INFORMATION SKILLS (IT) SKILLS LEARNED IN THE UNDERGRADUATE ACCOUNTING CURRICULUM AND THEIR RELEVANCE IN THE WORKPLACE

Lyn Holy Baylon, Adrian Anthony Contillo, Raezel Carla Fontanilla, Fabrienne Kate Liberato, Jerome Marquez*

ABSTRACT

IT skills are now becoming highly valuable in the accounting practice. Therefore, IT skills should be included as integral part in the undergraduate accounting curriculum. The study aimed to gauge the relevance of IT skills embedded in the undergraduate accounting curriculum with respect to the current workplace scenario of Certified Public Accountants. This study made use of two sets of questionnaires as the primary tools. This study gathered the data and responses provided by 5th year BS Accountancy students of the University of Saint Louis Tuguegarao, as well as CPA's in the public, commerce and government sectors of accounting practice. The student responses were analyzed through mean, while employee responses were analyzed through mode and frequency. The study showed that IT skills were learned by students at a good extent. On the other hand, employee responses have shown the need to further intensify IT skills education in the undergraduate, given that IT skills are highly valued in the accounting career. Given that this study was administered to limited respondents in a certain locale, future studies may be conducted to increase generalizability.

Keywords: Information Technology, Skills, Accounting, CPA, Workplace

INTRODUCTION

Traditional technical accounting skills are essential, yet no longer the main skill set for emerging accountants. (Senik and Broad, 2011) Indeed, the face of business over the years has been changed by technology (Bahador, Haider, & Saman, 2012). As acknowledged by the International Federation of Accountants, concerns regarding the level of competence accountants have regarding IT skills have increased. It is therefore apparent that new set of skills such as information technology skills are now highly given emphasis by the different accounting industries in order to cope up with the dynamic demands of the industry they are into. Issues concerning information technology (IT) skills for accounting graduates have been on national and international accounting education agendas for decades (Senik, Broad, Mat, & Kadir, 2013). IT skills have also been regarded as a subset of employability skills (Stoner, 2009). Business data processing, processes and models have been significantly transformed due to the rapid advancements in information technologies in the 1990s and significant effects on accounting professions have been evident (Seethamraju, 2010). With all of these given scenarios, it can be concluded that sound information technology skills are now

highly required from Accounting graduates. But the question arises whether these graduates really possess the IT skills demanded by the workplace.

According to Sithole (2015), the associated impacts of technologies brought necessary changes to the undergraduate curriculum of many colleges and universities in order to align the curriculum with the needs of the employers. The rapid dynamics in business environment requires CPA's to constantly develop their IT knowledge and skills. (Tam, 2011) However, universities still seem to focus on inculcating theoretical concepts, despite the CPA's need for learning relevant skills in the selection, implementation, management and use of information technologies at their work place. (Seethamraju, 2010) Such colleges and universities will not be able to produce graduates who are 'work ready' if the curriculum is not properly embedded with the relevant IT skills which a future accountant must possess

It is evident at present circumstances that IT courses are being integrated in the current accounting curriculum of the schools in the Philippines. This is in order to reduce the probabilities of "skill dissatisfaction," that is, the lack of IT skills inculcated in the overall skills set of an accountant. Hence, the Commission on Higher Education implemented that at least nine (9) units of IT related courses are integrated in the accounting curriculum. These units should include a course for basic IT education, systems analysis and design, accounting information systems, and auditing in a CIS environment, preferably with the use of Computer Assisted Audit Tool (CAAT's). Skills points also include basic computer knowledge, such as skills in recalling and using computer hardware and software, troubleshooting, and application of such skills in document processing and accounting processes using IT (Commission on Higher Education, 2012).

The University of Saint Louis - Tuguegarao (USLT) currently implements such courses as required by CHED. However, questions arise as to whether those IT courses integrated in the undergraduate accounting curriculum in the university are really relevant in the actual workplace. There is a need for students to be equipped with necessary IT knowledge and skills in order for them to be in line with the present demands of the accounting profession with information technology taking its inevitable role. Hence, the need for this study arises.

