Global Business and Management Research: An International Journal
Vol. 14, No. 3s (2022)

Accounting Education in the Era of IR 4.0: Exploring the Market Relevance of Auditing Courses in Malaysian Public Universities

Nur Liyana Zolkifli
School of Management, Universiti Sains Malaysia,
11800 USM, Penang, Malaysia
Email: liyanazol@student.usm.my

Zubir Azhar *
School of Management, Universiti Sains Malaysia,
11800 USM, Penang, Malaysia
Email: zubirazhar@usm.my

Dayana Jalaludin
Faculty of Business and Economics, University of Malaya,
50603 Kuala Lumpur, Malaysia
Email: dayana@um.edu.my

** Corresponding Author*

Abstract
Purpose: There have been criticisms from accounting practitioners on the pragmatic aspect of accounting education, especially in keeping up with the latest audit related technologies. Such criticisms appear to challenge universities to develop appropriate learning capabilities in preparing students to become market-ready employees. This study explores the relevancy of audit courses offered through the Bachelor of Accounting programmes in Malaysian public universities.
Design/methodology/approach: This study adopts a qualitative research approach to address its research objectives. Accounting students, academics, and auditors were interviewed to examine the alignment between audit courses, students IT skills and market expectations.
Findings: The findings suggest that the content of audit courses offered through the Bachelor of Accounting programmes are fundamentally relevant. Nevertheless, there are concerns regarding the students' auditing knowledge and IT skills due to a lack of experiential learning experience.
Theoretical/Practical implications: This study extends the accounting education literature as it highlights on the changes needed for auditing courses to keep abreast with audit technologies developments. Besides relevant internship experience, close and active collaboration with audit practitioners, and audit simulation games are suggested as important aspects of the audit course.
Originality/value: This study provides some understanding regarding accounting students' readiness in meeting the audit industry needs of the IR 4.0 era.

Keywords: Accounting education, IT Skills, Audit Knowledge, IR 4.0, Malaysian Public Universities

Introduction

In today's Industrial Revolution 4.0 (IR 4.0) era, the global business market is confronted with many challenges particularly in adapting to the changing business environment. IR 4.0 has transformed the broader economy and society in a variety of ways as it directly affects businesses including audit firms (Jacky & Sulaiman, 2022). The massive development of information technology (IT) has resulted in increasing audit effectiveness and efficiency, as major audit stages such as audit preparation, audit testing and audit reporting are now electronic based, allowing for faster and more flexible audit processes (Zerbino et al., 2018; Bierstaker et al., 2001).

The dominant role and integration of technology in today's market has substantial impact on the auditing profession as auditors find themselves to be in need to respond positively toward these developments to stay competitive (Jacky & Sulaiman, 2022). Accordingly, audit firms now pay more attention in reviving their human capital strategy to ensure their talents are adaptable to the changing dynamics of the market (Deloitte, 2017). Audit education is no exception to this shift. Universities are seeing the need to revamp audit education to prepare students pursuing Bachelor of Accounting to be more market-ready. As the auditing practices are changing rapidly to cope with changes in the business world (Reinstein et al., 2018; Bryan & Smith, 1997), there is an urgent need to equip accounting students with relevant audit knowledge and technology skills. Hence, it has become a priority for higher education institutions, including Malaysian public universities, to ensure that their graduates are well-equipped with sufficient and updated knowledge and skills before entering the marketplace (Azhar et al., 2018).

Over the years, accounting graduates have faced criticisms from the market for not being able to reach the required standards expected of them. Audit education has been heavily criticised for failing to develop students' practical decision-making and problem-solving skills (Chiang et al., 2021). Among the most common claim is regarding the inadequate learning experience where students are said to be exposed with a disproportionate balance between theoretical knowledge, real-world application, and hands-on experience. Although audit teaching resources, such as textbooks, professional training manuals and lecture handouts, can provide the required intellectual knowledge, many undergraduate students are having difficulties to have a good grasp on the subject matter given that many audit concepts are abstract, difficult to learn and even more challenging to apply (Crawford et al., 2011).

