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Information communication technology integration via Bloom's taxonomy in accountancy curriculum

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Accountants should stay relevant to the business world, making Information Communication Technology (ICT) competencies essential, as highlighted by professional bodies and employers. For this reason, how and when ICT competencies can be integrated into the accountancy curriculum following the guidelines of Bloom's taxonomy was investigated. ICT competency integration into the accountancy curriculum remains a challenge at South African universities, further highlighted by online teaching during the COVID-19 pandemic. This research followed a qualitative approach. Data collection was done through a literature review of Bloom's taxonomy, ICT requirements from the South African Institute of Chartered Accountants (SAICA) and employers, responses from a self-developed questionnaire from lecturers of two participating universities focusing on the perceived inclusion of ICT competencies and when these competencies should be taught in the accountancy curriculum. The participants agreed with the inclusion of MS Excel and MS Word with a discrepancy of when.

Contribution: Based on the sample selected, the results highlighted that how and when ICT competencies could be integrated is not in line with Bloom's taxonomy approach. It is recommended that universities integrate ICT competencies for MS Excel and MS Word in the accountancy curriculum through the assignments already available in a structured and scaffolded approach. This research contributes to the body of knowledge of how and when ICT competencies can be integrated into the accountancy curriculum. Higher education must keep up with the fast-changing business environment and aim to transform their learning accordingly through applying Bloom's taxonomy in a holistic view when integrating ICT competencies within the accountancy curriculum.

Keywords: accountancy; curriculum; employers; graduates; Bloom's taxonomy; ICT competencies; integration.

Introduction

With the non-stop transformation of the working environment, accountancy professionals[1] need to stay relevant and up to date when performing their duties (Barnes 2017; South African Institute of Chartered Accountants [SAICA] 2019; Theuri & Gunn 1998). The transformation has now been influenced by the Fourth Industrial Revolution (4IR), computers not merely storing data but performing complex accountancy transactions (Eberhard et al. 2017:47; Tiron-Tudor & Deliu 2022:256). Thus, forcing universities to extend learning beyond classroom basics to keep up with the constant changing computer environment within the accountancy profession is becoming crucial.

Dating back to 1986, historic concerns highlighted by different institutions, researchers, and professional bodies are still being raised, and highlight the importance of and the need for the integration Information Communication Technology (ICT)[2] into the accountancy curriculum (American Accounting Association [AAA] 1986; Accounting Education Change Commission [AECC] 1990; International Federation of Accountants Education Committee [IFAC] 1996; Kirkham 2020; Stumke 2021:1; Theuri & Gunn 1998; Tiron-Tudor & Deliu 2022:279). Integration of is necessary as technology is incorporated into every part of an accountant's professional trade (Eberhard et al. 2017:48; Lubbe 2017:61). Previous research primarily focusses on adjusting the accountancy curriculum to include ICT competencies (Lubbe 2017:61). There is, however, limited

1.This article's focus is on accountancy professionals and the concept 'accounting and accountancy' is broadly used and refers to different qualifications. In effect, when referring to the module accountancy as a curriculum it includes BCom CA, BCom Accountancy, and BCom Accounting. Similarly, when referring to prospective accountancy professionals it is inclusive of professional accountants, internal auditors, financial managers, tax advisers, among others, for this article.

2.The term ICT includes any technology components. This is inclusive of computer programs, software programs and competencies used to calculate, analyse, and research, technological resources such as computers, laptops, the internet, and any other devices, the use of a computer to type.

research available, past and present, on how and when specific ICT competencies should be integrated into the accountancy curriculum (Stumke 2021:7).

Further uncertainty on how and when ICT competency integration should occur stems from the limited guidance by the SAICA: a significant role player in determining study outcomes for accountants. In their competency framework, the specific ICT competencies that should be integrated into the accountancy curriculum are outlined according to level of competence and not related to a specific year of study (Stumke 2021:80).

This research focussed on how and when ICT competencies can be integrated into the accountancy curriculum using Bloom's taxonomy's guidelines. Emphasising the required ICT competencies as outlined by SAICA.

