

DIGITAL SKILLS REQUIREMENTS OF THE REAL ESTATE, FINANCE AND BUSINESS SERVICES SECTOR IN SOUTH AFRICA

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ABSTRACT

Purpose: Owing to the digital skills shortage in South Africa, this article ascertains the digital skills requirements of the Real Estate, Finance and Business Services sector in South Africa. The aim of this study is to understand which digital skills graduates are expected to possess when they enter this sector, as well as its level of importance of each digital skill. The Real Estate, Finance and Business Services sector has been South Africa's largest GDP contributor for the past several years, therefore this particular sector was selected for this study.

Methodology: A quantitative research approach was undertaken to survey 387 business professionals from the Real-Estate, Finance and Business Services sector in South Africa. The survey was conducted online via LinkedIn and participants acted in their individual capacity as business professionals, resulting in a response rate of 49 per cent.

Findings: Digital skills related to the use of software applications and Web tools, the use of information systems, and the application of security measures in digital environments were analysed using Principal Component Analysis. The findings revealed that this industry sector placed a great deal of importance on a graduate's ability to apply security measures in digital environments, particularly pertaining to Personal IT Security Skills.

Originality: This study will greatly assist South African higher education institutions with regard to curriculum development in the commerce disciplines, since most commerce students feed into the said sector. A curriculum that is better aligned to meet industry needs, will ensure that graduates are adequately prepared for this particular South African industry sector. A study of this nature is lacking in the South African context, which will greatly help South African higher education institutions to align their curricula to meet this sector's digital skills need.

Keywords: digital skills, software applications, Web tools, information systems, security measures, digital environments, South Africa, developing country

INTRODUCTION

Rapid technological advancements are the epitome of the 21st century, which compels corporate organisations to keep up with these advancements, so as to remain competitive in the digital economy. Such technological innovations create additional demands for tertiary institutions to ensure that their graduates meet the digital skills needs of industry, so that the economy can ultimately prosper. However, the job market is also fast changing and tertiary institutions generally do not have sufficient time to bridge the gap between their curriculum offerings and industry demands. In view of the fact that researchers consider digital skills with an equal level of importance as arithmetic or reading, it is therefore important to identify the digital skills required of graduates by the various industry sectors within a country (Gekara et al. 2017; Funes et al. 2018). Funes et al. (2018, 1) suggests that traditional digital skills are needed to appropriately use digital technologies, and the skill categories range from completely no skills to beyond novice skills, which are evaluated using five “competence areas (that is, information, communication, safety, problem-solving and content creation)”.

It is suggested that there is a vital need to sufficiently train graduates for the respective industry that each of them will eventually feed into, however, there is inadequate research that can act as a “blueprint” for tertiary institutions to update their curricula in a manner that will meet industry requirements (Aasheim, Li, and Williams 2019; Van Laar et al. 2017). Generating digitally skilled students with the competencies of the 21st century globalized trades and professions, is possible by embedding digital technologies within pedagogy and curriculum (Evangelinous, Holley, and Kerrigan 2016; Kivunja 2014). In addition, the high unemployment rates and skills shortage in developing countries, like South Africa, has created a major cause for concern for some of the country’s key stakeholders, such as government, industry and academia. For these reasons, it is important to understand the digital skills needs of industry, with the aim of creating a seamless alignment between industry needs and higher education offerings, potentially reducing unemployment rates and enhancing the economy. Graduates ought to be competent to utilise digital technologies and media in effective, safe and responsible ways, but this is often not the case as these competencies are habitually overlooked by leaders and educators, despite the fact that it is vital to one’s proficiency in utilising technology and surviving in the digital economy (Park 2016).

As a result, there is a need to research the digital skills needs of industry, in order to update the curriculum based on industry needs, so that graduates are prepared for the industry that they will feed into. The focus of the topic was narrowed down to explore only one industry sector in South Africa, that is the Real Estate, Finance and Business sector, because a subsequent article will investigate if the graduates of South Africa’s higher education institutions (HEIs) are

adequately prepared with the necessary digital skills for the Real Estate, Finance and Business sector in South Africa. This article aims to contribute to the curriculum development that is related specifically to the education of digital skills and presents pertinent findings concerning the digital skills gap.

RELATED LITERATURE

Digital technology has transformed the face of educational pedagogy, globally. Yet despite of its ever-increasing impact, there exists a digital skills gap that students' experience, which is developed by one's socioeconomic status. This is also known as the "second digital divide", which affects thousands of students worldwide, and can be defined as the division of people who can effectively employ ICT and those who cannot, and when viewed in isolation may be identified as digitally literate and illiterate (Scheerder, Van Deursen, and Van Dijk 2017). Digital systems and tools have invaluable benefits, particularly at tertiary level, hence industry utilises them to execute business engagements apart from its numerous other advantages. Much research has focused on the use of digital systems and tools in the health-care industry, forestry and in teaching and learning. However, there have been no studies that have investigated the digital skills requirements of graduates for any industry sector in South Africa, nor for a related industry sector abroad. In light of this, the related literature covers the use of pertinent digital technologies used in industry and the risks related to data breaches of organisations, which advocates the importance of security related digital skills.

Conventional digital tools, such as social networking and gaming are being employed progressively more in education, although not specifically designed to support scholars to cognitively participate in problem solving, collaborative knowledge construction or learning (Näykki et al. 2019). There are very few studies related to the digital skills requirements of industry, especially pertaining to this particular industry sector, therefore this section explores the digital skills that were found to be important to the said sector. Many researchers concur that digital skills are a fundamental skill, equivalence to the importance of mathematics, and digital skills are now required by a large number of industry sectors, worldwide. For this reason, it is important to study international reports and research, since there are very few local research papers to study. Such an undertaking reveals that digital skills is an essential competence needed to successfully compete in the digital/knowledge economy. Mills, Sanders, and Hussain (2018) surveyed 2,700 newsroom managers and journalists from 130 countries and discovered that many newsrooms were lacking in 23 core digital skills, which consist of digital photography, audience engagement on social media platforms, Web statistics and analytics usage, video editing and creation, and graphic design. Consequently, industry leaders have

worked together to address and resolve the abovementioned issues, and higher education institutions have generated reports and structured workshops that focused on integrating digital skills into their amended curriculum (Mills et al. 2018).

Industries are recognising the advantages of cloud computing and are consequently investing significantly into this exceptional business technique. Gartner Inc. (2019a) has predicted that public cloud services will increase globally from \$227.8 billion in 2019 to a total of \$266.4 billion in 2020. On account of subscription-based software's scalability feature, software as a service (SaaS) is still the largest market segment, and the 2020 projection was to grow to \$116 billion (Gartner Inc. 2019b). Infrastructure as a Service (IaaS)¹ is envisaged to rise by 24 per cent annually, which is the largest growth rate among all other market segments (Gartner Inc. 2019b). Such an expansion is attributed to the demands of current applications and workloads, which requires infrastructure that conventional data centres are not capable of supporting (Gartner Inc. 2019b). Cloud computing greatly changed the way that many organisations carry out business functions, especially during the COVID-19² epidemic, whereby employees are required to work from home. Cloud computing skills are invaluable to many occupations, hence graduates who have these digital skills may be more proficient at their job.

