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Exploring perception of IT skills among Australian accountants: An alignment between importance and knowledge

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ABSTRACT

This paper investigates the alignment between the perceptions of information technology (IT) importance and knowledge levels among accountants in Australia. Data were collected from a survey of 165 accountants. The results indicate that accountants have a high IT knowledge in email and communication software, and electronic spreadsheets, while knowledge in systems development and programming tools is low. Overall, the IT knowledge levels among Australian accountants are lower than the perception towards the importance of these technologies. The greatest alignment between importance and knowledge is in accounting software. On the other hand, the biggest gap is in security management skills. Accountants perceive that IT security is very important to their roles; however, they view themselves as lacking knowledge in this area. The results of this study can be used as a guideline to further develop training programs to improve the relevant IT skills among accountants.

Keywords

Accounting, Information Systems, Australia, IT skills, IT importance, IT knowledge

INTRODUCTION

Since 1995, the International Federation of Accountants (IFAC), as a central professional accounting education body, has addressed the need for current practicing accountants to be proficiently educated with knowledge and skills in information technology (IT) (IFAC, 1995). The International Accounting Education Standards Board (IAESB) is an independent standard setting board affiliated to the IFAC, responsible for developing standards and guidelines on pre-qualification education, training, and continuing professional education and development for all members of the accountancy profession (IFAC, 2007). The IAESB acknowledges that professional accountants should maintain a level of professional IT knowledge and skills, which is required to ensure that their clients or employers receive competent professional services based on current developments in practice. They also recognize that growing expectations from the various stakeholders and clients currently requires professional accountants to offer a more specialized service and to operate in more complex IT related skill areas (IFAC, 2007). However, given such rapid growth in technology development, it is a challenge to assemble a specific list of IT skills that are relevant to the current roles of accountants (Greenstein and McKee, 2003). This may be due to the dynamic nature and broad spectrum of emerging technologies used within accounting practices, which may vary over time (Chang and Hwang, 2003; Gelinis and Gogan, 2006).

In response to the IFAC's guidelines, previous studies have identified the relevant IT skills for accountants by surveying their perception of *IT importance* in their career (Burnett, 2003; Chayeb, 2004; Beaman and Richardson, 2007). On the other hand, some researchers have surveyed the accountants' self-reported *IT knowledge* levels to identify the relevant skills (Van-Meer and Adams, 1996; McCourt-Larres and Oyelere, 1999). Studies that attempted to identify the alignment between IT importance and IT knowledge focus on the specific role of auditors (Greenstein and McKee, 2004; Janvrin et al, 2008; Ismail and Abidin, 2009). For example, Greenstein and McKee (2004) have conducted their studies on auditors in the United States (US) and Norway, and later have extended their study to Germany (Greenstein and McKee, 2008); while Ismail and Abidin (2009) found that Malaysian auditors report lower IT knowledge compared to their perceived IT importance.

In spite of the IT skills being required by the IFAC, to our knowledge, the alignment between the perceived importance of IT skills among accountants and their knowledge levels has been largely ignored, particularly in the Australian context. In responding to this knowledge gap, we seek to identify which IT skills are perceived as important to accountants and their knowledge levels of such technologies, in order to identify the gap between the IT importance and knowledge among accountants. Findings from this study are important, as they will help researchers, educators and practitioners to identify relevant IT skills enabling professional accountants to perform their tasks in the modern IT driven business environment.

The remainder of this paper is organized as follows. The next section presents a literature review relating to the IT skills that influence accounting professionals. Drawing upon prior literature, we identify relevant IT skills to be used in this study. The paper then discusses the research methodology, followed by the results of data analysis and the discussion section. Finally, the paper considers the limitations and future research.

