand how input should flow through an accounting system. It is vital that graduates have a sound understanding of accounting fundamentals so that they are able to discern errors in output. Attitudes that will benefit accounting graduates in the workplace include flexibility, a willingness to learn new technologies and a client focus. Competencies in ICT combined with competencies in communication, critical thinking and problem-solving will assist in graduates' workplace success.

The answers to the study's third research question provide employers' insights regarding the extent of accounting graduates' ICT competencies. Employers' perceptions of the suitability of graduates' ICT competencies vary for most of the common software that is used by graduates. Rather than reporting average responses to survey questions, this study highlights that a significant portion of employers have concerns about graduates' ICT competencies for frequently used software, such as Excel, Word and other accounting applications. A further concern is that some graduates lack a solid understanding of accounting fundamentals, which prevents them from detecting obvious inaccuracies in accounting information.

The findings from the first three research questions were drawn on to answer the fourth question, which alerts accounting educators to the current shortfalls in accounting graduates' ICT competencies. Educators need to ensure that accounting graduates have a sound foundation of accounting knowledge and are able to build on this knowledge when using ICT tools. A willingness to learn new technologies is another critical competency. Students need to combine their accounting knowledge with business knowledge to think logically about data, recognise how transactions are processed by accounting software, identify inconsistencies and tailor outputs to user needs. To ensure that accounting graduates have well-developed ICT competencies, ICT needs to be integrated throughout the curriculum. The development of accounting students' ICT competencies needs to be linked to the requirement for them to possess critical thinking and problem-solving skills along with competency in communicating with users of accounting information.

There are a few limitations to this study. While there were several participants from industry, NFP and government organisations, more than half of the participants were from public practice. As there were only small groups of employers from government, industry and NFP organisations it was not possible to reasonably contrast the views between interviewees based on their organisation type. Future studies could investigate differences in employers' perspectives regarding the ICT competencies that are required of accounting graduates in different types of organisations and those performing financial and management accounting roles. From the demographics collected from participants, it could not be determined if firm size may have an impact on the findings. Some employers were from regional offices of national firms and the number of employees at the office of the interviewee was not provided. Future research might consider the influence of firm size on employers' requirements of the ICT competencies they required in accounting graduates. Given the rapid changes in technologies, another avenue for investigation could be employers' views of expected future changes in the workplaces of accounting graduates.

The current research focussed on employers' perspectives of what they required of graduates. Further research could interview recent accounting graduates about their perceptions of the ICT competencies they had obtained by the time they graduated. Graduates might also provide insights into the extent to which the ICT competencies gained at university prepared them for the workplace and areas where they wished they had greater competency. Given the identified graduate ICT competency deficiencies future studies could address how to best integrate such competency development into the curricula. The concerns expressed regarding technology enabled communication require further research to understand best business practices and how to foster competency in these practices.

To be successful in the rapidly changing technology environment requires graduates who are adaptable, comfortable with technology and who find it easy to learn new technology skills. A solid understanding of accounting fundamentals, basic business knowledge, critical thinking, problem-solving and communication skills are all crucial contributions to accounting graduates' successful careers. When well-developed ICT skills are added to these skills, graduates are in a strong position to generate meaningful information, analyse and interpret data and evaluate the reasonableness of data. Employers have higher expectations that graduates will be proficient in ICT when entering the workforce. Easing graduates into accounting employment through spending time on bookkeeping is a thing of the past. Employers are looking to accounting educators to provide work-ready graduates with solid skills and knowledge. This study will assist accounting educators as they continue to wrestle with developing accounting programmes that have the appropriate mix of technical and generic skills to prepare graduates for job readiness in an accounting career in these rapidly changing technological times.

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Appendix 1 Schedule of interviewees and their details

Code	Gender	Organisational activities	Sphere of responsibilities	Span of activities
1P*	Male	Public practice	Consulting and advising for an accounting professional body	National
2P*	Male	Public practice	Audit	National
3P*	Female	Public practice	Human resources	Big 4
4P*	Female	Public practice	Audit	National
5P	Male	Public practice	Audit and consulting	Regional
6P	Female	Public practice	Superannuation and taxation	Regional
7P	Male	Public practice	Business advisory	National
8P	Male	Public practice	Taxation	Regional
9P	Male	Public practice	Forensic	National
10P	Male	Public practice	Insolvency	National
11P	Female	Public practice	Accounting, taxation and consulting	National
12P	Male	Public practice	Insolvency	National
13P	Male	Public practice	Human resources	National
14P	Male	Public practice	Taxation	Regional
15N	Male	NFP	Corporate services	National
16N	Male	NFP	CFO	National
17I	Female	Industry	Financial accounting	National
18I	Male	Industry	CFO	Regional
19G	Male	Government	CFO	Local council
20G	Male	Government	Financial and management accounting	Higher Education
21G	Female	Government	Financial and management accounting	Higher Education
22G	Male	Government	Financial services	State government

*These interviewees participated in the focus group.