The Ministry of Education in Finland has emphasised that ICT skills, predominantly coding, is an essential element of the "Finnish curriculum (Finnish National Board of Education)" (Tuomi et al. 2018, 420). Tuomi et al. (2018) also elucidates that coding has become an obligatory school course at Finnish schools, together with the United Kingdom (UK) and Estonia schools. Coding can be recognised as a digital skill that should be mastered by every citizen, considering that it will be demanded increasingly more as future job requirements (Tuomi et al. 2018; Wilson and Moffat 2010). Moreover, coding may potentially heighten enhance creativity, self-confidence, and promote systematic thinking, which are important for the workplace (Kafai, Burke, and Resnick 2014).

Research advocates that coding courses have certain cognitive benefits. For example, Scherer, Siddiq, and Viveros (2018) discovered that students who were exposed to coding instruction scored higher marks than those students who lacked coding and other cognitive skills, such as creative thinking, mathematical skills, metacognition and reasoning. Additionally, Manches and Plowman (2017) confer the characteristics vis-à-vis early childhood coding: (1) coding is fundamental to ICT education; (2) ICT education is recognised as a vital component of learning; and (3) the increasing amount of tools currently to support the teaching and learning of coding structures. South Africa can adopt strategies used by first world countries, such as England whereby the ICT curriculum in schools commence from five years

of age for all their students (Manches and Plowman 2017). England has recognised the value of ICT education for their citizens, and anticipated a growth of their economy as a result of this endeavour.

Data breaches are a huge concern for many organisations and governments, since they spend enormous amounts of money to protect their data from hackers making it public, as the legal consequences of a data breach could cripple the organisation. Consequently, in many countries the governments and their business sector are increasingly focused on protecting their customer and citizen data, with the aim of developing a compliance structure (Chatterjee and Sokol 2019). Spanos and Angelis (2016) articulate that an information security breach is when hackers are successful in their attacks, via an information system, with the intention to destroy the integrity, availability, or confidentiality of a system. Conversely, Goode et al. (2017) suggests that the phrase “data breach” is more suitable since an organisation is cognisant of the data breach, but is typically unaware of the actual data breached when the breach is identified and investigated. Accordingly, a data breach could combine privacy information, and security breaches. They also clarify that a data breach is an electronically aided facility failure that follows once personal, confidential, consumer or financial data is accessed by individuals that are external to the organization.

Moreover, a major problem for numerous organisations is that their clients who are victims of a data breach usually cease the consumer relationship and they would rather not acquire products or services post a data breach. Constance et al. (2020) explains that data breaches are very costly to organisations affected, it is also ever more prevalent, and its repercussions go far beyond the breached organisations. Consequently, the far-reaching effects of data breaches occur in stock markets as well, due to irregular returns to supplier stocks, once data breaches were divulged to key customers. They also expound that the breach repercussions affect the organisation’s customers as well as their suppliers, since suppliers reduce their trade credit budget once breaches were disclosed. It also curbs particular associated investments concerning research and development (Constance et al. 2020). The risk of a security breach has been explained in detail to highlight the importance of cyber-security related digital skills. It is therefore essential for all graduates to be knowledgeable on how to prevent the different types of cyber-attacks.

The South African government has recognised the growing importance of digital skills to several industry sectors. It has long been recognised that modern industries are more likely to employ graduates who possess digital skills that are relevant to their sector. According to Ohei, Brink, and Abiodun (2019), the digital skills limitation possibly inhibits the growth of the South African economy, which would likely produce additional jobs. Consequently, the labour market

together with the present economic crisis in South Africa promotes graduate unemployment (Ohei et al. 2019). In light of this, e-learning and/or digital literacy courses are therefore essential to employability growth in South Africa. In 2007, the “Presidential International Advisory Council” placed the matter of digital skills on their agenda (Van Audenhove et al. 2018, 4). Van Audenhove et al. (2018) explains that the NeSPA policy classifies skills based in industry sectors or fields. Consequently, the researcher felt it appropriate to maintain a similar outlook with regard to the categorisation, therefore the digital skills outlined in this study pertains to the Real-Estate, Finance and Business Services sector, in South Africa. Although, some digital skills may intersect with other industry sectors.

RESEARCH METHODOLOGY

Including every industry sector in South Africa as part of this study, and would have vastly increased the magnitude of this study. The Real Estate, Finance and Business Services sector is considered an economic engine of South Africa, since it has largely contributed to South Africa’s economy when compared to other sectors (Statistics South Africa 2017). To date, this sector continues to be a major backbone of South Africa’s economy (Statistics South Africa 2017). Convenience sampling was the sampling technique used to survey 389 respondents from the Real Estate, Finance and Business Services sector. GoogleDocs was used to survey business professionals from the Real-Estate, Finance and Business Services sector in South Africa.

The questionnaire was an adaptation of the questionnaire employed by Chinien and Boutin (2011). It was necessary to update the construct items from their research instrument, because technology has considerably advanced since 2011. In addition, this study focuses on one of four constructs in their questionnaire, that is the Digital Technical Skills construct. The omission of the other constructs was necessary to achieve the main objective of this article. The questionnaire constituted three constructs, namely: “Use of Software Applications and Web Tools”, “Use of Information Systems”, and “Apply Security Measures in Digital Environments” (Civilcharran and Maharaj 2018). All items of the questionnaire were tested. The questionnaire was pre-tested for reliability and validity by academic professionals in the discipline of “Information Systems and Technology”, considering that they were suitable in providing insight into the digital skills items in the research instrument. Pre-testing was undertaken to guarantee that any inconsistencies and ambiguities were identified and rectified, prior to pilot testing.

Initial attempts to email business professionals’ by first acquiring email addresses from an online business directory turned out unsuccessful, since the response rate was 0.08 per cent. The email contained the ethical approval letter for the study, the informed consent form, as well

as a link to the GoogleDocs survey. Finally, the researcher decided to strategize by selecting business professionals from the aforementioned sector via LinkedIn. The process involved the profile of prospective candidates to establish the sub-sector that the respondent belonged to, namely: (1) Real Estate, (2) Finance, or (3) Business Services. Each respondent was first sent an introductory message with the aim of the study. The LinkedIn response rate was 49 per cent, evidently far higher than the email method. This technique proved highly successful, since many business professionals were extremely intrigued by the topic and was eager to know the findings. They also pointed out the value of this study to HEIs, and particularly to their industry sector. The participants completed the survey in their personal capacity as business professionals, therefore it was not necessary to submit gatekeeper's letters.

The quantitative data from the electronic survey was designed to be captured by the respondent via GoogleDocs, and was examined for accuracy and completeness. The data was then transferred from GoogleDocs into SPSS (version 25) to be statistically analysed.

FINDINGS

A total of 389 surveys were completed by the employees in the Real Estate, Finance and Business Services sector in South Africa. Figure 1 represents the gender distribution, almost two-thirds (63.2%, n=246) of the respondents were female, roughly one-third (36.0%, n=140) were male, while 0.8 per cent (n=3) preferred not to say.