Correspondingly, universities are urged to prepare accounting students to have strong knowledge in audit and at the same time, be critical thinkers by being able to apply the audit knowledge that they have been exposed to. A practical audit experience will induce better understanding as it helps to link the theoretical audit knowledge obtained and its application to the actual situation (Tonge & Willett, 2012; Chiang et al., 2021). Here, the domineering role of IT in audit is another area of concern. On one hand, the daily tasks of auditors are now made easier due to the assistance of IT. On the other hand, the continuing development and growth of new IT bring about new audit risk issues that auditors should be aware of.

The significant impact of IT on internal controls, as well as the issue of executing audit tasks in a computerised environment, necessitate an enhanced level of IT expertise and abilities for those in the audit field. As a result, audit education at higher institutions must acknowledge these developments and response to the changes appropriately. It is now vital for accounting students that are going to work in the audit line to be proficient and competent in both audit

and its related IT skills to enable them to execute their duties successfully. This means that future auditors trained by higher institutions must be up to date on the latest IT knowledge and skills and continue to improve their level of expertise if they are to add value to the workplace. Therefore, audit courses for the Bachelor of Accounting programmes' students should be tailored to the current business environment's demands and expectations so that these students will be able to adapt to these changes.

Research Objectives

Given the above overview, this study attempts to achieve the following two objectives:

1. To explore whether audit courses offered in the Bachelor of Accounting programmes have been aligned with the industry needs in the IR 4.0 era.
2. To analyse the level of IT knowledge and skills possessed by accounting students to face the IR 4.0 era in the field of auditing.

Research Questions

Based on the above research objectives, this study has developed the following three research questions:

1. How have audit courses offered in the Bachelor of Accounting programmes been aligned with the industry needs in the IR 4.0 era?
2. What are the IT knowledge and skills that accounting students possess to prepare them for the IR 4.0 era in the field of auditing?

Literature Review

Accounting Profession in the IR 4.0 Era

IR 4.0 is the second digital revolution involving rapid development of technologies and has revolutionised many industries and jobs including auditing (Chong et al., 2020; Kruskopf et al., 2019). On overall, the IR 4.0 presents new challenges to the accounting profession as some tasks are now automated or being replaced by robots. Accountants need to be IT-savvy to remain relevant and meet the new way of fulfilling the need of the job market. By utilising new technology to aid them in their work, they may now give more focus on value added activities, which enhance efficiency, and contribute towards the company's overall performance (Ghani and Muhammad, 2019).

The IR 4.0 has encouraged accountants to improve their talents and skills to cater for the advancement where the profession is now being aligned with the expanding use of technologies (Akhter and Sultana, 2018). Hence, it is critical to prepare accounting students with the ability to embrace new technologies. As a profession rooted in tradition and surrounded by frameworks and regulatory concerns, it will take a concerted effort to embrace and anticipate the1309volutits and difficulties that the digital and technological revolution will offer (Deloitte, 2019).

As today's automated technologies are highly intelligent, users of IT systems need to gain more skills to enable them to demonstrate high-level alignment with such systems. This suggests that accountants need to shoulder more responsibilities. While technology appears to automate most of the administrative and routine tasks, accounting practitioners need to focus on value-added tasks. For instance, auditors are required to have greater emotional intelligence skill rather than just focusing on data testing straightforwardly (ACCA, 2019). Here, those in the accounting profession will be required to display a combination of professional competencies, including a collection of technical knowledge, skills, and talents, as well as interpersonal behaviours and

attributes (ACCA, 2016). It is also critical for those in accounting profession to possess IT skills in order to run the system effectively and to detect any risks related with the system employed (Kruskopf et al., 2019; Ku Bahador and Haider, 2012). In addition, interpersonal behaviours, skills, and qualities should be reflected in quotients for creativity, emotional intelligence, and vision; technical skills, ethics, and experience should be integrated with intellect and digital awareness; interpersonal behaviours, skills, and qualities should be reflected in quotients for creativity, emotional intelligence, and vision (ACCA, 2016).

The Evolution of Auditing

The word "audit" is derived from the Latin word "audire", which means "to listen". Audit, according to Flint (1988), is an asocial phenomenon with no purpose or value other than its practical use, and its existence is entirely utilitarian. The audit function has arisen in response to a recognised requirement of individuals or groups in society seeking information or reassurance regarding the conduct or performance of others in which they have an accepted and legitimate stake (Flint, 1988). Hence, an audit function is seen as a sort of social control because it acts as a method for monitoring behaviour and performance, as well as ensuring or enforcing accountability of financial statements (Lee & Ali, 2008).