LITERATURE REVIEW

The IFAC first released guidelines for areas of IT knowledge and competency development for accounting professionals in their International Education Guidelines 11 (IEG 11) titled Information Technology for Accountants in 1995. Since 1995, revised versions of the IEG 11 have been issued by the IFAC as recently as 2003, 2006 and 2007 (IFAC, 2003a; 2003b; 2006; 2007). The 2007 release of the Information Technology for Accountants guidelines includes five broad pre-qualification areas for IT knowledge and competencies. These consist of general knowledge of IT, IT control knowledge, IT control competencies, IT user competencies and one of a range of roles of the manager, evaluator or designer of information systems (IFAC, 2007). More specifically, within these board subject areas, accountants are required to have knowledge of IT strategy, IT architecture, management of IT, general systems concepts, transaction processing systems, software, physical hardware components of a system, data organization and access methods, IT security management, networks, data transfer, IT communication, IT internal control, project management and systems acquisition, development life cycle and implementation phases (IFAC, 2007).

Studies on IT skills of accountants in the 1980s to the early 1990s have focused on systems development and programming related areas. Wan and Choo (1988) surveyed the importance of 15 IT skills that were taught to accounting students in tertiary accounting courses. They found that accountants perceived systems initiation, design, implementation and control as the most necessary IT topics. Van Meer and Adams (1996) surveyed accountancy practitioners and educators in New Zealand, and identified the IT skills that should be included in accounting curriculum in New Zealand to include - systems analysis, design and development, IT applications, internal control, documentation, IT audit, spreadsheets, and basic hardware and software components. Moreover, McCourt-Larres and Oyelere (1999) pointed out the need for effective training of personal computing skills among accountants in Ireland. They found that accountants reported an increase in their IT knowledge levels after they have completed relevant training programs.

Studies in the 2000s have proposed additional IT skills to those identified in earlier literature, due to the growing complexity of IT development in businesses. Burnett (2003) conducted a survey of CPA (Certified Public Accountants) respondents in the US, to identify which skills were important for new accounting graduates and found that along with general office skills such as spreadsheets and word-processing, having skills in project management software, security management, e-commerce, network management and computer programming were essential to the roles of modern-day accountants. Interestingly, a study by Fordham (2005) pointed out the need to incorporate some highly technical skills considered useful for accountants. These skills include digital and wireless communication and internet security e.g. encryption tools and firewalls. Furthermore, Wessels (2005) addressed a need for South African universities to better incorporate IT topics into the accounting curriculum. He asserted that most of the core subjects in the accounting curriculum such as management and financial accounting are taught without any reference to the role of IT, and suggested a list of IT skills that are required by accountants in business automation, office management and audit automation skills.

More recent studies have primarily focused on identifying IT skills for auditors. One of the major studies in this area was conducted by Greenstein and McKee (2004). Drawing from IFAC's 2001 IT guidelines, they identified 36 IT skills and classified them into six categories, namely, general office, audit automation, databases, accounting applications, e-commerce and advanced technologies. They found that auditors reported the highest knowledge levels in the general office and accounting categories. Nevertheless, they asserted that more IT training programs for auditors should be encouraged. Later Greenstein-Prosch, McKee and Quick (2008) extended their study to auditors in the German context. They found that German auditors reported higher knowledge levels in the categories of network management and data transfer, while US auditors had higher knowledge of e-commerce and audit technologies. Interestingly, auditors in both countries were not different in their IT knowledge levels in general office and accounting applications.

Generally, previous studies have attempted to identify and address either the IT knowledge levels (Van-Meer and Adams, 1996; McCourt-Larres and Oyelere, 1999) or the importance of IT skills (Burnett, 2003; Chayeb, 2004; Beaman and Richardson, 2007) among accountants. Very few studies have attempted to map the alignment between IT knowledge and importance to the current accountants' roles. One such study was conducted by Ismail and Abidin (2009). Their results indicated that audit practitioners in Malaysia have perceived the highest knowledge in general office automation and accounting automation skills, while knowledge in audit automation, advanced and systems development skills were low. They also found that the overall IT knowledge levels of auditors were lower than the perceived importance of these skills in their careers.