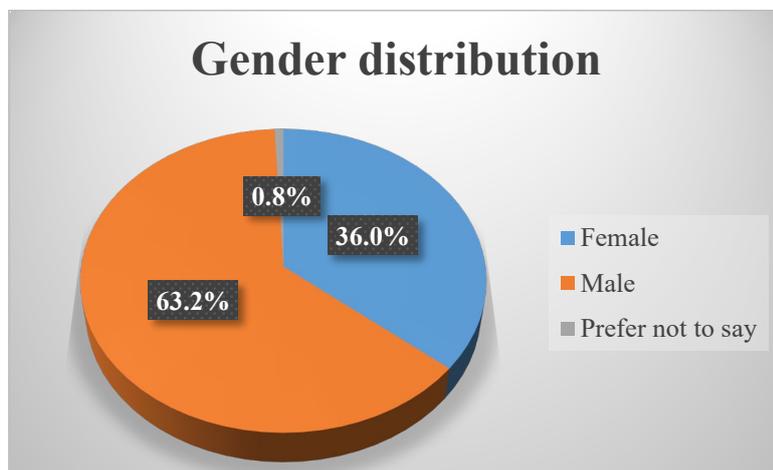


Figure 1: Gender Distribution of Respondents

Respondents were drawn from three subsectors across South Africa. The Business Services (52.4%, n=204) sector were largely represented, 41.4 per cent (n=161) represented the Finance sub-sector, and only 6.2 per cent (n=24) represented the Real-Estate sub-sector (see Figure 2). This finding was probably due to there being generally more individuals in the Business and

Finance sub-sectors, than there are in Real-Estate.

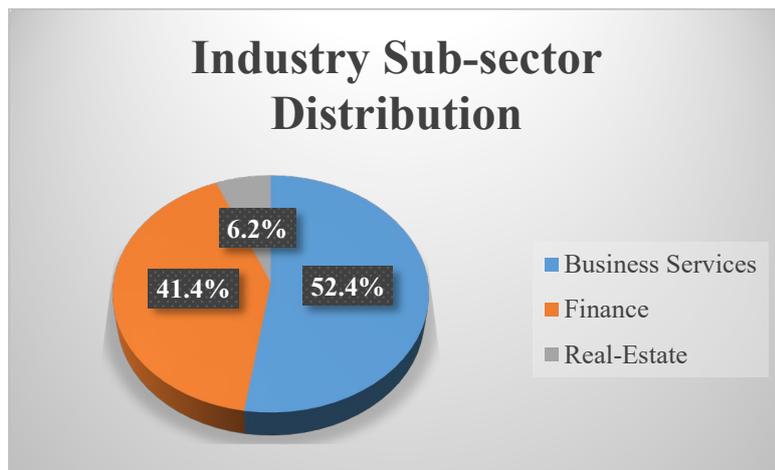


Figure 2: Industry Sub-Sector Distribution

The respondents were also asked to indicate their current qualifications, in order to establish a general idea of their digital literacy, and to ascertain their academic qualification. A total of 387 respondents answered this question. The bar graph in Figure 3 captures the distribution of the respondents by qualification. Honours was the main qualification with 30.2 per cent (n=117) of the respondents possessing an Honours degree.

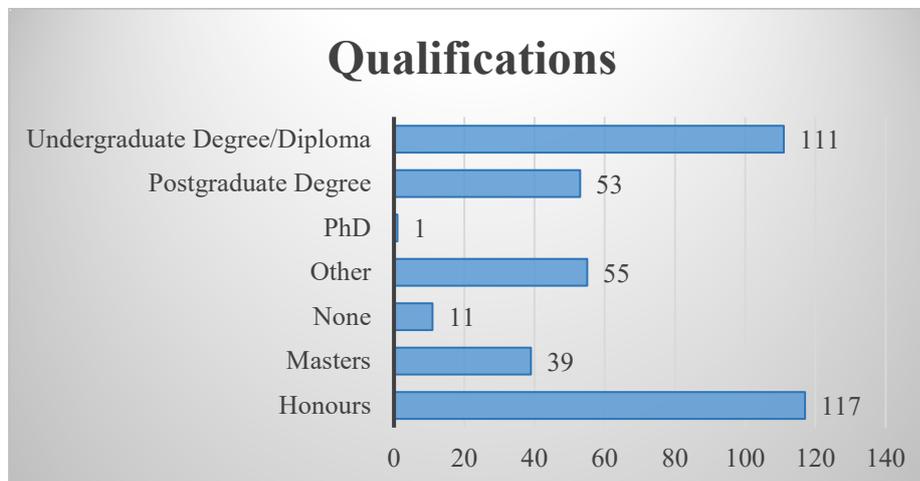


Figure 3: Level of Qualification

The online survey for phase one was sent out to all nine provinces in South Africa, in order to ensure that there was sufficient representation of respondents from all provinces. However, Figure 4 reveals that surveys were mostly completed by respondents in KwaZulu-Natal (47.3%) and Gauteng (39.8%), following the Western Cape (6.7%).

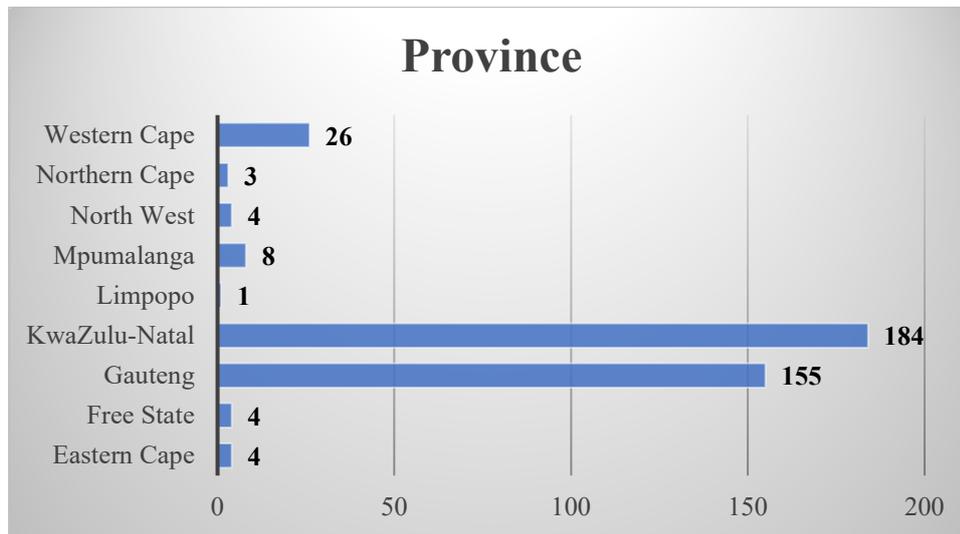


Figure 4: Province Distribution

The Monte Carlo Fisher's Exact Test gave a value of 22.683 with a corresponding p-value of 0.038 (Confidence Interval – CI 0.033-0.043). Therefore, there is a relationship between sector and qualification at a 5 per cent level of significance (see Table 1). This implies that the industry sector is associated with the qualification variable.

