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Research Article

Pervasive Accounting Skills Needed For The World Of Work In The 4th Industrial Revolution Era

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ABSTRACT

With the World Economic Forum's benchmarking framework, South Africa's readiness and adoption of Fourth Industrial Revolution (4IR) has been found wanting as it is still in the nascent quadrant and has not gone beyond the rudimentary stage yet. The aim of this study is to ascertain the effects of the 4IR in teaching and learning of accounting pervasive skills that are needed to prepare the graduate for the world of work. The study was conducted using a qualitative research method since it is mostly applicable for a small sample size. Taking into consideration the purpose and nature of the research, purposive sampling was employed to identify lecturers in the field of Accounting Education at a university in the province of KwaZulu-Natal, South Africa. The findings from the study indicate accounting academics should possess various skills such as technical skills, ethical skills, soft skills and digital skillsto teach under the 4IR era because the students are tech savvy. Again, there is need for a well-developed, structured work integrated learning programmes to bridge the 4IR knowledge gap in the accounting field in order to prepare the graduates for the world of work. Therefore, the study recommends that universities should develop a plan that will ensure that student graduates are ready for the advancing working world as propelled by the Fourth Industrial Revolution by introducing formal and harmonised accounting curriculum based on 4IR.

Keywords: Adoption, 4IR, Accounting, Education, Pervasive skills

1. Introduction

The readiness for the adoption and usage of the Fourth Industrial Revolution (4IR) by South Africa is a worrying national economic issue. It is important to remember that the 4IR dependson the idea of "smart factories," which calls for integrating people and machines from end-to-end cyber-physical systems (CPS). As indicated in the figure below, there are nine types of newtechnologies that are essential to Industry 4.0. These include cloud computing, big data, automated robots, cybersecurity, simulation, 3D printing, augmented reality, additive manufacturing, Internet of things, and augmented reality (Petrillo et al., 2018).

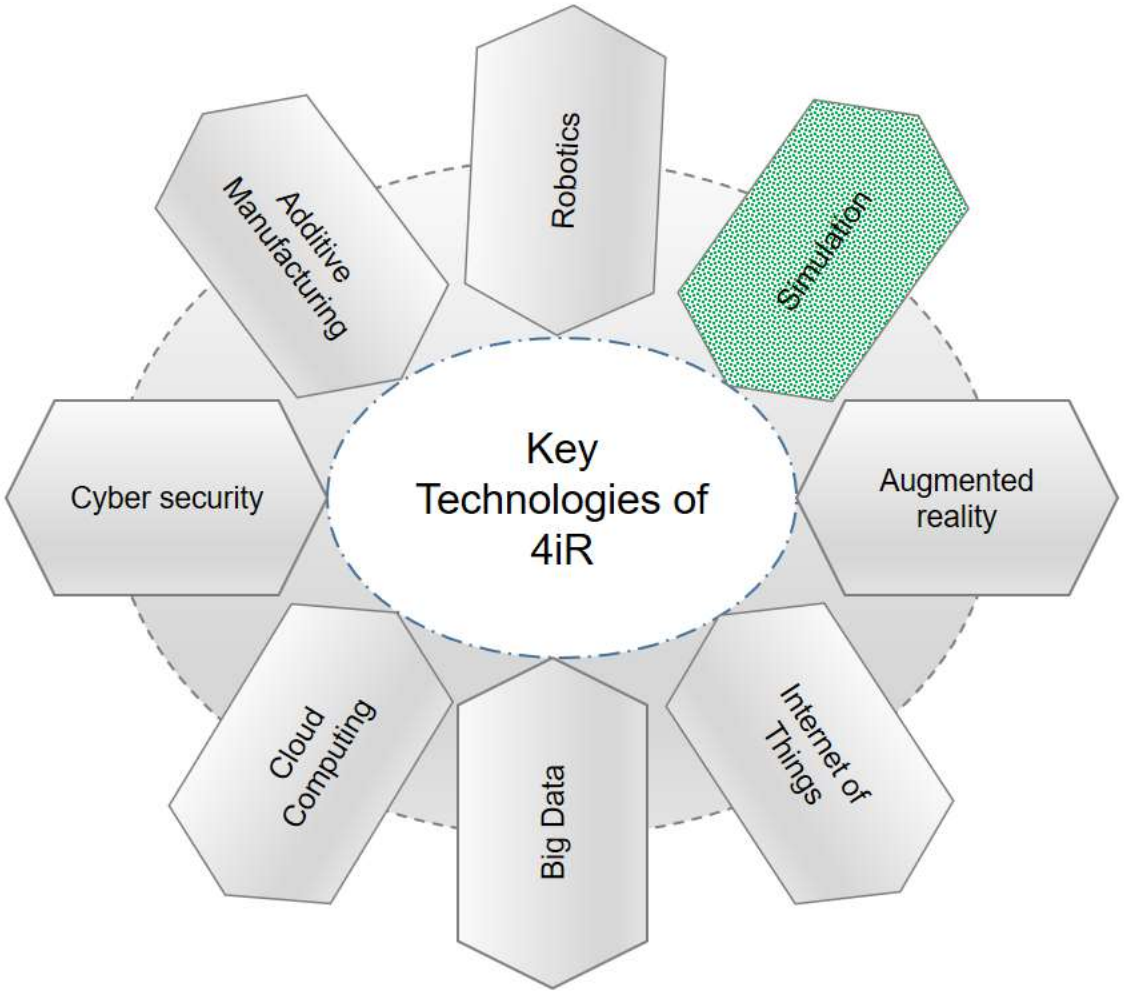


Figure 1: Enabling technologies of 4IR (source: adapted from Dargar and Srivastava, 2020).