Research Objectives and Questions

The study aimed to identify the relevance of Information Technology skills learned by students in their undergraduate accounting studies in the University of Saint Louis Tuguegarao, in the current workplace of Certified Public Accountants. In particular, this study aims to answer the following:

1. What is the extent to which the students have learned IT skills in the undergraduate accounting curriculum?
2. What are the IT skills relevant in the workplace, along private, public and government industries?
3. What are the IT skills recommended by the employees as areas for further emphasis and focus?

Significance of the Study

This study will be imperative in gauging the relevance of the IT skills learned in the undergraduate accounting curriculum offered in the University of Saint Louis - Tuguegarao in relation to the current scenario being faced by the CPAs in the different accounting industries particularly in the private, public and government sector with information technology taking into place. It will be useful in making relevant enhancements to the university's accounting curriculum in order to properly integrate IT courses that are really relevant in the actual work.

Literature Review

Conceptual Framework

This study was grounded on the fact that there should be a congruence between IT skills learned in the undergraduate accounting curriculum and IT skills relevant in the workplace.

Accounting has indeed a large technological foundation in the real world; however, it is still doubtful whether colleges and universities are producing the so called 'work ready' accountants. According to Seethamraju (2010), mismatch between the learned IT skills from school and relevant IT skills in the workplace may arise especially when colleges and universities' learning strategies are not aligned with what the industry really needs such as focusing more on the theoretical aspect of information technologies related to the Accounting profession rather than the practical application of such. There may be IT skills which were not taken into consideration or which were not given enough emphasis in the undergraduate accounting curriculum but are much needed in the workplace. There may also be IT skills which were over emphasized in the undergraduate accounting curriculum but are not much needed in the accountant's workplace (Seethamraju, 2010).

Information technology has been a partner of every industry in this dynamic economic environment paving the way for the issue regarding the development of IT skills in the undergraduate curriculum to arise (Seethamraju, 2010). Given the ever-fast paced progress in the accounting process, many colleges and universities

have started including IT courses in their current accounting curricula, after seeing the benefits of having such knowledge for a potential accountant. Enhancing the IT skills of their students has been manifested to be one of the major concerns of these schools. It is therefore essential to embed the undergraduate accounting curriculum with current and emerging information technologies relevant to the accounting profession in order to produce graduates who are 'work ready' (Seethamraju, 2010).

IT Skills Learned in the Undergraduate Accounting Curriculum

Technology and IT has become vital in the accounting academe, given that IT skill is slowly becoming a global standard of employability. In fact, a globally renowned charter of accountants sees the tremendous impact of IT in finance and accounting, in general, eyeing increase in value and emergence of new methods of work in the field of corporate finance. (International Federation of Accountants, 2018) That is why a globally-recognized standard-setting body for accounting education has tweaked the way IT skills are valued. IT skills are now a requirement, recognizing it as part of organizational skills, one of the four dimensions of professional skills. Accountants should be able to apply appropriate tools and technologies to increase efficiency and effectiveness and improve decision making. (International Accounting Education Standards Board, 2014) Competence areas now involve not just intellect and interpersonal skills, but also wide array of skills set involving organizations, methods and technology (International Accounting Education Standards Board, 2014).

Given these revamped requirements, the authorities for higher education in the Philippines have also set new rules and guidelines in order to gradually incorporate IT skill sets in the curriculum. IT skills were made available as early as 2007, where IT was still regarded as a knowledge set (Commission on Higher Education, 2007), but now evolved to be a skill set, as manifested in a revamped memorandum issued by the Commission on Higher Education, where a performance indicator include the ability to employ technology as a business tool in capturing financial and non-financial information. Sample outcomes, as mentioned, include the ability to use and manipulate accounting information systems, as well as the ability to create financial models using spreadsheets (i.e. Microsoft Office Excel). (Commission on Higher Education, 2017) The memorandum has set a minimum number of nine (9) units required to be allotted for IT skills courses. The courses, at the minimum, include IT concepts and systems analysis and design, accounting information system, and auditing in a CIS (Computer Information System) Environment, in which the school may add more units to accommodate more IT skills courses as they see fit, given the current work requirements.