Consequently, in order to fully understand which IT skills are required by modern accountants in Australia, it is essential to investigate both aspects of knowledge and importance. Identifying the gap between knowledge and importance will help researchers, educators and practitioners to understand any deficiencies in IT skills among Australian accountants. To achieve such objective, we identify the 30 relevant IT skills from the latest IFAC IT guidelines in 2007 and incorporate this with the findings on current IT skills from prior research (Greenstein and McKee, 2004; Wessels 2005; Ismail and Abidin, 2009). Importantly, these 30 IT skills were statistically tested using the factor analysis method. Results from rotated components analysis with Varimax rotation, in SPSS Version 16, influenced the grouping of the 30 IT skills into eight categories. These consist of: general office, data management, accounting applications, advanced automation, audit automation, systems development, network operation, and security management. Furthermore, the Cronbach alpha (CA) analysis, with the cut off value of 0.7 or greater, was used to confirm internal consistency. Due to the limited space available, the statistics results from the factor analysis are not presented herein. These eight categories and their 30 corresponding IT skills with their original sources of references are listed in Table 1 below, followed by the research methodology.

Table 1: IT skills classification

Category	IT skills	References
General office	Word processing	IFAC, 2007; Ismail and Abidin, 2009
	Electronic spreadsheets	Fordham, 2005; IFAC, 2007; Wessels, 2005
	Internet search and retrieval tools	IFAC, 2007, Ismail and Abidin, 2009
	Email and communication software	IFAC, 2007, Taylor and Murthy, 2009
Data management	Electronic databases	Greenstein and McKee, 2004; IFAC, 2007
	Data sharing and groupware tools	Greenstein and McKee, 2004; Ismail and Abidin, 2009
Accounting applications	Accounting software	IFAC 2007; Ismail and Abidin, 2009
	Tax software	Clovey and Oladipo, 2008; Ismail and Abidin, 2009
	Time management and billing tools	Wessels, 2005; Stimpson, 2007; Ismail and Abidin, 2009
Advanced automation	ERP system	Wessels, 2005; IFAC, 2007
	Electronic data interchange (EDI)	Ismail and Abidin, 2009
	Decision support and expert system	Ismail and Abidin, 2008; Wessels, 2005
Audit automation	Electronic working papers	Greenstein and McKee, 2004; Ismail and Abidin, 2008
	Audit software	Curtis et al, 2009; IFAC 2007; Ismail and Abidin, 2009
	Test data	Curtis et al, 2009; Janvrin et al, 2008; IFAC, 2007

Category	IT skills	References
Systems development	System development methodology	Fordham, 2005; IFAC, 2007
	Flowcharting and data modeling	Fordham, 2005; IFAC, 2007; Ismail and Abidin, 2009
	Simulation software	IFAC, 2007; Wessels, 2005
	Programming tools	Burnett, 2003; Ducrot et al, 2008
	Project management software	Burnett, 2003; IFAC, 2007
Network operation	Operating systems	IFAC, 2007; McCourt- Larres and Oyelere, 1999
	Client and server technologies	Fordham, 2005, IFAC, 2007; Wessels, 2005
	Digital and wireless technologies	Fordham, 2005; IFAC, 2007
	Network configurations	IFAC 2007; Ismail and Abidin, 2009
Security management	Anti-virus software	IFAC, 2007; Kumar et al, 2008; Wessels, 2005
	Encryption software	IFAC, 2007; Ismail and Abidin, 2009
	Firewall technologies	Fordham, 2005; IFAC 2007; Wessels, 2005
	User authentication systems	IFAC, 2007; Ismail and Abidin, 2009
	Backup and disaster recovery tools	IFAC, 2007; Kumar et al, 2008
	Intrusion detection tools	IFAC, 2007; Ismail and Abidin, 2009; Wessels, 2005