Schwab (2016) claims that we are at the beginning of a revolution that is radically altering theway we live, work, and relate to one another. The Fourth Industrial Revolution differs significantly from the previous three industrial revolutions in practically every way when measured in terms of "scale, scope, and complexity" (Schwab, 2016). The Internet of Things (IoT), big data, and artificial intelligence are just a few examples of the digital technologies that Oliver (2020) believes are being integrated into our daily lives as part of the 4IR. This explains why it has become challenging to discern between the digital and physical worlds.

The term "Fourth Industrial Revolution" is used to describe a shift from the digital age to ground-breaking technologies like artificial intelligence (AI), machine intelligence (learning),advanced robotics, technology, genome editing, augmented reality, ubiquitous web (which powers block-chain technology), and 3-D printing (Philbeck and Davis, 2019). Computers or robots can carry out jobs that humans can do, thanks to artificial intelligence. Predictive texts on mobile devices are an example of how machine learning enables a computer to identify trends and make predictions (Oliver, 2020). Block-chain technology enables the encryption of transactions, transfer of results and audit trails to appropriate stakeholders (Siba and Prakash, 2016). Mohammad (2019) asserts that an accountant's professional capacity reflects his/her level of knowledge. This covers his/her amount of education, level of accountability, and skillset. Accounting professionals view colleges, companies, and professional groups differently in terms of the advancement of technological capabilities (Jackson, Michelson and Munir, 2022).

2. Literature Review

2.1 The concept 4IR

The Fourth Industrial Revolution which is currently in its infancy or early stages, is distinguished from the previous three industrial revolutions by a range of innovations that combine the physical, computerized, and natural worlds, affecting all the existing disciplines, economies, and industries (Schwab, 2016). However, from a global perspective, 4IR is a new stage in human evolution made possible by tremendous technological advancements that parallel those of the previous three industrial revolutions. These notable technological advancements combine the digital, biological, and physical worlds in ways that have the potential to both greatly increase security and increase uncertainty. The idea of the Fourth Industrial Revolution has been widely discussed, not only at the World Economic Forum (WEF) (2017) gathering, which are often held in Davos, Switzerland, but also in business leadership circles. Notably, the objectives of the 4IR and how it will (predictably) "define the future of education, gender, and work" have been discussed in recent White Paper(s), and howthis will (predictably) need "accelerating workforce reskilling" (WEF, 2017).

Although the term "industrial revolution" is frequently used to describe the large-scale increase in manufacturing of commodities during the late 19th and early 20th centuries, that period wasin fact, one of the fourth industrial revolutions. Numerous academics have disagreed with the Fourth Industrial Revolution's concept and impact. On one hand, according to Schwab (2016) the term "4IR" refers to an industrial world that is developing and being shaped by a variety of new technologies that combine the digital, biological, and physical worlds. As a result, the 4IRaffects all disciplines, economies, and industries without excluding the question of what constitutes humanity. Erboz (2017) on the other hand, interprets the 4IR referring to the collective technologies of value chain organizations.

The 4IR is primarily focused on the development of digital systems and the use of smart technologies for network integration. It is important to recognize that the 4IR increasingly substitutes the usage of machines for the performance of jobs that formerly required human labour (Erboz, 2017). Moloi and Mhlanga (2021) assert that 4IR refers to "the change of life digitally to be at variance from what we know." This interpretation results from a move from digitalization to innovation, which focused on technologies being coupled and promises considerable increases in productivity. While Erboz (2017) sees 4IR as a collective name for technologies, Schwab (2016) defines 4IR as an emergent universe of work in new technologies.As a result, it is obvious that Erboz and Schwab agreed that the idea of 4IR is dangerous for society and higher education.

The definition by Schwab is more pertinent given the diverse definitions of 4IR by numerous researchers and the fact that this study also recognises the impact of 4IR in the workplace, particularly in Higher Education. Therefore, it is a rebuttable assumption that in the Fourth Industrial Revolution, education is not only difficult and dialectical, but also a thrilling opportunity with the potential to change society and its dimensions, improving logical justifications, the advancement of science, and environmental aspects. The 4IR presents both opportunities and problems for education in this regard (Marwala, 2019). Therefore, it is debatable if the education sector can finally be altered to provide solutions to new challenges by utilizing multiple 4IR components, which vary from IoT, 3D printing, quantum computing,and AI.