Table 1: Crosstab between Sub-sector and Qualification

		Qualification							Total
		Honours	Masters	None	Other	PhD	Postgraduate Degree	Undergraduate Degree/Diploma	
Business Services	Count	62	18	5	29	1	20	68	203
	% within Subsector	30.5%	8.9%	2.5%	14.3%	0.5%	9.9%	33.5%	100.0%
Finance	Count	51	18	4	19	0	32	36	160
	% within Subsector	31.9%	11.3%	2.5%	11.9%	0.0%	20.0%	22.5%	100.0%
Real-Estate	Count	4	3	2	7	0	1	7	24
	% within Subsector	16.7%	12.5%	8.3%	29.2%	0.0%	4.2%	29.2%	100.0%
Total	Count	117	39	11	55	1	53	111	387
	% within Subsector	30.2%	10.1%	2.8%	14.2%	0.3%	13.7%	28.7%	100.0%

USE OF SOFTWARE APPLICATIONS AND WEB TOOLS

Table 2 reveals the frequency distribution of the level of importance that the Real Estate, Finance and Business Services sector places on the graduates' ability to use software applications and web tools. Nwosu and Amahi (2019) also revealed that business employers and educators both agree that accounting software skills foster the proficiencies needed to make accounting students more employable and develop in their career paths. Pan et al. (2018) suggests that finding and retrieving data (i.e., basic data manipulation) is an invaluable

analytical skill, particularly for business students regardless of their majors. Comparatively, the use of a Database Management System (DBMS) for data management is considered less important. This implies that business students should be proficient in retrieving and manipulating data rather than to manage data.

Respondents were asked a series of questions related to the digital skills that graduates should possess upon entering their industry sector, that is: operating system, word processing, spreadsheet software and presentation skills. They predominantly answered that these skills are “very important” for their industry sector. When the two responses, “important” and “very important” on the Likert scale, were joined almost 80 per cent of the respondents point out that these are necessary skills. These findings are aligned to the findings by Gambo (2017) and Pan et al. (2018). These skills are considered important, since numerous job requirements demand such skills in order to carry out routine administrative functions.

Respondents then indicated that graduates should have the ability to use social media, as well as online collaboration tools, like Facebook. These skills were not as important as the operating systems and other skills discussed above, since not all businesses are using social media for customer relationship management and advertising. Many businesses also conduct business by means of provincial or national team efforts, therefore online collaboration tools are a skill that is considered significantly important. Social networks is a medium for networking and is a strategic skill used to increase business appeal (Shuen 2018). Moreover, social networks facilitate businesses outreach to a larger audience, and establishes healthier interactions with the project’s team (Shuen 2018).

Table 2: Use of software applications and Web tools

Graduates entering this sector should be able to:		Frequency Distribution						Descriptive	
		Not Important	Slightly Important	Moderately Important	Important	Very Important	% Important/ Very Important	Mean	Standard Dev
1. use a computer operating system, e.g., Windows 10	Count	1	3	25	75	285	92.6	4.65	0.660
	%	0.3	0.8	6.4	19.3	73.3			
2. use word processing software, e.g., Microsoft Word	Count	1	4	34	85	263	90.0	4.56	0.718
	%	0.3	1.0	8.8	22.0	68.0			
3. use audio and video software, e.g., Windows Movie Maker	Count	102	83	103	50	51	26.0	2.65	1.341
	%	26.2	21.3	26.5	12.9	13.1			
4. use spreadsheet software e.g., Microsoft Excel	Count	1	6	39	59	284	88.2	4.59	0.753
	%	0.3	1.5	10.0	15.2	73.0			
5. use presentation software, e.g., Microsoft PowerPoint	Count	3	19	57	101	209	79.7	4.27	0.937
		0.8	4.9	14.7	26.0	53.7			

Graduates entering this sector should be able to:		Frequency Distribution						Descriptive	
		Not Important	Slightly Important	Moderately Important	Important	Very Important	% Important/ Very Important	Mean	Standard Dev
6. use multimedia software, e.g., Windows Media Player	Count	75	90	98	63	63	32.4	2.87	1.342
	%	19.3	23.1	25.2	16.2	16.2			
7. use desktop publishing software, e.g., Microsoft Publisher	Count	80	88	102	66	53	30.6	2.80	1.315
	%	20.6	22.6	26.2	17.0	13.6			
8. use accounting software, e.g., QuickBooks	Count	73	65	91	79	80	41.0	3.07	1.396
	%	18.8	16.8	23.5	20.4	20.6			
9. use database software, e.g., Microsoft Access	Count	49	64	98	81	97	45.7	3.29	1.340
	%	12.6	16.5	25.2	20.8	24.9			
10. use data management software, e.g., IBM Analytics	Count	67	58	104	78	82	41.2	3.13	1.367
	%	17.2	14.9	26.7	20.1	21.1			
11. use software for analysing Big Data, e.g., software to predict customer behaviour	Count	63	55	93	84	94	45.8	3.23	1.386
	%	16.2	14.1	23.9	21.6	24.2			
12. use project management software, e.g., Microsoft Project	Count	55	72	88	97	77	44.7	3.18	1.328
	%	14.1	18.5	22.6	24.9	19.8			
13. use design software, e.g., Microsoft Visio	Count	94	53	74	86	82	43.2	3.02	1.474
	%	24.2	13.6	19.0	22.1	21.1			
14. use drawing and planning software, e.g., Corel Draw	Count	143	74	90	44	38	21.1	2.38	1.337
	%	36.8	19.0	23.1	11.3	9.8			
15. use custom-designed software, e.g., in-house software	Count	62	52	63	98	114	54.5	3.39	1.432
	%	15.9	13.4	16.2	25.2	29.3			
16. comply with legal copyright provisions	Count	21	23	40	89	214	78.3	4.17	1.165
	%	5.4	5.9	10.3	23.0	55.3			
17. use software applications to access information	Count	13	18	56	131	169	77.6	4.10	1.031
	%	3.4	4.7	14.5	33.9	43.7			
18. migrate to new software applications	Count	22	34	85	132	115	63.6	3.73	1.144
	%	5.7	8.8	21.9	34.0	29.6			
19. use social media and online collaboration tools, e.g., Facebook	Count	66	67	79	79	98	45.5	3.20	1.424
	%	17.0	17.2	20.3	20.3	25.2			
20. use Web 2.0 tools, e.g., Google/YouTube	Count	30	51	78	99	130	59.0	3.64	1.277
	%	7.7	13.1	20.1	25.5	33.5			
21. use of cloud computing applications, e.g., Google Docs	Count	27	36	76	110	139	64.2	3.77	1.225
	%	7.0	9.3	19.6	28.4	35.8			
22. critically evaluate software applications to determine its effectiveness in enhancing work performance	Count	36	37	85	109	122	59.4	3.63	1.269

While online collaboration tools and social media are both Web 2.0 tools, respondents signified that graduates should be dexterous in Web 2.0 tools, like Google/YouTube. However, their responses significantly varied from the results relating to collaboration tools and social media, which suggests that level of importance of the different Web 2.0 tools vary.