(Commission on Higher Education, 2007) IT skills were also incorporated as part of business statistics, as well as a core business course, which include computer applications and database management (Commission on Higher Education, 2007).

However, IT skills inculcation is still far from effective. Some students still lack the necessary skills in using spreadsheets even the basic skills. For example, studies show that many students were inserting their own formulae to calculate internal rate of return (IRR) and net present value (NPV) because they did not know that the functions for the formulae were readily available as one of the software features. Many of them did not even know how to insert formulae, format or update the spreadsheet (Senik et. al., 2013).

IT Skills Relevant in the Workplace

With the advent of technology, accounting processes have also emerged from simple ones which only require traditional technical skills to those which require thorough knowledge of the systems and process that already involves the use of information technology. Such updates in the accounting arena back accountants in delivering a higher quality of output. Therefore, accounting graduates must possess necessary IT skills in order to meet the challenges of the dynamic economic environment (Bahador, Haider, & Saman, 2012). Skills as regards the use of spread sheet have been found out to be the most relevant in the accounting profession (Stoner, 2009; Tam, 2011). Suggestions regarding Excel to be spread out over more courses to enable students to use it in variety of contexts were also raised by the respondents (Senik et al, 2013). Introduction to Excel should begin with its basic functions, including formatting and inserting formulae.

The study by Welch et al., 2010 supports the importance of highly advanced Excel skills expected of entry-level accountants. The use of Excel still leads the rank (Welch J., Madison, Welch S., 2010). Word processing and presentation software did not also fail to quality to the top ranked IT skills of professional accountant. Spreadsheets have indeed an inarguable role in the accountant's workplace. In a study conducted by Sithole (2015), the respondent firms said that the five most important technological skills, in order of importance are; knowledge of accounting packages, spreadsheet packages, word processing packages, communications software (for example outlook), electronic commerce. It is very apparent that spreadsheet skills are highly required from accountants given all the results from the previous studies.

Based on a study conducted by Senik, Broad, Mat & Kadir (2013), expected skills to develop from accounting students include skills in using financial accounting package, auditing and tax packages, management accounting-related applications, as well as skills in using excel. Substituting some accounting exercises with computer-based applications was among the suggestions given by

the respondents in order to better expose them to the actual practice. It has also been argued that there is more emphasis on conceptual understanding rather than technical skills as regards the use of such applications. Accountants should know much about IT related skills, which include data communications, presentation software, networking, data control and cybersecurity, systems analysis and design, and e-business applications. (Stoner, 2009) Aside from software that helps to record business transactions and produce information for annual reports, some educators and students saw the potential for introducing auditing and tax packages in relevant course (Senik et al, 2013 p.95). Introduction to the related audit and tax software would complement the conceptual learning in these areas. The study also saw the potential of introducing performance measurement applications in the curriculum such as the balanced scorecard systems and simulations concerning decision-making relating to management accounting.

In addition, a study conducted by Tam (2011) also found out there is perfect agreement between accounting educators and chartered accountants (CA) on the importance of using spreadsheets. IT skills ranked in terms of importance include the following: 1) spreadsheets, 2) database management, 3) presentation software, 4) technology management and budgeting, 5) word-processing software, 6) communications software (Outlook), 7) e-commerce, 8) World Wide Web and 9) Windows. (Tam, 2011) CAs and educators agreed that programming was not the responsibility of accountants and that less emphasis should be given to database software and systems design and development. Knowledge of the potential applications and possibilities of such tools is required but do not necessarily need to be a core skill (Maceli & Burk, 2016).
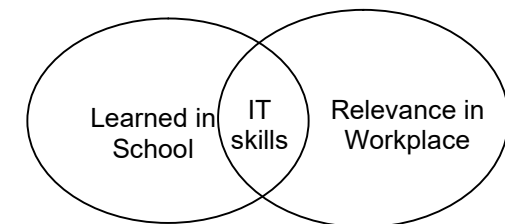
Research Paradigm

Figure 1. Paradigm of the Study

The figure shows that the IT skills learned by the students in the undergraduate accounting curriculum of the University of Saint Louis Tuguegarao, made effective year 2014, have a corresponding relevance in the workplace of CPA's.