2.2 Reshaping the accounting curricula in line with the 4IR environment

Researchers such as Jackson and Meek (2021) are of the view that to shape accounting curriculato better prepare students for the future of work and the expectations of the accounting profession should be the collective responsibility of the stakeholders. Nonetheless, Dolce, Emanuel, Cisi, and Ghislieri (2020) advance the view that, to ensure a proper linkage betweentheory and practice specific training programmes should be created for the less developed skills. Implementing this, universities can use experiential learning, teamwork tasks, case studies, role-plays, and extracurricular activities as options (Wats and Wats, 2009). It is notable,however, that embedding Work Integrated Learning (WIL) components within accounting degrees programmes is just one way in which universities have responded to the growing demand for skills and the improvement of the curricula of Accounting (Freudenberg, Brimble and Cameron, 2011; Lowe and Hay, 2016; Henderson and Trede, 2017;). It is, thus, arguable thatto ensure that accounting students adapt these 4IR technologies which their work environments will require from them, HEIs need to be able to manage the shift to teaching in the

context of the 4IR (Martin-Sardesai, Guthrie and Tucker, 2020).

2.2.1 Work-integrated learning (WIL)

In reference to WIL, Uleanya, Uleanya, and Gamede (2021) argued that students learn best by active participation in learning. It is for this reason that Work Integrated Learning (WIL) provides an opportunity for students to practically apply knowledge and skills attained from theory or learning. The authors (Uleanya et al., 2021) further opined that WIL is beneficial to students when it is appropriately planned, designed, and structured well. Stirling, Kerr,Banwell, MacPherson and Heron (2016) highlighted the following benefits of the WIL below;

- Students' comprehension of the desired type of learning style and their own learningprocess increases.
- There is increased knowledge and skills of critical reflection that improve students'thoughts and insights for practice in the workplace environment without supervision.
- Students are equipped with anticipated basic knowledge and skills required to structureformative and summative reflection tasks.
- Students' abilities to integrate theory and practice, test and try new concepts and notionsare improved.
- Students' personal and professional growth is strengthened.
- Students' Higher Education experience is enhanced.

Further, to prepare students for the real work environment, they engage in Work-Integrated Learning (WIL) which is career-focused learning that integrates the acquisition of theoretical and practical knowledge at university and industrial workplaces (Patrick, Peach, Pocknee, Webb, Fletcher, and Pretto, 2008). WIL plays a significant role in improving the procurement of professional competencies of the student which have a bearing on employability as the skillsbeing acquired get tested in practice (Wilton, 2012). So, the qualification being pursued duringthe learning period develops not only the ability but also the attitude to apply skills in the performance of a professional task in the years of employment and the graduate would be expected to perform a professional task with relative ease.

Furthermore, Tsiligiris and Bowyer (2021) explain WIL as a broad term referring to educationaland knowledge development processes which introduce students to actively participate in the actual work environment where they might be employed in future. Notably, WIL has, as a matter of fact, become a major accounting skills development phenomenon globally. As observed by Jackson and Meek (2021), the processes in this regard entail both internships andplacements which involve engaging students as employees periodically in an entity that promotes their area of study. Mentorships entail placing students under a qualified professionalwithin a work setting with the view of providing them with the opportunity to learn from the professionals. Notably, other WIL engagements include service learning wherein students learn from participating in community activities relating to their area of study. According to Elijido-Ten and Kloot (2015), to connect the theoretical knowledge of students to industrial practice isthe rationale for Work-integrated learning. This connection, as averred by Barrie and Pizzica (2019), is necessitated by the observed gaps between what is produced by educational systemsin graduates and what is required by the world of work. This gap, among other things, is as a result of the slow adaptation of the educational systems to change, as well as issues of graduateswho are of poor quality, resulting from mismatched ratios of teacher-to-student (Jackson and Meek, 2021).

Moreover, Jackson and Meek (2021) noted that before students permanently join the workforceand or the entrepreneurial world, WIL comes in handy as a remedial action which seeks to direct noted professional deficiencies in students. It is against this backdrop, therefore, as argued by Tsiligiris and Bowyer (2021), that the 4IR knowledge gap in the accounting field canbe bridged by WIL programs which are appropriately structured and well-developed. Thus, to contribute towards effective 4IR development of skills, WIL expands the development of knowledge beyond the limits of an educational institution and is thus an enabler of other qualified stakeholders. Notably, basic digital skills and accounting processes such as virtualization are some of the digital skills specifically identified as developable via the WIL route**.** Of importance to note also is the argument that even before the popularization of 4IR theaccounting field has generally been highly digitalized. What is remarkable, however, is that the rapidity which 4IR has brought on the use of technology in the profession renders other modes of skills developmental support, among which WIL is an invaluable and objective necessity.