Literature review

A structured approach is required to integrate ICT competencies into the accountancy curriculum. This structured approach in an educational context of teaching and learning activities is based on learning outcomes (Maphosa, Mudzielwana & Netshifhefhe 2014:355), which includes a series of prerequisites expressing specific levels of knowledge, skills, competencies, and attitudes. Bloom's taxonomy is regarded as the preferred tool used in higher education to formulate such learning outcomes (ElKelish & Ahmed 2022:173). Bloom's taxonomy follows a scaffolding approach with six different knowledge levels that gradually move up, like with a scaffold, from basic knowledge to the level of creating one's own original work, similar to the process applied by Soares, Carvalho and Dias (2020:392). Bloom's knowledge levels indicate how and when ICT competencies can be integrated into the accountancy curriculum and further aid in identifying at which level or year of study it should be done (Stumke 2021:52).

Bloom's taxonomy involves action verbs based on six knowledge levels staggered in ascending order (ElKelish & Ahmed 2022:173). These categories, starting from the bottom and most basic level of knowledge, are (1): lower-order thinking: remember – recall basic facts and concepts; understand – explain concepts and ideas; apply – information gained in the first two categories is used in a new situation and (2) higher-order thinking: analyse – taking several ideas and drawing connections between them; evaluate – form own decision or stance; and create – own original work. Bloom's taxonomy ensures a more reliable assessment of students through the development of clear and level-appropriate learning outcomes by educators (Bhakti 2010:1440).

Zaidi et al. (2017:456) and Agarwal (2019:189) critique Bloom's taxonomy in that although it has been modified and adapted over time, it remains very general. The overall approach through Bloom's taxonomy follows a hierarchical and linear learning approach (Barari et al. 2022:1643). The problems that educators may face are that the diversity of the specific learning outcomes, different learning styles, and the variety of learners may not be considered (Sobral 2021:148). If used as is, the intricacy and interrelation of learning will not be addressed or even considered (Barari et al. 2022:1649). Instead, Bloom's taxonomy needs to be adjusted with a more holistic approach, which will be more valuable for specific subject areas to promote a more comprehensive and inclusive learning environment (Momen, Ebrahimi & Hassan 2022:517; Sobral 2021:150). The perception created by Bloom's taxonomy is that higher-order thinking is always better than lower-order thinking (Momen et al. 2022:517). However, it remains crucial for a balance between lower- and higher-order thinking (Agarwal 2019:189). This balance necessitates the creation of a learning environment that cultivates factual knowledge attainment and the development of higher-order thinking skills, which is crucial when it comes to technology.

The ICT requires a student to first master basic theoretical knowledge and then implement that knowledge in a practical manner. Integrating ICT competencies in the accountancy curriculum through Bloom's taxonomy would enable accountancy students to apply ICT knowledge practically after first mastering basic knowledge and improving their knowledge level in a scaffolding approach (Stumke 2021:49). Should ICT be included in the accountancy curriculum for any reason, students should be exposed to the theory first as this gives them the foundation required for practical application.

The South African Institute of Chartered Accountants (SAICA) emphasises the importance of ICT in the accountancy curriculum through their CA 2025 project, bringing accountancy education in line with 4IR requirements (SAICA 2016:19). This was even further emphasised where the coronavirus disease 2019 (COVID-19) pandemic can be viewed as a 'blessing in disguise' or even 'the push needed' for universities to review their accountancy curricula to realise SAICA's vision. It also facilitates SAICA's plan to equip prospective accountancy professionals with the necessary basic ICT competencies to better integrate and work in a digital working environment. This will be achieved through their revised competency framework, where more ICT competencies are included and required of accountancy graduates (SAICA 2019:5). These ICT competencies, both basic and specialised, are categorised as 'digital acumens'. The digital acumens include data analytics, big data, cognitive and non-cognitive systems, new developments and protocols, distributed processing and cybersecurity and user competencies (Stumke 2021:80). This research focusses on what the basic ICT competencies are as required by SAICA, in line with employer needs, to enable accountancy graduates to be more employable.