The skills relating to audio and video software, multimedia software, the and use of desktop publishing software revealed that these digital skills are not as important in this sector, but other industry sectors, it could well be an important skill. With regard to the use of multimedia software, this digital skill was one of the least important skills from all others in this study. Although this skill is largely considered moderately important, it is believed that with computer networking, multimedia training will greatly influence training and education domain (Wang and Wang 2018). Desktop publishing software is generally used to create documents that include typographic quality images, as well as graphical designs and text, like newspapers, magazines, books, and the like (Manuja and Duggal 2017). Although, desktop publishing software skills is regarded as moderately important by the majority of respondents, it is nevertheless needed by the said sector, therefore graduates should be familiar in this software. Desktop publishing can be valuable for the marketing and advertising of any organisation, so if an organisation is appropriately marketed, this could potentially enhance the organisation's revenue and subsequently the economy.

With regard to the use of project management, design and drawing software, 14.1 per cent of respondents feel that these digital skills are not important for graduates, while 18.5 per cent indicated it as slightly important, 22.6 per cent pointed out that it is moderately important, 24.9 per cent indicated that this skill is important and 19.8 per cent specified important. Project success is determined based on the objectives that are needed to be achieve, however attaining effective results is dependent to how businesses risks are managed (Kliem and Ludin 2019). Accordingly, project management software is fundamental to risk management, therefore it is essential for graduates to possess such skills. This sector's expectations of graduates regarding their ability to use design software is mainly considered important. On account of present global economic trends, Microsoft Visio and Microsoft Project is the predominant digital product design software (Wang 2016).

The graduates' ability to use drawing and planning software largely moderately important. Although, this skill is not predominantly regarded as a "must have" by this sector, broad-spectrum digital skills training should encompass such skills, to facilitate graduates' awareness of different drawing and planning software, to meet their future potential needs. Since, this skill is considered relatively important for certain occupations, a specialised program requiring these skills, such as architecture, should be offered for students in those fields. A graduate's ability to use custom-designed software was largely rated as very important. Organisations are realising the advantages of employing custom-designed software, which are designed to meet their business goals and objectives. Although companies spend hundreds and sometimes millions of rand on systems/ software development, it is necessary for graduates to be

conversant with using custom-designed software.

This sector needs graduates to comply with copyright provisions, as 55.3 per cent considered this skill as very important and 23.0 per cent rated it as important. Complying with copyright provisions is essential for an organisation's employees, as failure to comply will possibly lead to legal disputes and avoidable legal costs. Furthermore, an infringement of any copyright will jeopardise the company's reputation. As a result, graduates should be taught about the non-compliance implications. Moreover, certain organisations transcend the beliefs of their impact economic growth, which demands rigorous copyrights to ensure its development (Ncube 2018).

Information is believed to be the heart of every organisation, therefore, it is significant in every organisation. Consequently, graduates should be knowledgeable in the use of software applications and the various Web tools if they wish to be successful in the digital economy. Intrinsically, most respondents feel that the digital skills in this construct is of utmost importance to their sector, because 33.9 per cent rated it as important and 43.7 per cent as very important. Many employees assert that the ability to access information is an essential component of their job responsibilities, which denotes the importance of information literacy skills to businesses (Travis 2011). The value of continuous learning and information literacy has been understated, as it is significant to all industry sectors, (Travis 2011). Businesses' upgrade their information systems regularly, in order to keep up with technology advancements and to attain a competitive advantage. Consequently, their employees should be familiar with software migration to new versions. For this reason, most respondents consider a graduate's ability to migrate to new software applications as important.

USE OF INFORMATION SYSTEMS

Many businesses use information systems to accomplish fundamental business functions, other than to maintain their client records. A knowledge base is sometimes necessary for the information system, to which business professionals need to supply information and for additional elements of the information system. Communication between business professionals and IT experts have grown significantly, with the intention of developing an effective system. Occasionally, information systems development takes longer and perpetually costs more owing to the lack of digital skills by business professionals on the systems development lifecycle (SDLC) team. For this reason, rudimentary SDLC knowledge with regard to the business sphere could potentially mitigate this type of drawback.

Respondents mostly indicated the graduate's ability to assist during information systems analysis is important, thus scoring the highest percentage of importance within this construct

(i.e., Use of Information System), to the said sector. Moreover, it was considered important for a graduate to assist during information systems design. IT organizations support non-IT organizations, which shapes the development endeavour, as well as the overall result of the information system (Kobus et al. 2018). So, when systems development responsibilities are initially allocated, vast discrepancies among team skills are revealed by the non-IT organization's employees (Kobus et al. 2018). Such employees need considerably more effort and time to articulate the information needed by the IT experts for the systems development. This additional time translates into higher costs and will subsequently prolong the development effort and deliverables. Most businesses want to increase profits and decrease operating costs, therefore all commerce students should be enlightened on the analysis and design phases of the SDLC. This initiative will potentially benefit businesses, because their employees will be sufficiently knowledgeable to collaborate with IT experts when information systems need to be developed or upgraded, in so doing lowering the system development costs.

The ability to write software code was rated as not important by most respondents in the said sector. This particular digital skill is a key skill for most IT professions, such as computer engineering, hence this skill should certainly feature in IS and computer science curricula. However, coding knowledge is beneficial to commerce students and the organisations they work for (Tuomi et al. 2018; Wilson and Moffat 2010). For example, students become more employable, as the coding exposure will enhance their cognitive problem-solving skills. Research also suggests that coding is essential all the more so in primary school, and several first-world countries have incorporated coding as a significant advantageous constituent of their curricula.

There are presently numerous software applications available to perform various organisational tasks, as a result it is necessary organisations to frequently update their software. Most respondents specified the ability to install software programs as moderately important. Although graduates installing or updating software may be an economical approach to save on IT costs, permitting non-IT specialists to install software could pose a security risk. Cyber-threats like Trojan horse software and ransomware are particularly precarious for an organisation, therefore, this skill is good for personal software usage, but could be detrimental to the organisation. The graduate's ability to make sure the information system functions smoothly is again considered moderately important. Since, an information system is considered the heart of most organisations, IS issues that occur have a ripple effect, which is a fall in productivity and then a fall profit margin.

The ability to connect information systems to the Internet is mostly considered as very important by the respondents. This finding may be due to many organisations running their IS

on the Internet or their company Intranet, so it is vital for their IS to be always linked up to the Internet. A loss of Internet connectivity means system downtime, which eventually results in profit loss. This skill could assist in mitigating the adverse effects of Internet downtime. The ability to troubleshoot an information system was mainly rated as very important, as it is also needed to ensure the smooth functioning of the IS. IS users require training for custom IS that are developed in-house. Nevertheless, there are important trouble shooting skills that should be included in the curricula, so that graduates are ready for the job market.