That notwithstanding, it is important to note though that challenges associated with the processes of WIL are highlighted by both its critics and proponents. Poor coordination and lack of skills development basis which are common between educators and the industry are includedamong the challenges that reduce the effectiveness of work-integrated learning. This, accordingto Elijido-Ten and Kloot (2015), stems from the possibility that the education system creates wide gaps which may still not be fillable through WIL. The limited availability of WIL placement positions for students is a critical challenge which is commonly experienced (Rumbens, Richardson, Lee, Mizrahi and Roche, 2019). Meanwhile, according to Barrie and Pizzica (2019), both limited willingness

and a constrained recruitment capacity on the part of future employers are cited, on the one hand, as accounting for this undesirable state of affairs. On the other hand, Jackson and Meek (2021) cite the fact that the WIL of some organisations is constructed poorly and is thus of little benefit for the student. What is gleaned from the explication above is that capacity constraints and issues of uncertainty relate to failure to guarantee skills development which is effective for the benefit of accountants.

Scholars, such as Stanley and Xu (2019), have asserted emphatically on the several challengesfacing Accounting Education in the implementation of work-integrated learning. Again, as averred by Stanley and Xu (2019), shortage of placements, limitations of staff and resource, and lack of participating employers are critical challenges for universities in their quest to implement WIL. Many universities are of the view that these challenges increase the pressureto bridge the skill's gap with special focus being accorded the development of soft skills as theyare necessary for adaptation to the changing demands of the workplace streamed by 4IR. It is notable, however, that despite the fact that employers have to deal with limited capacity to mentor and supervise students, and difficulties as regards the securement of suitable students capable of performing in the workplace as well as problems relating to the supply of suitable projects to the universities, potential employers recognise the benefit of work-integrated learning (Jackson and Meek, 2021).

2.3 Contemporary issues pertaining Accounting Education

It bears underlining the fact that one of the major criticisms levelled against traditional accounting curriculum and its accompanying assessment methods is that it focuses on the acquisition of specific knowledge which is incapable of developing critical thinking skills in students. This educational situation, therefore, behoves those changes to be made in the accounting curriculum and the teaching of accounting to achieve these new skills which are not adequately addressed by traditional Accounting Education (Malan and Van Dyk, 2021). This assertion is corroborated by Skhephe and Matashu (2021) averment to the effect that traditional approaches bear the blame of producing accounting students who lack the relevant skills and expertise albeit having technical abilities which are commendable apportioned to them**.** It is noted, therefore, that the twenty-first-century business environment demands a different approach to learning and different methods of assessment which make imperative changes in the way in which Accounting Education knowledge and skills are taught to studentsand developed in them.

In as much as accounting can be regarded as a subject that is work-related, where students aretaught procedural knowledge geared towards the performance of specifically assigned tasks inthe accounting field (Pereira and Sithole, 2020), accounting lecturers should lean towards a student-centered approach and further inculcate the culture of critical thinking. This call mustbe heeded since, as argued by Pereira and Sithole (2020), using the most efficient teaching methods for accounting will increase the competence and qualities of accounting students. Jeyaraj (2020) avers that academics should embed their teaching philosophies in the critical classroom. Uddin (2019) alluded to the above fact arguing that the central to contemporary notions of schooling is the enhancement of capability of students to think critically. Hence, it is contended that blended learning (which essentially comprises mixed e-learning andface-to-face learning methodology) is deemed to be potentially apposite in the circumstance (Marwala, 2015). Virtual learning offers a great educational value in the process of informationtransmission and interactive participation. It happens either in real-time, using video conferences or non-simultaneous participants such as in forums and chats. Moreover, face-to-face teaching and evaluation can be used to develop analytical expressions and problem- solving capabilities related to Accounting Education.

2.3.1 Time and place convenience

Time and place convenience view is corroborated by Fortin, Viger, Deslandes, Callimaci and Desforges (2019) assertion that students pursuing other academic or professional activities areafforded the opportunity to manage their studies better. Therefore, Accounting students (not excluding other students) appreciate blended structures as they avail time for work without content or quality being compromised (Fortin et al., 2019). It is also noted that blended programs ease the inconvenience to the work schedule of the individual working student in theevent of the student having to retake the course for reasons of failure. As such, blended teaching increases inclusive opportunities for the broadening of education in circumstances where this would otherwise not materialize.

2.3.2 Cost-effectiveness

According to Dasoo, Bornman, and Rhodes (2020) integrating Accounting Education with ICTs in blended and other hybrid formations produces positive performance outcomes which enhance prospects of securing a job at a reasonable cost to the institution and the student. Unless blended teaching and learning systems in use align with a given society's socio- economic circumstances, the United Nations (2020) does not regard cost-effectiveness as an automatically guaranteed benefit. That the process might become too expensive for intended users is a possibility if costly systems are deployed as part of blended systems.

2.3.3 Student engagement

Mhlanga (2021) asserts that blended teaching and learning increase student engagement, resulting in the production of graduates of high-quality in accounting. This enhanced engagement is accounted for as a function of increased flexibility in teaching and learning which accords students choices on the most convenient times and places for learning (Mhlanga,2021; Kintu et al., 2017). These positive results notwithstanding, Masadeh (2021) argues that student engagement might be lowered by factors which include, among other things, poor self-discipline by students in blended learning and teaching as they demand a greater sense of personal responsibility and self-management on the part of the students (Kintu et al., 2017).