METHODOLOGY

This study adopts the quantitative survey method. Prior to the main data collection, a pre-test was carried out to ensure the reliability of the survey instrument. Nine accountants were engaged in the pre-testing process. Each was asked to provide feedback on the survey instrument in order to identify any ambiguous wording or expression. For the main data collection, participants were identified from a combination of yellow pages listings and online Australian company websites, as well as the Australian Stock Exchange listing and the BRW Top 100 companies listing for 2009. Accountants' contact details were then verified by visiting the company's official website for the latest and most accurate company postal address. Given that some online information may be outdated, phone calls were made to accountants prior to sending out the survey, where possible, to confirm both the respondents' employment status and their postal addresses for sending out the survey kit.

A total of 500 surveys were mailed directly to accountants during August to September 2009. The responses were returned anonymously. The response rate for accountants within this study was 33%. 165 valid surveys were included for analysis. Non-response bias analysis suggested that there were no significant differences between early and late respondents. Respondents were asked to rate their self-reported knowledge levels and perceived importance ratings for each of the 30 specified IT skills on a 5-point Likert scale ($1 = \text{No importance}$ to $5 = \text{very high importance}$; and $1 = \text{no knowledge}$ to $5 = \text{very high knowledge}$). SPSS Version 16 statistical software and Microsoft Excel were used for carrying out data analysis within this study. The results are presented in the following section.

ANALYSIS OF RESULTS

Demographic results

Table 2 below presents the demographical results. Of the 165 accountants that responded to the survey, the majority of (69.7%) were male, and (30.3%) female. A large proportion of the respondents were over the age of 50 years old (27.3%), followed by those aged between 40-49 years (21.2%), 30-39 years (18.8%), 25-29 years (18.8%) and 18-24 years (13.9%). The majority of accountants held, at a minimum, either a bachelor's degree (64.8%) or a master's degree (26.1%). A smaller minority also included those with either an HSC (High School Certificate) (4.2%) or a TAFE/Diploma (4.8%). 90.9% of respondents were engaged in full-time employment, while (4.8%) were part-time and (4.3%) casual/contractual staff. The average years of experience for all accountants within their accounting career roles were 14.5 years. The positions occupied

by accountants ranged from a graduate-entry accountant (8.5%), accountant (40%), accounting manager (21.2%), director (17.6%), partner (6.7%), financial controller (4.2%) and other (1.8%).

Of the surveyed accountants, (48.5%) were working in the tax field, with (19.4%) in the financial area, (6.7%) in audit, (8.5%) in the management accounting field, and (5.5%) in a combination of tax and financial domains. The remaining (11.5%) included accounting areas such as systems accounting, insolvency or a combination of tax, financial, audit and management areas. The majority of surveyed accountants were from small business with 1-20 employees (59.4%). The next biggest representation came from large businesses with over 201 employees (24.2%), with (16.4%) from medium-sized businesses with between 21-200 staff members. Accountants were largely employed within the financial services industry (78.8%). The government/public sector (5.5%), retail (5.5%), manufacturing (2.4%), and other (7.9%) industries also had small representations. Other industries included pharmaceutical, real estate, hospitality, telecommunications and transport companies.

Table 2: Practitioners' demographic information

	Practitioners' demographics	Number of respondents	Percent of total
<u>Gender</u>	Female	50	30.3%
	Male	115	69.7%
<u>Age</u>	18-24	23	13.9%
	25-29	31	18.8%
	30-39	31	18.8%
	40-49	35	21.2%
	50+	45	27.3%
<u>Highest level of education</u>	HSC	7	4.2%
	TAFE diploma	8	4.8%
	Bachelors	107	64.8%
	Masters or higher	43	26.1%
<u>Years of experience</u>	Average years of experience	14.5 years	
<u>Employment type</u>	Full-time	150	90.9%
	Part-time	8	4.8%
	Casual/contract	7	4.2%
<u>Accounting position</u>	Graduate/entry	14	8.5%
	Accountant	66	40%
	Accounting manager	35	21.2%
	Financial controller	7	4.2%
	Partner	11	6.7%
	Director	29	17.6%
	Other	3	1.8%
<u>Primary accounting area</u>	Financial	32	19.4%
	Management	14	8.5%
	Audit	11	6.7%
	Tax	80	48.5%
	Tax and financial	9	5.5%
	Other	19	11.5%