Table 3: Factor 1 Frequency Distribution - System Development and Troubleshooting Skills

Graduates entering this sector should be able to:		Frequency Distribution					Descriptive		
		Not Important	Slightly Important	Moderately Important	Important	Very Important	% Important/ Very Important	Mean	Standard Deviation
1. assist in the analysis of an information system	Count	33	37	89	118	112	59.2	3.61	1.231
	%	8.5	9.5	22.9	30.3	28.8			
2. assist in the design of an information systems	Count	75	58	88	100	68	43.2	3.07	1.370
	%	19.3	14.9	22.6	25.7	17.5			
3. write software development code	Count	145	58	69	62	55	30.0	2.55	1.472
	%	37.3	14.9	17.7	15.9	14.1			
4. install software applications	Count	86	58	86	80	79	40.9	3.02	1.434
	%	22.1	14.9	22.1	20.6	20.3			
5. ensure smooth functioning of the information system	Count	75	52	77	96	89	47.6	3.19	1.428
	%	19.3	13.4	19.8	24.7	22.9			
6. connect information systems to the Internet	Count	64	64	76	88	97	47.5	3.23	1.413
	%	16.5	16.5	19.5	22.6	24.9			
7. troubleshoot information systems	Count	72	60	80	86	91	45.5	3.16	1.425
	%	18.5	15.4	20.6	22.1	23.4			
8. use mobile digital devices, e.g., smartphones	Count	16	20	59	94	199	75.5	4.13	1.108
	%	4.1	5.2	15.2	24.2	51.3			
9. use information systems to process information	Count	14	21	64	113	177	74.5	4.07	1.076
	%	3.6	5.4	16.5	29.0	45.5			
10. use information systems for collaborating	Count	22	29	62	109	167	70.9	3.95	1.182
	%	5.7	7.5	15.9	28.0	42.9			
11. use information systems for solving problems	Count	16	17	69	109	177	73.7	4.07	1.086
	%	4.1	4.4	17.8	28.1	45.6			
12. migrate to new information systems	Count	27	40	99	110	112	57.3	3.62	1.200
	%	7.0	10.3	25.5	28.4	28.9			

The vast majority of respondents consider it very important for graduate to use mobile devices, which are sometimes necessary to complete job responsibilities. The technological advancements of digital devices, such as cellular telephones, together with the introduction of

other mobile devices have generated a paradigm change for various industries (Lee and Shin 2018). Subsequently, organisations have moved to digital platforms as a means of conducting business, where orders can be placed online, invoices are e-mailed to the customer and payments are completed electronically, all of which can be done via a mobile device (Lee and Shin 2018). Further to that, mobile commerce (m-commerce) offers an optimistic result, since it has shown prominent development, which is advancing even further (Baby 2019). M-commerce is renowned as a great strategy to better competitors, improve business brands and boost sales (Baby 2019). Another significant trend revealed by Baby (2019) regarding m-commerce is that consumers demand more information by way of mobile websites, and approximately 80 per cent of smartphone users need further product information when shopping online via mobile devices. These are all factors that contribute to this finding, whereby 51.3 per cent of the respondents deem the utilisation of mobile digital devices as very important.

With regard to the graduate's ability process information via the information system, most respondents consider it very important. Most organisations today use information systems for their day-to-day business administration, therefore this is believed to be an essential skill for graduates. "Information", is the primary economic resource that is used by management to obtain a competitive advantage, because information by itself can offer an organisation a competitive advantage (da Anunciação et al. 2018). Subsequently, it is vital to ensure that IS and IT investments yield good economic benefits for the organization (da Anunciação et al. 2018). Graduates should effectively process information with minimal or no issues, therefore, generic IS skills should be offered to all commerce students on effectively processing information, given that this skill is one of the job requirements for most graduates entering this industry sector.

Collaborating via information systems is also highly rated as very important. The world over has turned into an information society, information users may check the weather online or collaborate with colleagues via an information system. The collaboration functions that exist within the information systems range from group support system to enterprise systems, thereby ensuring that team efforts are run efficiently and easily. Collaboration is an extremely valuable strategy for enterprise systems, particularly so for Web 2.0 and Enterprise 2.0 (Prakash et al. 2020). Collaboration not only offers support within enterprise collaboration systems (ECS), but assists in achieving the goals anticipated by joining personnel working on related or similar tasks (Prakash et al. 2020). Accordingly, collaborating via information systems have gained substantial attention, which is probably why this digital skill is fundamentally regard as a very important skill for the said sector (Prakash et al. 2020).

Using an information system to solve problems is mainly regarded as very important. Over

and above attaining the objectives and goals of the organisation, an IS information system utilised for problem solving. Nevertheless, little attention has been given to the way people manipulate information systems for “problem solving or self-regulating performance (behavioural factors), nor organizational processes” (Nkanata, Makori, and Irura 2018, 9). For that reason, this area requires more research, which may influence curriculum development relating to information systems skills. Such skills could be incorporated within curriculum by applying the “Problem-Solving Process” model of George Huber, which comprises five stages: Intelligence, Choice, Implementation, Design and Monitoring.

The digital skill related to graduates migrating to new information systems is regarded as very important. In 1965, Gordon Moore made a prediction that the “number of transistors on a microprocessor chip will double every two years or so – which has generally meant that the chip’s performance will, too” (Waldrop 2016, 144). Accordingly, Moore’s Law has significantly influenced technological advancements. Year-on-year, industry’s hunger for greater processing power grows exponentially, on account of cumulative volumes of data that needs to be processed. Hence, technological advancements and evolving business requirements are some of the contributing factors that necessitate the upgrading or renewal of current information systems. These occurrences suggest that information systems users should be capable of migrating to new or upgraded information systems. Commerce students should be educated about such imminent developments and ways to handle the migration process. These graduates should also have change management skills with the aim of reducing the “resistance to change” in the event of a system upgrade or renewal.

APPLY SECURITY MEASURES IN DIGITAL ENVIRONMENTS

Cyber-attacks are a huge concern for many organisations and due to its incessantly changing nature it threatens computing devices, as well as computer networks (Biju, Gopal, and Prakash 2019). When addressing cyber-security concerns, several precautionary approaches are needed. For instance, using a firewall, encryption methods, anti-virus software, circumventing public networks and virtual private networks when transmitting confidential data will help in deterring cyber-attacks (Biju et al. 2019). The findings from this particular construct reveals that the Real Estate, Finance and Business Services sector regards cyber security skills as very important skills that graduates need to possess when entering their sector.