2.4 Perceptions of the lecturers on using technology

As a current and dominant trend of the Fourth Industrial Revolution in all its manifestations inthe different sectors of society, the 4IR environment which produces mobile devices that connect billions of people to powerful information access, processing, and storage network- servers, influences lecturers too, as significant others in the educational domain (Schwab, 2016).Thus, it cannot be gainsaid that the interests of various professionals and/or societies drive these devices. As for lecturers, they automatically promote the interests of these professionalsregardless of their affinity group and/or societies when they use these devices in teaching. Notably, it has become a daily occurrence in the 4IR that through the use of social media sites(SMSs) which range from Facebook, YouTube, WhatsApp, Facebook Messenger, WeChat, Instagram to TikTok, teachers are connected to other people in different social contexts of the communicative spectrum. It can be surmised, therefore, that to communicate and socialize withother people to become members of various groups is the main aim of using digital technologies(Bozalek et al., 2013; Mpungose and Khoza, 2020).

Therefore, it is logical to conclude that academics, when they teach, pragmatically facilitate the process of supporting students to internally construct knowledge with the view of achieving specific attainable learning outcomes. All teaching and learning activities address the question of “how” learning takes place. Since Education 4.0 is a concept that explains a technology- based teaching and learning inspired by 4IR (Hariharasudan and Kot, 2018; Suvin, 2020), the implication thereof is that Education 4.0 is responsive to the needs of the Fourth Industrial Revolution or the effect of 4IR on education (Shahroom and Hussin, 2018). To improve the digital competences across all levels as well as to enhance the use of digital technologies for teaching and learning is the aim of Education 4.0 in teaching and learning. Four basic ways tothe function of the technology-based teaching and learning approach are identifiable namely, basic digital education for all pupils and students, digitally competent educators, learners and employees, and digital educational media (Hariharasudan and Kot, 2018). Since the concept of digitalization is understood to have multiple interpretations, digitalization is conceived as the key driver of innovation in teaching and learning (Gillpatrick, 2020).

3. Research Methodology

In this study, constructivism as a theory of learning which construes reality as a product of human intelligence interacting with experience in the real world, was used for its relevance asthe researcher sought to establish the effects of 4IR in teaching and learning of accounting pervasive skills. Purposive sampling was used to expand the sample of the research under discussion. The six lecturers were selected based on their knowledge, relationships, and expertise regarding accounting hence, qualitative data were collected using interviews. Validityand reliability of the research instrument was ascertained, as the designed instrument was subjected for face and content validity criticism of the supervisor, accounting expert in the field. The data collected was coded in NVivo software and analyzed.

4. Results and Discussion

4.1 Respondents Demographic Data

This section presents and discusses the data which were collected from the respondents by means of interviews. Firstly, the demographics of the respondents will be described and then the analysis of the data follows. Table 1 below presents the demographic data of the respondents.

Table 1: Demographic data of the respondents

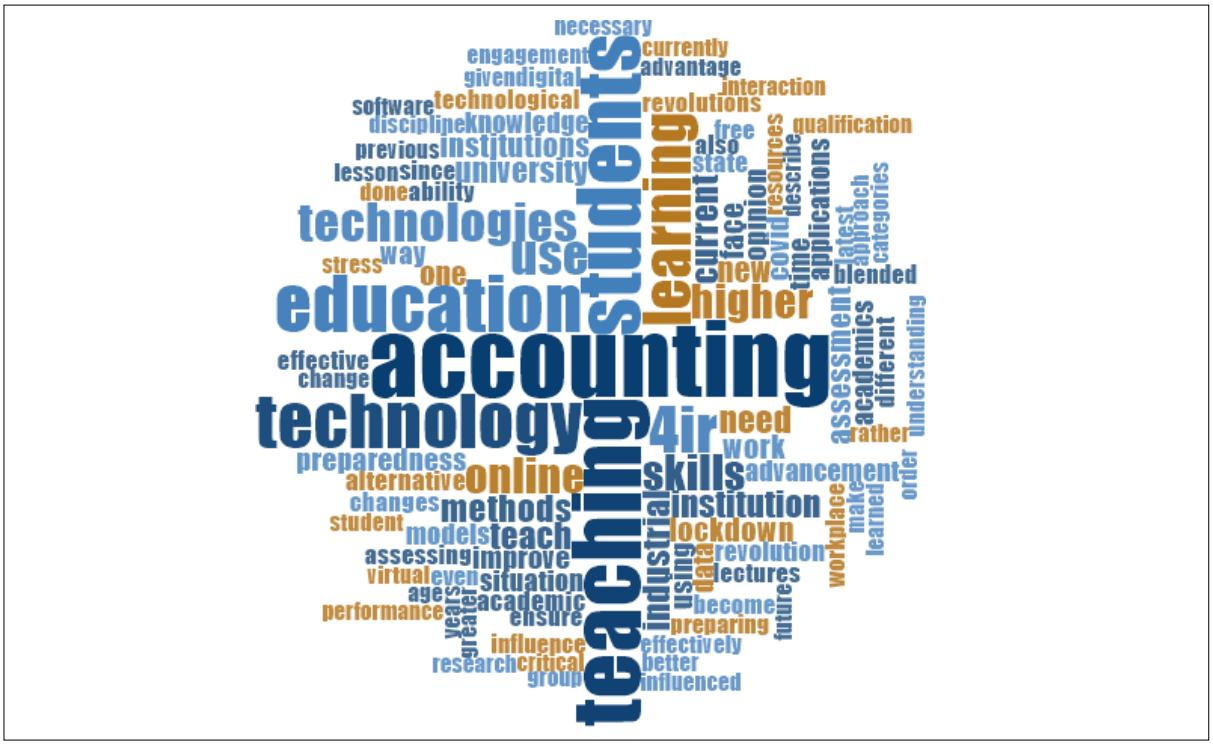
Variables		Frequency	Percent	Cum Percent
Gender	Male Female	4 2	67 33	67 100
Ethnic group	AfricanWhite Indian	3 2 1	50 33 17	50 83 100
Age	25-35 yrs. 36-45 yrs. 46-55 yrs.	1 1 2	17 17 33	17 34 67