	Practitioners' demographics	Number of respondents	Percent of total
<u>Size of organization</u>	Large (201+)	40	24.2%
	Medium (21-200)	27	16.4%
	Small (1-20)	98	59.4%
<u>Type of industry</u>	Financial services	130	78.8%
	Government / public sector	9	5.5%
	Retail	9	5.5%
	Manufacturing	4	2.4%
	Other	13	7.9%

Perceptions of IT importance and knowledge

The survey questionnaire asked accountants to rate their perceptions of importance and their knowledge levels in each IT skills on a 5-point Likert scale. The mean values and the ranks of the 30 IT skills are shown in Table 2. The results indicate that the mean values of IT importance range from 2.321 to 4.715. Sixteen technologies have the mean values of IT importance above 4.00, indicating that these IT skills can be considered as relevant in the context of accounting work in Australia. These skills are email and 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.

In terms of IT knowledge, the mean values range between 1.976 and 4.303, which is relatively lower than the range for importance. In addition, only five technologies have mean values above 4.00. This implies that accountants only considered themselves highly knowledgeable in only five IT skills, which are email and communication software, electronic spreadsheets, internet search tools, tax software and accounting software.

In order to further explore the alignment between importance and knowledge, we adopt the matching approach using deviation score analysis proposed by Ismail and Abidin (2009). This measurement technique is derived from the theory of fit proposed by Venkatraman (1988). He suggests a method to measure the matching of two independent variables by using the deviation score analysis. Matching represents a correspondence between two independent variables, such that a high level of one variable corresponds with high or low variables of the other variable (Williams et al., 2007). Statistically, matching can be tested using deviation score analysis (Williams et al., 2007), with a lack of fit whenever there is an absolute difference between the standardized scores of two variables (Venkatraman, 1989). In other words, a larger mean difference between the standardized values of importance and knowledge indicates a higher degree of misalignment, whilst a smaller difference indicates a higher degree of alignment. The following equation is adopted from Ismail and Abidin (2009) to calculate the mean difference for each IT skill:

$$\text{Mean difference (Alignment)} = \frac{\text{Sum of absolute values of [IT importance ratings – IT knowledge ratings]}}{\text{[Number of responses]}}$$

Table 3 shows the mean difference values which indicate the alignment between importance and knowledge. It appears that the greatest mismatch is in firewall technologies, intrusion detection tools, backup and disaster recovery tools, user authentication system, encryption software, client and server technologies, and anti-virus software respectively. On the other hand, the best aligned items are accounting software, followed by Internet search tools and tax software. All individual items have statistically significant differences between importance and knowledge, with an exception of internet search tools, accounting software, and tax software.

Additionally, in order to illustrate the gap between importance and knowledge in each IT skills category, the average mean values for each category are presented in Figure 1. The general office category has the highest mean values for both importance and knowledge, while the lowest is the systems development category. The best alignment between importance and knowledge is in the accounting applications category, whilst the biggest gap is in the security management category, followed by the network operation. All categories have statistically significant differences between importance and