The audit function has grown through several stages, according to the historical evolution of auditing (Lee & Ali, 2008). Auditing first appeared in the ancient civilizations of China, Egypt, and Greece and famous for its checking activities. Modern auditing, on the other hand, did not gain traction in the United Kingdom until the industrial revolution in the mid-nineteenth century. Auditing was primarily focused on assuring the correctness of accounting and finding frauds and errors from the mid-1800s to the early 1900s, which can be referred to as the "traditional conformance role of auditing" (Lee & Ali, 2008).

Over the last 30 years, auditors have played a rather "enhancing role" by improving the integrity and credibility of financial data. They are now required to deliver value-added services such as reporting on irregularities, detecting business risks, and advising management on the internal control environment, in addition to enhancing the credibility of financial statements (Cosserat, 2004). Continuous auditing was an early application of automation technology in auditing. Audit analytics software and electronic spreadsheets such as advance function of Microsoft Excel have been frequently used to automate tests and analysis in recent years. Although technology has substantially increased audit efficiency, integration across many systems or applications is still mostly performed by auditors, implying that the auditor remains labour-intensive (Srinivasan, 2016). In this regard, audit courses and syllabus should be able to prepare accounting graduates to possess the required knowledge and skills so that they can accommodate the current needs and beyond.

Audit Courses and Syllabus

Auditing textbooks still dominated content selection more than two decades after Bryan and Smith's (1997) research on the audit courses content. The use of textbooks is not limited to determining the content. Apart from assessments, textbooks have been used to set learning objectives (Irafahmi et al., 2021). Given the importance of a textbook, it is crucial that the auditing syllabus is aligned with current audit practices. For accounting graduates to remain relevant in the industry, academic contents must be regularly revised and well adapted with such practices (Azhar et al., 2018; Irafahmi, 2019; Irafahmi et al., 2021).

Accounting programmes are still catching up to changes in the auditing profession. While everyone recognises that something needs to change, no one knows where to start. The extent

to which universities have begun to teach advanced auditing methods varies. For example, some universities have started offering accounting information systems (AIS) courses as part of the basic accounting degree programme only whereas some even provided advanced AIS course. Part of the rationale for the lack of change in audit courses is that IT is still relatively new. Educators, according to Dai and Vasarhelyi (2016), have not yet learnt enough about the new audit trends to implement instructional improvements. Also, course resources for teaching this subject were yet to be developed. Brown-Liburd and Vasarhelyi (2015) described that textbook is slow to produce integrative audit projects and engaging case studies that students may work on with the tools. She employs case studies to familiarise her students with advanced audit software such as Audit Command Language (ACL) and IDEA, as well as how to extract data from simulated client databases for use as audit evidence. Then there is the issue that faculty already have a lot of material to teach. However, the undergraduate programme must cover all the conventional topics for students to be reasonably well-prepared for work in an audit firm.

Information Technology in Audit Courses

The effectiveness of accounting curriculum in educating students for accounting, auditing, and technological abilities has the biggest influence on students' acceptance of and preparation for new technologies. As a result, education is crucial in equipping students with IT skills that are valued in their careers (Damerji & Salimi, 2021). IT audit requires the auditors that not only grasp the economic management as the core point but also should have the sound foundation of the software, hardware, development, operation, maintenance, management, and security of the information system. Therefore, IT auditors can audit, test, evaluate and improve the security, stability and effectiveness of the information system by using standard and advanced audit technologies (Chong et al., 2020).

The shifts of auditors' abilities require substantive changes in audit education, which will bring IT science into the traditional management subject. Audit students are expected to master the traditional audit knowledge and methods, but also embody technology-oriented ability. For example, in particular accounting and auditing course, the way of digital data collection and process will increase the statistical and IT content in curricula. Traditional 'lecture' is still the main teaching mode. This teacher-centred lecture mode emphasises theory over practice, which eventually leads to too little information being transmitted in class and severely inhibits students' thinking ability (Sun & Qu, 2020). Moreover, students should be exposed to more real-life audit cases that enable them to be exposed to audit software (Brown-Liburd & Vasarhelyi, 2015). The study employed case studies to familiarise the students with advanced audit software such as ACL and IDEA, as well as how to extract data from simulated client databases for use as audit evidence.