	56 yrs. +	2	33	100
Academic Qualifications	Honours	2	33	33
	Masters	3	50	83
	PhD	1	17	100
Years in academia	0-5 yrs.	2	33	26.4
	6-10 yrs.	2	33	60.9
	11-15 yrs.	0	0	65.5
	16-20 yrs.	1	17	74.5
	21 yrs. +	1	17	100.0

From Table 1 above, it can be seen that male representation was dominant in this study whichconsists of 67%, while the representation of female respondents constituted 33%. This indicatesthat the male lecturers were more eager to participate in the study than the female lecturers, it could also mean that the accounting department is dominated by male lecturers. With regards to ethnicity, 50% of the lecturers were African, 33% were White and 17% were Indian. With regards to the age categories, it is evident that majority of the respondents fall within the age category of 46 years and above equating to 66% while 34% are in their youthful age ranging between 25-45 years. Regarding the qualifications of the respondents, 50% have acquired Masters' degrees, 17% hold a PhD degree while 33% have honours degrees, indicating that they are all well learned. Lastly, respondents were asked of their years of service in the accounting profession. From the table above, 66% of the respondents have been in the practicefor less than 10 years, while 34% have been in practice for 16 years and above.

4.2 Thematic analysis

The data were loaded onto NVivo to generate codes that were grouped into themes and sub- themes. The word cloud in Figure 1 below represents the most frequently used words from the interviews. Frequent words emanating from the word cloud include, but are not limited to, Accounting, Teaching, Students, 4IR, Higher Education, Technologies, and Online methods.



4.2.1. The first question seeks to discuss the about the previous industrial revolutions comparedto 4IR. Their views were solicited to establish how previous industrial revolutions compare with the 4IR from the Higher Education perspective. Overwhelming views from the respondents indicate that the 4IR has been one of the most effective in influencing the activitiesin Higher Education institutions.

P3 "*In my view, I think since South Africa always follow behind with technology advancements,I feel the 3rd IR is the one which has been the most effective in higher education.*"
P4 "*in my view, the 4IR is more effective because it results in exponential efficiencies and effectiveness. In a world of scarce resources, the minimization of costly errors is vital. 4IR includes excellent technologies which are able to predict, prevent, identify, and correctpotential and actual errors. Time is a precious commodity which we as humans have, that timeis limited. So, the idea of being able to achieve greater results in a shorter*

space of time also gives 4IR a much greater advantage when compared to previous industrial revolutions."
P5 *"The different industrial revolutions had their objectives that were relevant at each era of each industrial revolution and were effective to their levels. The first three industrial revolutions provided evidence for the profound shifts in society, the economy and education which resulted in a proliferation of curricular innovation and the establishment of new educational institutions. Because of the era and impact of other dynamics currently, 4IR is seenas a demand to all populations, including those who were not impacted during the first three industrial revolutions. However, the most profound effects of the 4IR on our society may not be realized for some time. The 4IR features the impacts of several compounding exponential technologies which share the capacity for rapid increases in usage scale, thus demands a moreproactive response from the educational sector and institutions as compared to previous industrial revolutions."*
P 6 *"in my view the Fourth Industrial Revolution has been more effective in higher educationcompared to other revolutions, however, fundamentally different. It is characterized by a rangeof new technologies that are fusing the physical, digital and biological worlds, impacting all disciplines, economies and industries, and even challenging ideas about what it means to be human. The advantages are evident: increased productivity, efficiency and quality in processes, greater safety for workers by reducing jobs in dangerous environments, enhanced decision making with data-based tools, improved competitiveness by developing customized products."*

The literature on the industrial revolution defines 4IR as a catalyst that aims at digitally transforming life based on a shift from digitalization to innovation at an unprecedented pace (Haleem et al. 2022). It is for this reason, that other scholars alert Higher Education institutions to focus on quality learning that sustains the development of society using service. In this endeavour, quality teaching, acquisition of knowledge, and research are also acknowledged (Xing and Marwala, 2017). From many angles, empirical evidence, secondary data, and the influence of 4IR are acknowledged by everyone and the argument that each revolution was relevant at its time is valid.