METHODS

This research used a descriptive quantitative approach. The locale of this research were Cagayan and Metro Manila. The respondents came from two sets (1) 5th year BS Accountancy students, batch 2020, of the University of Saint Louis Tuguegarao, who have used the BSAc curriculum which took effect 2014 and (2) employees from the private, public and government practice of the Accounting profession, who have undergone different IT skills education as integrated in various accounting curricula. This study made use of questionnaires which consisted two sets. A 7-point questionnaire was floated to the BSAc-5 students of batch 2020 of the University of Saint Louis Tuguegarao and a 2-point scale questionnaire was floated to the CPA employees of the public, commerce, and government sectors. The curriculum, which took effect 2014, benefited Batch 2019 and Batch 2020, but only the second batch (Batch 2020) were selected as participants. The content of the questionnaires were derived by obtaining the skill sets embedded in the IT related courses in the undergraduate accounting curriculum. The two sets of questionnaires contained the same skill sets. Recommendations were also gathered from the employee respondents through the questionnaires. The researchers sought approval from the office of the Vice President for Academics with the recommendation of the Dean of the School of Accountancy, Business and Hospitality. When permission was granted, the researchers used hard copies and gave the questionnaires to the prospective participants. Permission was also secured to float questionnaires to the respondents from the employees from the different sectors of accounting practice (public, commerce, government). The researchers sent the questionnaires via hardcopies or email to the employees. The researchers compiled the data gathered for tallying and analysis. Mean was used to analyze the data gathered from the 7-point questionnaire, mode was used for the 2-point questionnaire, and frequency was used to analyze the recommendations.

RESULTS

Table 1: The extent to which IT skills are learned by the students in the undergraduate accounting curriculum

Skill Set	Mean	Descriptive Rating
Computer Manipulation in the basic level	5.49	Very Good
MS Word Usage	5.72	Very Good
MS Excel Usage	5.42	Very Good
Excel Formulas and Formatting	4.70	Good
MS PowerPoint	5.13	Very Good
PowerPoint Design, Animations	4.75	Good
SAP Basic Usage	4.58	Good
SAP Purchase Order Creation and Management	4.51	Good
SAP Sales Order Creation and Management	4.55	Good
SAP Order to Payment	4.56	Good
SAP Financial Reports generation	4.18	Good
SAP Queries through SQL	4.05	Good
SAP Troubleshooting	2.98	Poor
Basic Flowchart Creation	3.96	Fair
Decision Type Flowchart Creation	4.34	Good
Loop Flowcharts Creation	4.46	Good
Systems Analysis and Design	4.07	Good
Data Flow Analysis using DFD	4.03	Good
User and Relationship Analysis thru URD	4.09	Good
Basic Visual C++ Usage	4.24	Good
C++ Arithmetic Functions	4.16	Good
C++ Counting and Averaging	4.22	Good
C++ Information Display	4.11	Good
C++ Loops (Repetitions)	3.99	Fair
C++ Decision (Booleans)	3.75	Fair
Programming applied in Business Scenarios	3.72	Fair
Database Creation and Management (MS Access)	3.47	Fair
MS Access Queries through SQL	3.03	Fair
IT Audit Techniques	1.58	Very Poor
IT Test of Controls	1.10	Very Poor
CAAT's and CAATT's Usage	1.05	Very Poor
Overall Mean	4.00	Good

Rating Scales:

0 - 0.99	Not learned	4 - 4.99	Good
1 - 1.99	Very poor	5 - 5.99	Very Good
2 - 2.99	Poor	6 - 6.99	Excellent
3 - 3.99	Fair	7.00	Exceptional