Therefore, the IT audit curriculum system should focus on the combination of the audit theory and practice with high integration of the IT course (Sun & Qu, 2020). It is important to design an interdisciplinary IT audit learning scheme, to emphasise the project-based teaching method and to improve school-enterprise cooperation, so that students are well exposed to innovation ability, practice ability and flexible application ability of knowledge (Sun & Qu, 2020).

Methods

This section describes the research methods adopted by this study to address its research objectives and presents the sources of information used in the analysis of the findings for this

study. It also describes the research design, data collection methods, and instruments used to collect the data.

This study adopts a qualitative research approach as it enabled us to obtain in-depth information concerning issues of interest to our study. This approach is deemed appropriate as it allows us to have a much deeper understanding of research issues which might not be achievable through a questionnaire survey (Jackson et al., 2007). Through a qualitative approach, information was easy to obtain since most of the answers were based on experiences from respective employers and internship students in the audit field.

As part of our data collection, we interviewed 13 students. They comprised of students from five public universities who were pursuing their Bachelor of Accounting programmes and underwent internship programmes in audit firms. We also interviewed two audit academics from two Malaysian public universities. Their vast experiences (more than 10 years) in teaching audit courses in their respective universities were useful for this study as they could reflect and describe the development of audit education in Malaysian public universities more precisely. To get better industrial insights of our research issues, we interviewed three auditors (senior level) from three different Big4 audit firms. Table 1 summarises the interviews conducted with three groups of respondents.

Table 1: Number of respondents interviewed

Group	Number of Respondents
Students	13
Academics	2
Auditors	3

Findings

The results of this study are discussed in this section based on the research objectives posed in the earlier part of the paper.

Audit Courses and Market Demand

For the first research objective, 6 out of 13 students mentioned that the audit topics taught in lectures were sufficient for the market. They further explained that the audit knowledge they gained had given a good perception on the audit courses because of its usefulness and relevance to the auditing profession. During their' internship, they were able to make use of the topics taught in lectures such as the concept and application of materiality in performing audit task given to them. However, the remaining four students said that the audit topics taught are limited at a certain level. They mentioned that most of the audit knowledge gained are not of use during their internship because they have limited access to the whole audit processes conducted in the company. One of their responses is as below:

> "I could not see the big picture of audit knowledge, therefore was unable to apply the knowledge during my internship. I had no clue what I was working on, and it was difficult to go on [do the task] without a senior's guidance in the firm I was doing my internship in." (Student #3)

Similarly shared by another student:

> "Only certain audit things are taught in lectures like materiality and assertions. They were useful when I was going through my internship programme. Most of the tasks given to me were admin jobs which did not require much audit knowledge." (Student #7)

Both interviewed academics agreed that the level of audit courses in Bachelor of Accounting is market-ready and are aligned with the industry needs. The topics taught in the lectures were still relevant to be practised by the students in the firms or industries. Nevertheless, they continued to explain that certain changes need to be made to ensure the audit courses in Accounting Degree are more relevant for the current and future market demands. An academic that we interviewed further elaborated on the certain changes she meant by:

> "[What is meant by] the changes in the audit field? We need to be clear on this. Of course, we need to revise the books that we use in our classes to make sure the topics covered are still relevant to the market. Also, we need to have new books that include more IR 4.0 related topics and have practical new auditing cases for students to apply their knowledge." (Lecturer #2)

The interviewed auditor gave a different perspective regarding this issue. He explained that based on his experience dealing with undergraduate students, they lack the understanding of the audit knowledge. He further explained that these students also lacked practice of audit theory, such as audit procedures, as follows:

> "The students who are trainees in my firm somehow portray a lack of practical knowledge. I admit that these students have quite a strong theorical audit knowledge. However, I find it hard for them to apply their knowledge in the tasks assigned to them." (Auditor #3)

The Level of IT Skills Possessed by Accounting Students

For the second research objective, out of all the students interviewed, only three students agreed that their level of IT skills is average. These interviews prove the level of IT skills of the students is relatively low. Students were taught basic IT skills like Microsoft Word, PowerPoint, and Excel. Besides, these students have also learned Accounting Information Systems (AIS) in university. However, they later commented that only certain IT skills are relevant during their internship programme because firms or industries often use their own IT systems or software to perform audit-related work.