4.2.2. The second question seeks to find out the skills academics in the accounting division should possess to teach in the 4IR era that has also seen seasonal pandemics which affect Higher Education institutions. Given that 4IR brings about the advancement of technology in the workplace, particularly in Higher Education, using virtual platforms calls for academics topossess information communication technology. In this theme the respondents provided a variety of responses.

P1 *"academics in accounting should have an inquiring mind and appropriate hardware and as an individual, I think I need time desire hardware."*
P2 *"accounting academics would require technical skills and subject knowledge and for me personally I think I am fine since I have a teaching qualification, adapting for me is not a problem."*
P3 *"academics in accounting would need basic knowledge of how to utilize the online learningprograms to effectively present lectures. This is still a developing issue as newer technologiesare developed academics should keep up to date with new innovations through training and pilot programs. In my case and in the context of this study, I cannot identify any skills shortageon my behalf."*
P4 *"accounting academics should have the following skills: critical thinking; agility; change-management; emotional intelligence and analytical skills. As an individual I need to improve on critical thinking; programming and analytical skills."*
P5 *"The academics in accounting education need a number of skills and these include analytical, organization, critical thinking, interpersonal communication, adaptability, time management, industry knowledge, information technology, decision making, problem-solving.On a personal level I need to improve more on learning software skills and information technology."*
P6 *"knowledge of generally accepted accounting principles (GAAP), IFRS; high level of proficiency in Microsoft Excel; knowledge of QuickBooks/pastel; experience with business intelligence software and knowledge of tax preparation software. In terms of the skills which Ineed to improve on, personally research skills and practices, interrogative questioning.Creativity, artistry, curiosity, imagination, innovation, and personal expression. Perseverance,self-direction, planning, self-discipline, adaptability, initiative. Oral and written communication, public speaking and presenting, listening."*

The findings of the study indicate various skills that respondents possess and further suggest more skills that an accounting academic should possess to teach under the 4IR era. Connolly (2014) states that academics in Higher Education are responsible for creating a challenging andconsciousness-raising learning environment for their students, and they rely on their set of skills to ensure that students receive the best education possible. Research also concurs with the findings of the study in terms of certain skills that are required for accounting academics. Tsiligris and Bowyer (2021) identify four broad skills needed in 4IR-focused accounting professionals: ethical, business, soft, and digital skills. Adding to the findings, Rumbens et al.(2019) state that accounting teachers have for most of history been required to be heavily equipped with accounting technical skills. This proves that academics in the current study areaware that teaching accounting in Higher Education

requires a certain level of competency. Furthermore, more skills would be required in the 4IR teaching and learning era. The literaturefurther enforces the latter assertion in that accounting educators must have subject knowledgedevelopment competencies as their central or core skill because it is primarily what distinguishes an accountant (Tsiligiris and Bowyer, 2021). Accounting educators must have advanced digital skills to motivate students to learn about 4IR (Ashraf et al., 2021; Mhlanga, 2021).

4.2.3. Given the changes that have been witnessed in Higher Education due to the advancementof technology, the researcher asked the respondents about the preparedness of the accounting students for the workplace. Different views emerged from the responses.

P1 *"in my opinion is that the effects of COVID and use of virtual teaching have reduced preparedness. In trying to improve this situation I think I have to implement engagement withdefined hours of participation."*
P3 *"I think it's only the method of delivery of the lectures that are different. In the context of this particular research, I do not see any effect on students' preparedness for the workplace - the same would apply should delivery be face-to-face. To improve the state of preparedness students should be prepared in the same manner regardless. Assessments are assessments beit in the form of written tests/ exams on campus or online proctored test/ examinations."*
P4 *"accounting students are not best prepared for the current and future workplace. There willbe substantial training and development that employers will have to expose these students to –in order for them to perform optimally. Current curriculums are largely 5-10 years old, in terms of their appropriateness for the market."*
P5 *"universities should enhance the development of employability skills and to ensure that such acquisition is made more explicit. Accounting students may not be prepared for the workplace in terms of the different perceptions between employers and university educators regarding the expected skills that accounting graduates should possess. Besides knowledge ofaccounting, there is a growing demand for critical soft skills that the industry expectsaccounting graduates to have. Accounting graduates should also have generic skills and be prepared for the emerging global world of work with its demands. Furthermore, one of the most important capabilities of accounting graduates should be IT proficiency, knowledge and programming skills, and problem-solving skills. Students should get acquainted with the knowledge of ICT even before gaining admission into the university. There should be the training of students on how to learn online and how to access online resources etc. Students need to train on how to access previously unobtainable data and improve data quality throughgreater accuracy and timeliness."*
P6 *"according to my personal experience I think students are confused, they want to graduateand have their degree certificates. The current situation finds them off guard. They are not wellprepared. To fix this situation Operational accounting competency is a student's ability to perform work in the accounting field, it is found in Indonesia. This competency is a core skill that serves as a minimum requirement for accounting graduates to perform generic work as accountants. SA Universities have to introduce this operational accounting competency in order to improve the preparedness of accounting students. The indicators are (1) organizational regulation; (2) internal control; (3) risk assessment; (4) performing accountingrecords; (5) assessing a company's performance; (6) performing an audit; (7) preparing financial statements; (8) preparing an effective budget; (9) preparing financial information; and (10) understanding the accounting system. The indicators for this competency already havegood validity and reliability performance."*