The table above shows that the student responses generated an overall mean of 4.00, indicating that students rated the overall extent to which IT skills were learned as "good" in the undergraduate accounting curriculum. Computer manipulation and Microsoft Office skills such as MS Word Usage, MS Excel Usage and MS PowerPoint have been learned to the greatest extent, with means ranging from around 5 to 5.99, suggesting a "very good" learning rate, with Microsoft Office Word skills being the highest at 5.72. On the other hand, IT audit skills came last, with means ranging from around 1 to 1.99, indicating a "very poor" grasp of the skills as indicated by the responses.

Table 2: IT Skills Relevant in the Public, Commerce and Government Sector of Accounting Practice

Skill Set	Public		Commerce		Government	
	Strongly Needed	Not Needed	Strongly Needed	Not Needed	Strongly Needed	Not Needed
Computer Manipulation in the basic level	30	0	30	0	30	0
MS Word Usage	30	0	30	0	30	0
MS Excel Usage	30	0	30	0	30	0
Excel Formulas and Formatting	30	0	30	0	30	0
MS PowerPoint	30	0	30	0	30	0
PowerPoint Design, Animations	27	3	30	0	28	2
SAP Basic Usage	30	0	28	2	13	17
SAP Purchase Order Creation and Management	10	20	28	2	9	21
SAP Sales Order Creation and Management	10	20	28	2	9	21
SAP Order to Payment	11	19	28	2	10	20
SAP Financial Reports generation	18	12	27	3	12	18
SAP Queries through SQL	14	16	15	15	9	21
SAP Troubleshooting	17	13	28	2	19	11
Basic Flowchart Creation	28	2	17	13	16	14
Decision Type Flowchart Creation	11	19	5	25	14	16
Loop Flowcharts Creation	9	21	6	24	9	21
Systems Analysis and Design	11	19	12	18	17	13
Data Flow Analysis using DFD	20	10	7	23	16	14
User and Relationship Analysis thru URD	20	10	8	22	16	14
Basic Visual C++ Usage	21	9	8	22	8	22
C++ Arithmetic Functions	3	27	4	26	5	25
C++ Counting and Averaging	6	24	4	26	6	24
C++ Information Display	7	23	4	26	5	25
C++ Loops (Repetitions)	5	25	4	26	5	25
C++ Decision (Booleans)	5	25	4	26	11	19
Programming applied in Business Scenarios	9	21	4	26	14	16
Database Creation and Management (MS Access)	27	3	29	1	25	5
MS Access Queries through SQL	9	21	15	15	17	13
IT Audit Techniques	29	1	12	18	16	14
IT Test of Controls	29	1	12	18	16	14
CAAT's and CAATT's Usage	29	1	12	18	13	17

The employee responses showed that basic computer manipulation skills as well as Microsoft Office skills were rated as "strongly needed" by a majority of employee respondents. Database Creation and Management (MS Access) skills and basic flowcharting skills were also rated as "strongly needed" by all sectors. SAP skills were rated as "strongly needed" in the private sector while majority were rated otherwise by the other sectors. On the other hand, the public sector rated as "strongly needed" all the IT audit skills while the other sectors rated these skills as "not needed".

Table 3: IT Skills Recommended by the CPA Employees as Areas of Focus

Skill Set	Public Practice	Private (Commerce)	Govern-Ment	Total
Skills in Microsoft Excel Usage	7	11	8	26
Skills in Microsoft Office Usage	4	12	6	22
Use of Systems Applications and Products (SAP) software		10	1	11
Expertise in Computer Assisted Audit Tools (CAATs)	7			7
Skills in IT Auditing	6			6
Use of Accounting Information Systems (SAP, Oracle, Quickbooks)		6		6
Expertise in Programming (C++)		4		4
Expertise in flowcharting		2		2
Systems Analysis		1		1
Others:				
EFPS and E-BIR Forms	2		5	7
Finance Data Entry System			1	1

The above table summarizes the keywords taken from the skill sets that CPA's believe should be given emphasis or focus for further enhancements. Most of the employees in all the sectors of accounting practice made mention of the Microsoft Office and Microsoft Excel skills, which are currently embedded in the undergraduate accounting curriculum. Other notable skill sets emphasized by the employees include AIS skills and IT Audit skills. Employees also made mention skills in electronic BIR forms and Electronic Filing and Payment System (EFPS), which were mentioned by the responses given by the employees from the public and government sectors, but are not currently given focus in the undergraduate accounting curriculum.