The academics and auditors also agree that the level of students' IT skills is still lacking. An academic from a public university explained that accounting students are only exposed to a low-level IT skill which is not sufficient for the market. She said that the basic exposure of IT skills could only cover a limited area in the audit.

> "Students should be exposed to much more advanced IT skills to cater market demands. They could discover more IT skills beyond classrooms to

> further increase their level of IT skills. This is because the market is using more advanced technologies […] latest software and all […] to complete most of their audit tasks. Therefore, more firms and industries are getting excited in our students as they are not only equipped with audit knowledge, but also have strong IT skills." (Lecturer #2)

She further explained the need for students to self-explore the IT knowledge and skills:

> "Students should not just rely on lectures and our limited exposure in classes. We have a very limited amount of time. Instead, they should go beyond the lectures to prepare themselves for the market especially when it comes to IT skills. They could do that by keeping up to date with evolving audit technologies like Big Data Analytics and Artificial Intelligence. The Internet has a vast information regarding these technologies." (Lecturer #1)

As for auditors, although these students have a good grasp of basic IT skills, they were not able to fully apply their knowledge in the task assigned during their internship. The auditor narrated as follow:

> "In firms, interns are given easy tasks at the very beginning of the internship. These students should have been able to perform a certain task with their basic IT knowledge unless there certain issues that needed guidance. However, some interns were still unable to get a grasp of the IT skills even after being guided. We do not have the luxury of time to guide these interns more detailed". (Auditor #2)

This has proved to be a challenge for existing auditors in the market as they need to guide them amid their pile of tasks. However, auditors are allowed to give a written guideline on IT usages like the firm's software or system.

Discussion

Syllabus in Audit Courses

The main objective of this study is to examine the students', academics', and auditors' perceptions of the content of the audit syllabus concerning the emphasis placed on the development of technical knowledge.

The students interviewed for this study agreed that the audit knowledge taught in lectures was sufficient. This is because the knowledge that they obtained in lectures was able to help them in their internship. Having adequate knowledge in audit has effectively helped these students to identify the right information needed to utilise during audit process. Audit knowledge also helped them recognize how audit process and procedure is undertaken by the company, hence allowing them to develop better processes around the sharing of information. However, students in the interview do voice out their concerns of not having enough exposure to relate their audit knowledge with audit job. One of the major difficulties in learning auditing lies in developing an understanding of the relatedness of the various elements of the curriculum.

Academics also have the same thought regarding the audit syllabus in Bachelor of Accounting. The audit knowledge taught in classes was sufficient for students before their internships or employment. However, one of our academic respondents (Lecturer #1) explained that universities need to improve their syllabus to be aligned with the market demand. She explained that public universities in Malaysia are preparing a blueprint to make changes with the syllabus taught in universities. This shows that universities do recognize that the profession and the required skillset of students have changed. This necessitates the need for changes in the qualification programme and curriculum. Therefore, universities should alter the syllabus of accountancy programme tracks to reflect the changes in the current environment that are taking place in the profession.

Meanwhile, auditors have different perspective on this issue. They explained that students are not market-ready with the limited knowledge of audit they have. An audit practitioner whom we interviewed commented that he agreed that students in general do have good knowledge in theory. However, such knowledge alone is not sufficient to meet the market demand at the current time. From his experience dealing with interns, he explained that although students appear to possess fundamental knowledge in auditing, but their technical and practical knowledge in auditing requires improvement.

To overcome these issues, all three groups of respondents unanimously agreed that the delivery of audit courses needs to be improved. Universities should embrace more experiential learning, which refers to activities that allows students to apply the knowledge and skills they have learned in the lectures in a real-world setting. The shift toward this type of learning stems partly from pressure on colleges to prove they're providing a return on investment for students and are ensuring they will be ready for the workplace. Besides, university can engage in more audit-related stimulation games for the students to have an engaging but informative experience. Some private universities have organised audit simulation programmes for students to experience the audit process based on real cases. Therefore, rather than assigning assignments, academics should encourage students to learn through case studies.