Employers are seeking employees who possess basic ICT competencies that can be applied in a business environment. This will aid in developing valuable employees who can function in a 4IR environment (Carvalho & Almeida 2022:5755). When investigating which ICT competencies are required, employers serve as the best benchmark. This is in

line with Kullberg et al.'s (1989:3) notion that universities need to place less emphasis on the needs of the faculty with an enhanced prominence on the needs of employers.

Literature highlights the fact that employers are generally disgruntled with the level of ICT competencies accountancy graduates possess when entering the workplace (Carvalho & Almeida 2022:5755; Phan, Yapa & Nguyen 2020:14). To mitigate this shortcoming, the integration of ICT competencies remains an integral part at university level (Ahmed 1999:14). With this said, it has been echoed throughout the years that the teaching methods of universities are simply not meeting employers' demands (Carvalho & Almeida 2022:5755). The competencies required by employers are set at a very basic level, emphasising MS Excel and MS Word. Research performed internationally and locally highlighted the importance of MS Excel and MS Word in the everyday lives of an accountancy professional (Ahmed 1999:14; Lee, Kerler & Ivancevich 2018:44; Medeiros 2019:5; Modisane 2019:164). Both ICT programmes fall within the user competencies as outlined by SAICA (2019:7). Correspondingly, these two ICT programmes will be referred to as the required ICT competencies for the remainder of this research. This may also aid in the integration of ICT competencies within the current South African context as these applications are available on multiple technological devices and not limited to laptops and computers.

As the inclusion of MS Excel enjoys a greater emphasis above all other software programs, its integration into the accountancy curriculum will be valuable to both the accountancy profession and the accountancy graduate (Lee et al. 2018:44). Willis (2016:87) advocates for the mandatory inclusion of MS Excel in the accountancy curriculum, emphasising the necessity of assigning it a greater significance in the academic program.

With the functionalities of MS Excel and MS Word being similar, the use of the one will ease the use of the other (Otoghile 2015). As a result, these two software programs are proposed to be integrated into the accountancy curriculum with the same level of importance. The specific ICT competencies for MS Excel and MS Word are divided into basic, intermediate, expert, and advanced (Otoghile 2015). These four levels can be linked to Bloom's taxonomy to ensure that the specific ICT competencies are integrated in the most appropriate year of study to follow a scaffolding approach. This translates to how ICT competencies should be integrated and links directly to SAICA's user competencies for their digital acumen as outlined in their competency framework.

Certainly, utilisation and application of ICT competencies necessitates that the specific equipment required should be available. A pressing issue becoming more prevalent with the growing inequality and poverty in South Africa, further highlighted by the COVID-19 pandemic, is the use and even the necessity of ICT in the way universities teach their students (Alvaredo et al. 2018:67; Hurlbut 2018:xii). Over the months following the COVID-19 pandemic, South African universities had to modify their teaching approaches from face-to-face to online learning (Adotey 2020). This addresses the unpreparedness of South Africa, perhaps as a whole and not just in a higher education context, to teach in this manner (Bangani 2020). The main reason for addressing this concern is that a vast number of students and learners do not have the financial means to purchase or have access to an electronic device, a laptop or data in order to access online learning materials. Comins (2020) argues that the more disadvantaged students are being left behind. With a vast majority of these students' parents losing their sources of income during the COVID-19 pandemic and still struggling to make ends meet, not enough funds were left in their households to secure data to access the online learning materials (Mafolo 2020). With this said, Mafolo (2020) indicates that laptops and data were secured and provided to students. Even so, the available laptops were insufficient to cater to all those who needed them, leading to students being unable to access their required online learning materials made available by their respective universities.

Literature clearly outlines that the South African environment is not yet conducive to teach with and integrate ICT competencies because of the lack of available laptops and network connections resulting from current poverty and inequality. This is further contested based on how drastically higher education institutions need to adapt to equip students with laptops and data to enable them to use online learning. With the challenges South African students face, integrating ICT competencies into the accountancy curriculum is and remains necessary to ensure that accountancy graduates will be able to function in the 4IR employer environment.