DISCUSSION

The students have an adequate grasp of IT skills overall, as such IT skills are learned at an average extent. Microsoft Office skills are learned at the great extent overall. Microsoft Word skills were learned at a greatest extent, while skills in Excel formulas and PowerPoint presentation designs need further enhancements. Senik and Broad (2011) stated that education should further enhance other Excel-related skills. The study conducted by Stoner (2010) produced similar results, citing the need in addressing particular skill deficits involving spreadsheet within the curriculum, considering the central role of spreadsheet modeling in the accounting education parlance. Skills in the usage of Accounting Information Systems (AIS), flowcharting and programming skills were learned at an average extent, where students are expected to have an adequate grasp of AIS usage, flowchart creation, and use of programming for business firms. Database management skills were learned at less than average extent, though students are found to have some knowledge of the use of Microsoft Office Access but not at an adequate level. In a study conducted by Stoner (2009), it is also found that entrant skills regarding database management are low and have hardly made progress since 1997. Finally, IT audit skills were learned at the poorest extent, where students are found to have some knowledge regarding the IT audit concepts, but were never applied through computer applications. Similar findings were found by Pan (2016), stating that IT audit and data analytic skills were lacking in numbers among professional accountants.

The employees consider overall IT skills as important in the workplace, in which skills in computer usage and manipulation, as well as skills in Microsoft Office usage, is considered as strongly needed in all sectors of accounting practice. Bahador, Haider, and Saman (2012) likewise found that accountants must be proficient with the use of spreadsheets and word processor. Database Creation and Management (MS Access) skills was also rated as "strongly needed" by all sectors of which Stoner (2009) found that database skills are likely to be one of the most important IT skills areas for the future of the accounting profession. Only basic flowcharting skills are demanded by the different sectors. SAP skills was shown to be highly needed in the private sector since the accounting aspect is highly emphasized in the private sector and students are expected to learn and use IT-based accounting applications particularly in recording accounting information in financial accounting units (Senik, Broad, Mat & Kadir, 2013). Programming skills are not really needed in the actual workplace of accountants. On the other hand, IT audit skills and CAAT's were found to be highly utilized in public practice, such as in the audit firms. Ensuring that business systems deliver the values that the organization board expects is one of the significant roles in information technology governance by accountants and auditors (Pan & Seow, 2012).

The recommendations given by the employees further amplify the need to further the learning of relevant IT skills such as the use of Microsoft Office software, specifically Word and Excel. The study done by Tam (2011) showed a similar recommendation, where spreadsheet and word processing skills are highly valued and are atop the rankings of relevant IT skills. A similar study made by Senik and Broad (2013) stressed the importance of integrating Microsoft Excel in enhance skills and develop more spreadsheet-related competencies, such as formulas and formatting. The private practice reinforced the need for learning AIS such as SAP, Oracle and Quickbooks. The employees in public practice also deem the same for IT Audit and CAATs, amplifying the importance of IT audit skills. This supports what Senik and Broad (2013) discussed, as they stated that the availability of IT audit software would be helpful in helping students apply IT audit theories and concepts. Lastly, the employees also amplified the importance of having the skills in utilizing e-BIR forms and EFPS filing, stating that it "is now a thing."