Internship experience also proved successful for these students. In Malaysia, an internship programme is compulsory for public university students, while it is optional for students in private university. From the interview conducted with the students, they assessed positively the internship experience in relation to the overall understanding, motivation and skills required to obtain employment in the workplace (Kapareliotis et al., 2019). The internship experience allowed them to realize the importance of using of audit contents (knowledge and skills) that they can excel in the workplace, identify what matters to them to be fully engaged in the completion of work activity and feel more confident about how to use their skills effectively in the workplace. Although with the positive feedbacks, students feel that they should be better prepared in universities by getting a real feel of the market before stepping into the real working environment.

For students to have more industry or firm related cases, universities invite audit practitioners into lectures and allow these practitioners to share on the real audit cases. This will allow students to put their audit knowledge into good practice, which will then enhance students' mind to get a bigger picture of the application of the audit theory. Therefore, the involvement of industrial practitioners will benefit students in terms of early exposure to the real market demands.

Students' IT Skills

IR 4.0 is changing the way humans live, work, and communicate. The changes can be seen through business models and employment trends. The usage of IT in the market is vital in this era. IR 4.0 encourages s firms and industry to use emerging IT in their daily workload to accommodate many tasks. Certain repetitive jobs are more likely to be automated. In auditing, firms use technology to store audit data and with the advancement of technology, most of the low-level accounting and auditing skills have been replaced with IR 4.0 audit technology (ICAEW, 2017). Smart software systems (including cloud computing) will support the trend towards outsourcing services and greater use of social media via smart technology will improve collaboration, disclosure, engagement with stakeholders and broader communities. Research conducted by the American Institute of Certified Public Accountants (AICPA) in 2020 found that public accounting firms are hiring more non-accounting graduates who possess different skill sets, particularly those related to technology.

As this study's results suggest, students have been equipped with basic IT skills by universities. Although this does help students to increase their IT knowledge, many have regarded that such skills are insufficient for them to perform real audit functions. Students have experienced some difficulties in using IT applications as different firms might use different applications to perform audit functions. Still, students generally have been able to obtain new technological experience through their internship programmes as they are exposed to IT applications.

Auditors and academics provided detailed explanations regarding IT skills. They commented that accounting students should go beyond their capabilities to pick up more IT skills besides being able to use Microsoft tools. Evolving technologies like Artificial Intelligence, Blockchain, Cyber Security, and Big Data (ICAEW, 2017) should also be exposed to students in the accounting curriculum, specifically the impacts of such technologies in auditing tasks. The incorporation of Big Data Analytics (BDA) in firms has pushed most of the occupations, including auditors into adapting to the changing environment (Gupta & George, 2016). Big data analytics one form of advanced analytics, which involves complex applications with elements such as predictive models, statistical algorithms and what-if analysis powered by analytical systems (Javadi et al., 2014). A firm can capture and analyse data towards the generation of insights by effectively orchestrating and deploying its data, technology, and talent (Gupta & George, 2016; Mikalef et al., 2017). Large audit firms, particularly the Big Four, have all made statements regarding the development of BDA tools to navigate and make sense of the vast data stores now available within and outside client organizations (IAASB, 2014; EY, 2014; KPMG, 2014) and invested significant amounts in projects designed to advance the technology (Brown-Liburd & Vasarhelyi, 2015; Cao et al., 2015).

> "Data analytics is doing more than just change the way we will do an audit.
> It will change what an audit of the future will look like" (Drake, 2017).

Seeing that these have become a norm in the business world, both the auditors and academics believe that the introduction of BDA to students during their undergraduates needs to be implemented in Bachelor of Accounting to equipped students with relevant IT knowledge and skills as required by current industry. Given the rapid pace of technological and digital advances, it is important that those in the audit field or who are planning to continue their journey in audit invest in understanding and developing these technologies for one's benefit. This can be a huge challenge for students when starting to embark on their audit career.

Audit courses in universities should also involve more industries and firms to collaborate giving students equivalent knowledge and exposure related to latest technologies in IR 4.0. In some public universities in Malaysia, certified IT auditors from leading audit firms are invited to deliver lectures and introduce technology-wise audit for students' better understanding. In this way, they can learn from practitioners and equip themselves with up-to-date IT skills.