The ability to use anti-virus software to prevent a cyber-attack is highly believed to be very important. Kaspersky (2019) suggests that organisations typically employ anti-virus software to prevent viruses from affecting their computing technology, however, some organisations expect their employees to update the anti-virus software, by running the updates

Table 4: Factor 1 Frequency Distribution – Digital Content Security Skills

		Frequency Distribution					Descriptive		
		Not Important	Slightly Important	Moderately Important	Important	Very Important	% Important/ Very Important	Mean	Standard Deviation
1. use anti-virus software to protect against a cyber-attack	Count	22	30	42	79	216	75.8	4.12	1.212
	%	5.7	7.7	10.8	20.3	55.5			
2. install local firewall on computers	Count	65	44	62	74	142	55.8	3.48	1.491
	%	16.8	11.4	16.0	19.1	36.7			
3. securely send and open digital messages and content	Count	16	18	59	98	198	76.1	4.14	1.095
	%	4.1	4.6	15.2	25.2	50.9			
4. securely connect to networks	Count	17	16	45	83	228	79.9	4.26	1.094
	%	4.4	4.1	11.6	21.3	58.6			
5. encrypt sensitive information	Count	28	28	66	85	181	68.5	3.94	1.255
	%	7.2	7.2	17.0	21.9	46.6			
6. backup and store digital content on your local computer network	Count	17	18	46	76	232	79.1	4.25	1.110
	%	4.4	4.6	11.8	19.5	59.6			
7. backup and store digital content on the Cloud, e.g. Google Drive	Count	21	21	55	84	208	75.1	4.12	1.169
	%	5.4	5.4	14.1	21.6	53.5			
8. delete sensitive digital content	Count	22	31	56	87	193	72.0	4.02	1.213
	%	5.7	8.0	14.4	22.4	49.6			
9. maintain secure user id and passwords	Count	7	9	27	42	304	88.9	4.61	0.856
	%	1.8	2.3	6.9	10.8	78.1			
10. protect digital content against accidental damage	Count	12	20	39	67	251	81.7	4.35	1.053
	%	3.1	5.1	10.0	17.2	64.5			
11. protect unauthorized use and modification of digital content	Count	16	14	35	68	255	83.2	4.37	1.062
	%	4.1	3.6	9.0	17.5	65.7			
12. comply with legal issues regarding digital content	Count	13	15	30	69	259	85.0	4.41	1.019
	%	3.4	3.9	7.8	17.9	67.1			
13. determine the trustworthiness of digital sources	Count	11	15	40	74	249	83.0	4.38	1.007
	%	2.8	3.9	10.3	19.0	64.0			
14. identify digital frauds, suspicious activity and cyber crimes	Count	14	19	35	70	250	82.4	4.35	1.066
	%	3.6	4.9	9.0	18.0	64.4			
15. practice safe online behaviour	Count	2	5	29	46	306	90.8	4.67	0.714
	%	0.5	1.3	7.5	11.9	78.9			
16. secure personal information against identity threats	Count	2	4	27	54	302	91.5	4.67	0.696
	%	0.5	1.0	6.9	13.9	77.6			
17. maintain a secure digital footprint	Count	4	3	36	78	268	89	4.55	0.777
	%	1.0	0.8	9.3	20.1	68.9			
18. report suspicious online activity	Count	3	7	30	58	291	89.7	4.61	0.771
	%	0.8	1.8	7.7	14.9	74.8			
19. report breaches in security	Count	4	3	29	45	308	90.8	4.67	0.735
	%	1.0	0.8	7.5	11.6	79.2			
20. comply with employer's digital policy	Count	2	2	13	36	335	95.6	4.80	0.564
	%	0.5	0.5	3.4	9.3	86.3			

and determining if and when those updates should happen. In many instances, employees generally decline anti-virus software updates, especially when they are busy with their daily job responsibilities, since the updates generally needed the computers to be restarted. Since most

respondents consider the use of anti-virus software as very important, anti-virus updates are similarly as important and ought to be promptly updated without this task being assigned to employees.

The ability to install a computer firewall was largely rated as very important. “Bring your own device (BYOD)” permits employees to “bring” their computing devices to the office and to access restricted information and business applications (Gupta et al. 2019, 1). BYOD offers many organisational benefits, like efficient productivity, better employee confidence, employee convenience, thereby making the organisation more appealing to employee, and in the process attract new employees (Gupta et al. 2019). A firewall is used to improve the network security by authorising dynamic objects within the firewall’s rules (Gupta et al. 2019). Conversely, BYOD presents great security problems, like data breaches and business data exposed on employee devices (Gupta et al. 2019). Consequently, graduates should possess the skill of installing a local firewall on their devices, particularly when implementing BYOD within an organisation.

More than 50 per cent of the respondents believe that it is very important for graduates to be able to securely open and send digital content and messages. An increasing number of organisations employ digital mobile platforms with the aim of improving their consumer experience (Karpeh and Bryczkowski 2017). Organisations are using social media platforms to improve customer relations and advertise their products and services, but since these are public platforms, this needs to be done responsibly. Although some Social media platforms, such as WhatsApp, use high-level encryption, policies are still needed by organisations, in order to govern social media sites in addition to e-mails when disseminating confidential information (Karpeh and Bryczkowski 2017). The POPIA Act is the main reason that respondents have placed high importance on graduates’ sending and opening digital content in a secure manner. It is therefore essential for employees’ awareness of such laws, including the laws on e-mail privacy (O’Connor and Schmidt 2018).

Although many vendors and enterprises use cryptographic algorithms to encrypt sensitive data, graduates should be able to encrypt sensitive data, since there may be occasions when the need arises to share sensitive data other organisations that may not have that great cyber-security. The employee may need to e-mail the information, which is vulnerable to hacking and considered precarious. Organisations hold and distribute sensitive data via electronic devices and networks, so graduates should be educated about the different cyber-crime prevention methods and cyber threats. The graduate’s ability to store and backup digital content is considered very important by 59.6 per cent of the respondents. Although some organisations perform automatic backup of business data, for some organisations manual backup is needed.

In instances where the employee needs to work on a personal device to conduct business tasks, the employee may need to know how perform manual backups and how to automate regular backups of digital content. Data loss is very costly and could potentially damage the organisation's reputation forcing a complete business shutdown, therefore high importance is placed on this particular digital skill.

The ability of a graduate to store and backup digital content on the Cloud is rated as very important by 53.5 per cent of respondents. Many organisations backup their data on cloud storage media, because of its appeal to reduce the need to purchase and maintain inhouse backup devices (Whitmer and Russo 2019). Data protection is secure on the Cloud in the event of a natural disaster at the organisation's premises, as the data is stored remotely at a cloud data centre, which can be accessed from anywhere in the world (Whitmer and Russo 2019). Deleting sensitive digital content was also highly rated as very important. Organisations typically have policies on the deletion of sensitive information, therefore graduates must comply with policies when securely deleting sensitive information.

The ability of a graduate to maintain secure user IDs and passwords is rated very important by 78.1 per cent of respondents. Viruses attacks adversely affect the benefits associated with ICT usage, when malicious code is spread by alluring users via e-mail or SMS to fake websites and uses social engineering as a common practice to attempt such cyber-crimes (Mun and Han 2016). Many websites authenticate users by requesting an username/ID and a password, but this is used as a basis for cyber-attack approaches to regularly change (Mun and Han 2016). Graduates should understand the vulnerabilities associated with user IDs and passwords, and ways to enhance password strengths with the aim of preventing such cyber-attacks that could potentially jeopardise an organisation's information system.