CONCLUSION

There are several IT skill sets learned in school that are highly relevant in the workplace, there are some IT skills which were not fairly given focus in school that are still highly relevant in the workplace, and there are certain IT skills that are learned in school that are not needed in the workplace. In the context of the CPA's current work, Microsoft Office skills and skills in usage of Accounting Information Systems—skill sets which are well integrated in the current undergraduate accounting curriculum, are highly valued by the CPA's. On the other hand, skills involving database management and IT auditing—skill sets which are not being given enough emphasis in the current undergraduate curriculum, are also highly valued by CPA's while programming skills are not needed in the workplace, despite being learned in the undergraduate accounting curriculum.

RECOMMENDATION

Further emphasis on advanced Microsoft Office skill areas should be given consideration by the school particularly skills in terms of Excel Formulas and Formatting as these skills were also recommended by the employees to be further enhanced. A more intensive training as regards the use of Microsoft Office is highly encouraged overall. Furthermore, SAP and accounting information system skills education should be further intensified, as well as database management skills. Skills in IT auditing should also be given further emphasis in the curriculum. Actual usage of the IT auditing tools should be implemented. Finally, E-BIR forms and Electronic Filing and Payment System skills and Financial Data Entry System skills should be introduced. Future studies may be conducted similar to this study to

increased generalizability, to better understand IT skills learned in the context of different locales. Furthermore, future studies may adapt this study for a continuing research, in order to gauge certain updates in the accounting curricula of the University of Saint Louis Tuguegarao, given that the study focused on a curriculum implemented during 2014.

REFERENCES

Bahador, M. K., Haider, A., & Saman, W. (2012). Information Technology and Accountants-What Skills and Competencies are Required? Doctoral dissertation, Information Systems Evaluation and Integration Group.

Commission on Higher Education (2007). CHED Memorandum No. 03, series of 2007. https://ched.gov.ph/cmo-3-s-2007/

Commission on Higher Education (2017). CHED Memorandum No. 27, series of 2017. https://ched.gov.ph/cmo-27-s-2017/

Commission on Higher Education (2007). Sample Curriculum for BSA, Pursuant to CHED Memorandum No. 03, series of 2007.

Harrast, S., Strong, J., & Bromley, R. (2010). More accounting theory or more information technology?. The Accounting Educators' Journal, 20(1)

International Federation of Accountants – International Accounting Education Standards Board (IFAC-IAESB) (2014). International Education Standards 3: Initial Professional Development – Professional Skills

International Federation of Accountants (IFAC)(2018). The future of finance profession and the finance function: IFAC talks May 2018

Maceli, M., & Burke, J. J. (2016). Technology skills in the workplace: Information professionals' current use and future aspirations. Information Technology and Libraries, 35(4), 35-62

Pan, G., & Seow, P. S. (2016). Preparing accounting graduates for digital revolution: A critical review of information technology competencies and skills development. Journal of Education for business, 91(3), 166-175.

Seethamraju Dr, R. (2010). Information technologies in Accounting education. Association for Information Systems AIS Electronic Library (AISeL)

Senik, R., & Broad, M. (2011). Information technology skills development for accounting graduates: Intervening conditions. International Education Studies, 4(2), 105-110.

Senik, R., Broad, M., Mat, N., & Kadir, S. A. (2013). Information technology (IT) knowledge and skills of accounting graduates: Does an expectation gap exist?. Jurnal Pengurusan (UKM Journal of Management), 38.

Sithole, S. (2015). Information Technology Knowledge and Skills Accounting Graduates Need. International Journal of Business and Social Science, 6(8), 47-52.

Stoner, G., & Milner, M. (2010). Embedding generic employability skills in an accounting degree: development and impediments. Accounting Education: an international journal, 19(1-2), 123-138.

Stoner, G. (2009). Accounting students' IT application skills over a 10-year period. Accounting Education, 18(1), 7-31.

Tam, T. C. W. (2011). The relevant information technology knowledge and skills for accounting graduates in New Zealand.

Welch, O. J., Madison, T., & Welch, S. (2010). Accounting Professionals' Value Assessment of Entry Level IT Skills and Topics: A Comparison of the Differences between CPA Firms and Industry/Government Organizations. Issues in Information Systems, 11(1), 211-215