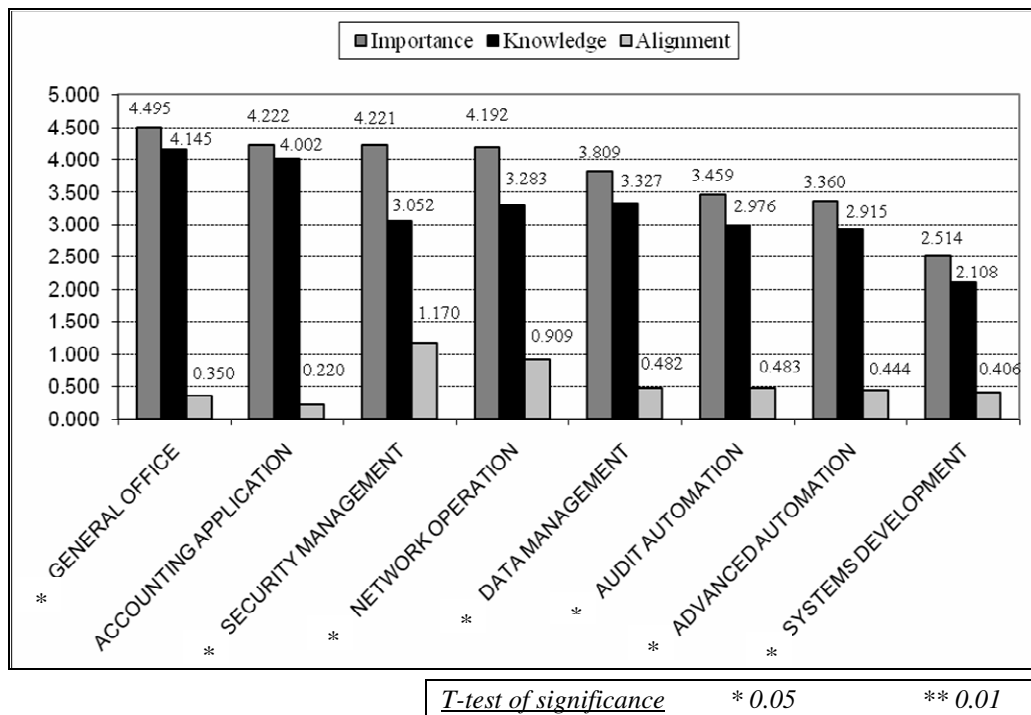
knowledge, with an exception of the accounting applications category, which has the least difference between importance and knowledge.

Table 3: Rankings and Ratings of IT importance and knowledge

Category	IT skills	Importance		Knowledge		Alignment
		Mean	Rank	Mean	Rank	Mean
General office	Email and communication	4.715	1 st	4.303	1 st	0.412*
	Electronic spreadsheets	4.679	2 nd	4.212	2 nd	0.467*
	Internet search tools	4.333	7 th	4.176	3 rd	0.158
	Word processing	4.255	9 th	3.891	6 th	0.364*
Accounting applications	Tax software	4.303	8 th	4.097	4 th	0.206
	Accounting software	4.212	12 th	4.067	5 th	0.145
	Time management and billing tools	4.152	13 th	3.842	7 th	0.309**
Security management	Anti-virus software	4.491	3 rd	3.479	9 th	1.012*
	Backup and disaster recovery tools	4.448	4 th	3.218	13 th	1.230*
	Firewall technologies	4.376	6 th	3.079	18 th	1.297*
	User authentication system	4.236	10 th	3.091	17 th	1.145*
	Intrusion detection tools	4.067	15 th	2.782	23 rd	1.285*
	Encryption software	3.709	20 th	2.661	25 th	1.048*
Network operation	Operating systems	4.412	5 th	3.612	8 th	0.800*
	Client server technologies	4.224	11 th	3.182	14 th	1.042*
	Network configurations	4.115	14 th	3.170	16 th	0.945*
	Wireless and digital technologies	4.018	16 th	3.170	15 th	0.848*
Data management	Data sharing and groupware tools	3.824	17 th	3.370	10 th	0.455*
	Electronic databases	3.794	18 th	3.285	12 th	0.509*
Audit automation	Electronic working papers	3.794	19 th	3.303	11 th	0.491*
	Audit software	3.412	21 st	2.879	22 nd	0.533*
	Test data	3.170	25 th	2.745	24 th	0.424*
Advanced automation	Electronic data interchange	3.388	22 nd	2.988	19 th	0.400*
	ERP system	3.382	23 rd	2.879	21 st	0.503*
	Decision support and expert system	3.309	24 th	2.879	20 th	0.430*
Systems development	Flowcharting and data modeling	2.636	26 th	2.218	26 th	0.418*
	Project management software	2.564	27 th	2.200	27 th	0.364**
	Simulation software	2.527	28 th	2.109	28 th	0.418*
	Systems development methodology	2.521	29 th	2.036	29 th	0.485*
	Programming tools	2.321	30 th	1.976	30 th	0.345**