Conclusion

This study has suggested that accounting education has experienced some interesting developments that have taken place in the era of IR 4.0. Although auditing courses taught at Malaysian public universities are still relevant to the auditing profession and practices, there is a need to change their coverage to be more relevant to the IR 4.0 contextual demands. Given that audit technologies are expanding and adaptive to the IR 4.0, accounting students cannot just rely on the theory of audit. Instead, they should be exposed to more real-life cases, so that they can appreciate and apply their audit knowledge within IR 4.0 working environment. By so doing, they can have a clearer picture of the market demands before they begin their employment. Although universities have long recognised that the audit profession and its matching skillset have changed, the response from the academia site is yet to match the demand of the practitioners. To close the disparity, some modifications to accounting programmes and auditing curriculum will be required. Universities may consider altering their accounting programmes to mirror relevant changes that have taken place in the marketplace. Besides, stronger collaborations with some industry players might reduce the expectancy gap between students and potential employers.

Acknowledgement

The authors would like to express their gratitude to the Ministry of Higher Education Malaysia for awarding the Fundamental Research Grant Scheme to this research project (Project Code: FRGS/1/2019/SS01/USM/02/7).

References

ACCA. (2016). Professional Accountants – the Future: Drivers of Change and Future Skills. https://www.accaglobal.com/an/en/technical-activities/technical-resources-search/2016/june/professional-accountants-the-future-report.html

ACCA. (2019). Audit and Technology. https://www.accaglobal.com/lk/en/professional-insights/technology/audit-and-tech.html

Akhter, A. and Sultana, R. (2018). Sustainability of Accounting Profession at the Age of Fourth Industrial Revolution. International Journal of Accounting and Financial Reporting, 8(4), 139–158. https://doi.org/10.5296/ijafr.v8i4.13689

Azhar, Z., Lim, T. C., Lok, C. L. and Phua, L. K. (2018). Closing the study gap. The Star (4 November 2018).

Bierstaker, J. L., Burnaby, P. and Thibodeau, J. (2001). The impact of information technology on the audit process: An assessment of the state of the art and implications for the future. Managerial Auditing Journal, 16(3), 159–164 http://dx.doi.org/10.1108/02686900110385489

Brown-Liburd, H., and M. A. Vasarhelyi. (2015). Big Data and audit evidence. Journal of Emerging Technologies in Accounting 12(1): 1–16.

Bryan, B. J., and Smith, L. M. (1997). Faculty perspectives of auditing topics. Issues in Accounting Education, 12(1), 1–14.

Chiang, C., Wells, P. K. and Xu, G. (2021). How does experiential learning encourage active learning in auditing education? *Journal of Accounting Education*, 54, 100713.

Chong, J. H., Lim, T. C. and Azhar, Z. (2020). The Readiness of the Accountancy Players for the Implementation of Artificial Intelligence. European Proceedings of Social and Behavioural Sciences (EpSBS), LXXXI (ICMR 2019): 237-244. https://doi.org/10.15405/epsbs.2020.03.03.30

Cosserat, G.W. (2004). Modern auditing. John Wiley & Sons. https://books.google.com.my/books?id=VwjTzgEACAAJ

Crawford, P., Lang, S., Fink, W., Dalton, R. and Fielitz, L. (2011). Comparative Analysis of Soft Skills: What is Important for New Graduates? Association of Public and Land-grant Universities and University-industry Consortium: Washington, DC, USA.

Dai, J. and Vasarhelyi, M. A. (2016). Imagineering Audit 4.0. Journal of Emerging Technologies in Accounting, 13(1), 1-15. https://doi.org/10.2308/jeta-10494

Damerji, H. and Salimi, A. (2021). Mediating effect of use perceptions on technology readiness and adoption of artificial intelligence in accounting. Accounting Education, 30(2), 107–130. https://doi.org/10.1080/09639284.2021.1872035

Deloitte. (2017). 2017 Deloitte Global Human Capital Trend: Rewriting the rules for the digital age. https://www2.deloitte.com/cn/en/pages/human-capital/articles/global-human-capital-trends-2017.html

Deloitte. (2019). 2019 Global Impact Report: Connect for Impact. Deloitte University Press. https://www2.deloitte.com/za/en/pages/about-deloitte/articles/2019-global-impact-report.html

Flint, D. (1988). Philosophy and Principles of Auditing: An Introduction. New York: Macmillan Education Ltd.