Protecting digital content from accidental damage was regard as very important by 64.5 per cent of respondents. Organisations store various types of digital content, such as information, videos, images and podcasts, which are fundamental to them. Many data breaches are either malicious, intentional or accidental, which frequently precedes data and/or financial losses (Aslam et al. 2019). Technical solutions to protect digital content are sometimes insufficient, so they spend more money to secure their digital content. Graduates should thus be aware of policies related to data protection against deliberate/ accidental damage, as well as the penalties of policy non-compliance, and methods to preclude the destruction or loss of digital content. According to Aslam et al. (2019), an approach to enhance user behaviour is by training, continuous awareness and monitoring the activities of users. This awareness may improve the general security of digital content.

Protecting unauthorized use and alteration of digital content was considered as very

important by 65.7 per cent of respondents. Content providers are usually concerned the protection of their protected digital content once it is accessible on the Internet, since hackers can circumvent security measures and easily disseminate the content (Hodzic, Goodman, and Ganesan 2019). One method to protect digital content is the digital watermarking method, whereby classified information is embedded within original data so as to maintain ownership of the digital content (Dixit and Dixit 2017). Awareness of such techniques will enable graduates to circumvent unauthorised usage and alteration of digital content.

Complying with legal issues related to digital content is believed to be very important by 67.1 per cent of respondents. A prominent issue to consider is that various social groups have various compliance behaviour. Van Rooij et al. (2017) revealed that Chinese students were prone to digital piracy mainly because of approval and observed behaviour by others, even though explicit restriction messages of execution were visible. On the other hand, the US sample of the same study revealed a different finding, wherein social norms influenced the decision-making processes, in addition to perceptible obligation to obey the law or with apparent deterrence. The transfer of this particular skill may need an alternate approach, subject to the social norms of South Africa.

Sixty-four percent of respondents rated the reliability of digital sources to be very important. Data authenticity is very important to organisations, as confirmed by this study. Accordingly, organisations implement policies to govern acceptable data sources in addition to its origin (Tang, Hong, and Jailani 2018). According to Tang et al. (2018, 2), several experts identify the “breakdown of trusted information sources as one of the grand challenges we face in the 21st century”. Guidelines and frameworks that are used as a yardstick to establish the authenticity of digital sources should be incorporated into the curricula as well. Graduates should also be cognisant of the repercussions related to using unreliable information for business reasons.

The ability to identify suspicious activity, digital frauds and cyber-crimes is considered very important by 64 per cent of respondents. The Internet has facilitated cyber-criminals to adopt a wide range of new-found crimes, along with online fraud (Collins and McGuirk 2018). Cyber-criminals can impersonate an authentic business professional, in order to attain some personal benefit from the victim. Malware attacks is increasing exponentially and has severe repercussions for an organisation that is attacked by malware. According to Kaspersky Lab, which is a global cyber-security company, such attacks in South Africa has grown by 22 per cent in 2019 compared to the previous year (Smith 2019). “Kaspersky’s head of global research and analysis in the Middle East, Turkey and Africa” described in the first quarter of 2019, 577 attempted cyber-attacks occurred per hour in South Africa (Smith 2019, 1). Furthermore, South

Africa's Android powered devices are the second highest target pertaining to banking malware, while Russia is the first (Smith 2019).

For the digital skill relating to the practice safe online behaviour, 78.9 per cent deem it to be very important. According to Jansen and Van Schaik (2019), end users ought to follow safe online behaviour to protect the online domain, and they play a vital role in maintaining online security. Graduates should be educated in the safe online behaviour, such as opening e-mail attachments only from trusted sources, since the attachment could contain a virus. Securing of personal information against identity risks is regarded as very important by 77.6 per cent of respondents. In addition, 68 per cent of respondents consider that maintaining a secure digital footprint is very important. Many computer users are not aware of their digital footprints and the potential threats it poses to them.

The reporting of suspicious online activity is rated as very important by 74 per cent of the respondents. This skill assists law enforcement officials in investigations, since they cannot view all social media posts. In recent years, international officials have been scrutinising more social media posts, which resulted in new leads that originated from Facebook friends or Twitter followers who reported suspicious online behaviour (WTOL Newsroom 2018). The reporting of security breaches is considered very important by 79 per cent of the respondents. Data breach reporting is considered highly important by this sector, because the security breach impacts corporate governance as well as compliance, and such disclosure makes risk management easier (Chatterjee and Sokol 2019).

Complying with the employer's digital policy is regarded as very important by 86 per cent of respondents. Chatterjee and Sokol (2019) highlight that increasingly more corporates concentrate on cyber-security risks, since 89 per cent public owned companies pointed out that their board meetings often included a cyber-security discussion (Chatterjee and Sokol 2019). From a compliance standpoint, if an employee fails to address security related weaknesses, the entire network becomes vulnerable. Sombatruang et al. (2019) stresses that people are the "weakest link" concerning Wi-Fi access, since many users are not concerned about Wi-Fi security.

CONCLUSION

The findings of this study suggest that HEIs ought to incorporate the respective digital skills into their curriculum based on the level of importance to the industry sector. Empowering graduates with the necessary digital skills relevant to the industry that they will feed into will help organisations in recruiting competent graduates. Most organisations spend thousands of rand to train their new recruits, so if these skills are incorporated into the curricula, they would not only benefit the graduate in attaining employment, but it will also benefit many

organisations. The Real Estate, Finance and Business Services sector has majorly contributed to South Africa's GDP for the past few years, and as such, it is essential to constantly upskill the graduates that enter this sector. This strategy will assist South Africa to successfully compete in global economies, rather than lagging behind as is with the country's current economic climate.

Kaspersky's head of global research and analysis highlighted the fact that numerous organisations fall victim of malware attacks, largely due to employees' incorrect use of the organisation's resources, such as computer networks and mobile devices (Smith 2019). Subsequently, the construct related to the graduate's ability to apply of security measures in digital environments is rated considerably greater than the remaining two constructs. For these reasons, it is imperative that graduates are able to effectively prevent or reduce the consequences of cyber-crimes. The results suggest that more time ought to be spent training students on cyber-security measures. If the South African HEIs fail to produce a cohort of graduates that possess the digital skills needed for the respective industry sectors, the gap between industry needs and academic offerings will only grow, which will lead to higher unemployment rates and South Africa will consequently struggle to sustain a globally competitive economy.

RECOMMENDATIONS

This study could be replicated within other industry sectors in South Africa to determine the digital skills requirements of each sector. The study can also be replicated for other industry sectors internationally, with the aim of understanding the digital skills needs of industry sector, globally. A comparative study can then be done between the digital skills requirements of various industry sectors within South Africa, as well as comparing the requirements to international requirements. For example, the digital skills requirements of the mining sector can be studied and then the results can be compared to the findings of this study or it can be compared to the digital skills requirements of the mining sector abroad.

NOTES

1. IaaS is a branch of cloud computing services that offers storage, computing and networking resources.
2. "On 7 January 2020, severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) was confirmed as the causative agent of coronavirus disease 2019 (COVID-19)" (National Institute for Communicable Diseases 2020).

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