T-test of significance * 0.05 ** 0.01

Figure 1: Bar chart of IT importance, knowledge and alignment for each IT skills category



DISCUSSION AND CONCLUSION

This study investigates the alignment between perceptions of IT importance and knowledge among accountants in Australia. We identify 30 relevant IT skills and classify them into eight categories, namely, general office, data management, accounting applications, advanced automation, audit automation, systems development, network operation and security management. In order to achieve the research aim, firstly, this study identifies IT skills that are perceived as important in accounting professions. Among sixteen IT skills that are rated as important by accountants, the top five skills are email and communication software, spreadsheets, anti-virus software, backup and disaster recovery tools and operating systems. In addition, most of IT important skills are in the general office, accounting applications and security management categories. Similarly, a study by Ismail and Abidin (2009) also found that auditors rank IT skills in general office and accounting applications in the top two categories of IT importance.

The second objective is to identify the level of IT knowledge among accountants. The top five areas where the accountants perceived themselves as having good knowledge are electronic spreadsheets, email and communication software, internet search tools, tax software, and accounting software. Similar to IT importance, the highest IT knowledge levels are shown in the general office and accounting applications categories. These findings are consistent with the findings by Greenstein and McKee (2005) and Ismail and Abidin’s (2009) studies albeit in the auditors’ context. Interestingly, earlier studies highlight that researchers and educators have placed considerable importance on system development and programming skills in the AIS curriculum (Wan and Choo, 1998; Van Meer and Adams 1996; Wessels, 2005). However, this study reveals that accountants possess the least knowledge in the system development category and view it as the least importance skill, particularly as it relates to programming tools. This may indicate a decline in demand for these skills among modern accountants, or a potential disengagement of accountants in the systems development process.

The third objective is to explore the gap between importance and knowledge among Australian accountants. As expected, we found that the best aligned IT skills are in the accounting applications, particularly the ability to use accounting software, followed by general office applications. Interestingly, the greatest mismatch between importance and knowledge is observed in the security management category. This may hint to a growing demand in IT security skills among accountants. These skills have become more important in the current accounting work environment. However accountants’ knowledge in this area is lacking. This finding is consistent with the views highlighted by the American Institute of Certified Public Accountants (AICPA). In 2009, the AICPA released its annual disclosure of the Top Ten most important Emerging Technology Initiatives for professional accountants, with information security management, privacy management and secure

data file storage as the top three initiatives (AICPA, 2009). This may indicate that rapid advances in emerging technologies, wireless and digital communications, networks and internet-based commerce has created some additional security risks to the accounting work environment. Thus, this could be the area that Australian accounting educators and industry professionals may consider in order to better incorporate IT security topics in academic AIS curricula and in professional training programs.

LIMITATIONS AND FUTURE RESEARCH

Findings from this research could be of significant interest to accounting standard boards and professional associations regulating the Australian accounting profession, academics designing university AIS courses, and accountants in the industry wishing to evaluate their own IT knowledge and perceptions. The study was conducted in the Australian context so caution should be considered regarding generalizing the results to other countries. In this research, effort was made to sample accountants employed in a wide range of industries and organizations. Consequently, a research focus on selected industries may serve to further contrast the findings of this study. Moreover, future research can aim to replicate the current study in a wider range of regional and national contexts.

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