Ghani, E. K. and Muhammad, K. (2019). Industry 4.0: Employers' expectations of accounting graduates and its implications on teaching and learning practices. International Journal of Education and Practice, 7(1), 19–29. https://doi.org/10.18488/journal.61.2019.71.19.29

Gupta, M. and George, J. F. (2016). Toward the development of a big data analytics capability. Information & Management, 53(8), 1049-1064. https://doi.org/10.1016/j.im.2016.07.004

ICAEW. (2017). Understanding the impact of technology in audit and finance. In. https://www.icaew.com/-/media/corporate/files/middle-east-hub/understanding-the-impact-of-technology-in-audit-and-finance.ashx

Irafahmi, D. T. (2019). Assessing the relevance of undergraduate auditing education: A scoping review. Journal of Accounting and Business Education, 4(1), 11-23. https://doi.org/10.26675/jabe.v4i1.9114

Irafahmi, D. T., Williams, P. J., & Kerr, R. (2021). Written communication: The professional competency often neglected in auditing courses. Accounting Education, 30(3), 304-324. https://doi.org/10.1080/09639284.2021.1916547

Jackson, R. L., Drummond, D. K. and Camara, S. (2007). What is qualitative research? Qualitative Research Reports in Communication, 8(1), 21–28. https://doi.org/10.1080/17459430701617879

Jacky, Y. and Sulaiman, N. A. (2022) The use of data analytics in external auditing: A content analysis approach. Asian Review of Accounting, 30(1), 31-58. https://doi.org/10.1108/ARA-11-2020-0177

Javadi, B., Zhang, B. and Taufer, M. (2014). Bandwidth modelling in large distributed systems for big data applications. 15th International Conference on Parallel and Distributed Computing, Applications and Technologies (pp. 21-27).

Kapareliotis, I., Voutsina, K. and Patsiotis, A. (2019). Internship and employability prospects: Assessing student's work readiness. *Higher Education, Skills and Work-Based Learning*, 9(4), 538–549. https://doi.org/10.1108/heswbl-08-2018-0086

Kruskopf, S., Lobbas, C., Meinander, H., Söderling, K., Martikainen, M. and Lehner, O. (2019). Digital Accounting: Opportunities, Threats and the Human Factor. Oxford Journal of Finance and Risk Perspectives, 8(2), 78-89.

Ku Bahador, K. M. and Haider, A. (2012). Information technology skills and competencies: A case for professional accountants. International Conference on Business Information Systems (pp. 81–87). https://doi.org/10.1007/978-3-642-34228-8_9

Mikalef, P., Pappas, I. O., Krogstie, J. and Giannakos, M. (2018). Big data analytics capabilities: A systematic literature review and research agenda. Information Systems and e-Business Management, 16(3), 547-578.

Reinstein, A., Churyk, N. T. and Tate, S. L. (2018). Analyzing pedagogical approaches used in second auditing courses. *Advances in Accounting*, 42, 110–124. https://doi.org/10.1016/j.adiac.2018.05.001

Salijeni, G., Samsonova-Taddei, A. and Turley, S. (2019). Big Data and changes in audit technology: Contemplating a research agenda. *Accounting and Business Research*, 49(1), 95-119.

Srinivasan, V. 2016. The Intelligent Enterprise in the Era of Big Data. John Wiley & Sons.

Sun, M. and Qu, Y. (2020). IT Audit Education Implemented Under the Cloud Accounting. International Conference on Social Science, Economics and Education Research (SSEER 2020), 455(40-43).

Tessema, B. S. and Abejehu, S. B. (2017). University-industry collaboration in curriculum development: Analysis of banking and finance graduates' attributes from educators and industries perspective. Education Journal, 6(2), 87-93.

Tonge, R., & Willett, C. (2012). An audit learning experience: A pilot project through cooperation with a third sector organisation. *Accounting Education: An International Journal*, *21*(2), 171-185. https://doi.org/10.1080/09639284.2011.615465.

Zerbino, P., Aloini, D., Dulmin, R. and Mininno, V. (2018). Process-mining-enabled audit of information systems: Methodology and an application. Expert Systems with Applications, 110, 80-92. https://doi.org/10.1016/j.eswa.2018.05.030