The findings of the study indicate that the respondents have mixed perceptions regarding the preparedness of the accounting students for the work environment. Most of the respondents feel that the advent of COVID-19 has reduced the preparedness of accounting students for thework environment. Research indicates that student's preparedness for work cannot be underestimated due to the observed gaps between what educational systems produce ingraduates and what the world of work requires (Barrie and Pizzica, 2019). Thus, it is necessarythat Higher Education institutions, through their academic enterprise, ensure that students are adequately prepared for the work environment.

The findings of the study further imply that the adoption of virtual learning platforms have notnecessarily assisted academics to prepare students for the world of work. In mitigating this anomaly, the research found that well-developed, structured work integrated learning programmes can bridge the 4IR knowledge gap in the accounting field (Tsiligiris and Bowyer, 2021). WIL extends knowledge development beyond the boundaries of an educational institution, allowing other qualified stakeholders to contribute to the effective development of 4IR skills (Tsiligiris and Bowyer, 2021). The authors specifically identified basic digital skills and accounting process virtualization as some digital skills that can be developed through the WIL route. It is important to note that academics in accounting have been able to establish that some of their students are not adequately prepared for the work environment. This shows that some ofthe academics are conscious of the development of their students. Teachers should help their students, but this can only be done by a teacher who has developed critical consciousness, as Paulo Freire advocated (Leal, 2021). In this study, the respondents, especially those who felt that their students were not adequately prepared for the work environment, also proposed someof the mechanisms that can be adopted to improve the level of preparedness among accountingstudents.

5. Conclusion

The study revealed that the accounting field is expected to be responsive to this new era of change. With the introduction of 4IR there is a need for universities to align the curriculum tomeet the changes that came with 4IR. The alignment should include intensive training of lecturers and provision of updated information technology systems for teaching and learning. The new innovations which are happening in the industrial world that is regulated by the 4IR require concomitant technical skills. However, making students ready for the workplace is notthe only goal of education, it is crucial to have a curriculum that combines the necessary core abilities and skills as accounting practice and theory advance and evolve. The findings of the study indicate various skills that the participants possess, and further suggest more skills that an accounting academic should possess to teach in the 4IR era. Connolly (2014) states that academics in Higher Education are responsible for creating a challenging and consciousness- raising learning environment for their students, and they rely on their set of skills to ensure thatstudents receive the best education possible.

Research also concurs with the findings of the study in terms of certain skills required for accounting academics. Tsiligris and Bowyer (2021) identify four broad skills needed in 4IR- focused accounting professionals: ethical, business, soft, and digital skills. Adding to the findings, Rumbens et al. (2019) state that accounting teachers have for most of history been required to be heavily equipped with accounting technical skills. This proves that academics inthe current study are aware that teaching accounting in Higher Education requires a certain level of competency. Furthermore, more skills would be required in the 4IR teaching and learning era. The literature further enforces the latter assertion in that accounting educators must have subject knowledge development competencies as their central or core skill because it is primarily what distinguishes an accountant (Tsiligiris and Bowyer, 2021). Accounting educators must have advanced digital skills to motivate students to learn about 4IR (Ashraf, etal., 2021; Mhlanga, 2021).

With respect to the preparedness of students for the workplace as future accountants under thedispensation of the 4IR, accounting departmental and faculty members can ameliorate the illusions of grandeur by disseminating needed curriculum changes. As liaisons between employers and students, members of accounting departments and those of faculty are in the best position to disseminate needed curriculum changes towards rectifying the current inadequate and stagnating digital readiness that besets the preparedness of the students as future accountants in the context of the 4IR workplace environment. Formal and harmonised accounting curriculum based on 4IR that will be implemented across all Higher Education institutions should be developed. Therefore, it is incumbent upon the universities, firstly, to determine the technical skills needed to align with the 4IR demands. Once determined, these skills need to be incorporated into the training of prospective and future accounting students toprepare them for the world of employment with demonstrable requisite skills. Future research could be undertaken to learn more about the needs and expectations of the public sector, commercial firms, or corporate world by the universities. That will help universities to produce graduates who are employable in the 4IR era, and to directly address the challenges of unemployment.

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