With the integration of ICT competencies highlighted, literature is limited as to how and when, in terms of in which academic year and at what knowledge level, these competencies and what specific ICT competencies should be integrated into the accountancy curriculum. It is suggested that the integration of ICT competencies into the accountancy curriculum should be based on learning outcomes within the accountancy curriculum (Stumke 2021:141). These learning outcomes are linked to Bloom's taxonomy, where specific verbs enable students to identify what they will need to be able to master to be regarded as competent in a module. Bloom's taxonomy follows a scaffolding approach where basic knowledge is acquired first and builds up to more advanced knowledge. Therefore, this study's research question was formulated as follows: *How can Bloom's taxonomy be applied while integrating ICT competencies into the South African accountancy curriculum context?*

Research methods and design

The research aim is to investigate and determine how and when ICT competencies can be integrated into the accountancy curriculum when following the guidelines of

Bloom's taxonomy. To achieve this, the research follows a qualitative research approach through document analysis and data collection through a self-developed questionnaire.

Instruments and procedures

The qualitative method followed an unstructured process of collecting data to better understand a complex situation by reviewing various text forms (Creswell & Plano Clark 2007:37–39, Leedy & Ormrod 2010:3). The investigation of secondary data sources is mainly to better understand how and when ICT competencies should be integrated into the accounting curriculum. This was achieved by investigating learning outcomes based on Bloom's taxonomy for the 'how' and 'when' to delineate the scaffolding teaching approach of ICT competencies. Subsequently literature was also reviewed on SAICA and accountancy employers' digital requirements to identify the basic ICT competencies that are perceived necessary for accountancy students to possess when they leave university (Stumke 2021:269). This also further aided in the development of specific questions in the self-developed questionnaire. This was performed to confirm the perceived ICT competencies to be integrated into the accountancy curriculum over the different years of study as identified through the literature review on SAICA and accountancy employers (Creswell & Plano Clark 2007:60–62; De Villiers 2015:323; Modisane 2019:94; Mouton 2011:103; Swart 2018:197–198). The questionnaire design and the collection of data are discussed hereafter.

Questionnaire design

The questionnaire was designed based on four different components, namely: (1) A questionnaire previously designed to test the general perceptions of accountancy lecturers and employers of accountants highlighting the seminal notion that there is an expectation gap between what employers expect and what accountancy graduates possess in terms of ICT competencies; (2) the yearbooks of two participating universities were scrutinised and to identify the ICT integration and ICT opportunities within the accountancy curriculum to formulate the most appropriate questions and to gather evidence from the participants of this research on which specific ICT competencies are being integrated and taught; (3) comparing the ICT competencies as indicated in the participating universities' yearbooks to the required ICT competencies required by SAICA as outlined in the competency framework (SAICA 2019); (4) and the ICT integration opportunities and competencies perceived necessary were identified through the in-depth literature review of Bloom's taxonomy and employer ICT expectations were taken into consideration (Stumke 2021:162).

Considering the aforementioned elements and themes, the self-developed questionnaire was designed based on guidelines from literature. The five guidelines of De Vos et al. (2018:61) were considered in this development. This entails the following:

- brief and simple instructions, limited to a five-point response scale;
- well-ordered and user friendly;
- question length to be limited;
- logic question order; and
- grouping of similar questions that are neutral.

The most appropriate distribution method for this research was a web-based questionnaire because of ease of distribution. Google Forms were used to develop the questionnaire as this platform proved to be user-friendly and easily accessible (De Vos et al. 2018:61). The following simple and brief instructions were included:

- researcher's contact information;
- respondent selection process;
- aim of the research;
- beneficiaries from the research;
- cooperation appeal;
- questionnaire completion time;
- incentive for participating in the research;
- anonymity and confidentiality assurance;
- questionnaire deadline; and
- ethical considerations in terms of disclosure of information and confidentiality.

As the answers to the developed questions are known, Monette, Sullivan and DeJong (2002:163) argue that in such circumstances, close-ended questions can be used. With close-ended questions, the interpretation of data is easier because only limited answers can be provided (Creswell et al. 2010:161). De Vos (2018:212) and Swart (2018:13) propose that where a Likert scale is used, it should be limited to five options because it will provide the most valuable data. The close-ended questions are asked in such a manner that the responses can be assigned numbers for easy interpretation. The predefined options respondents could select from, were limited to the specific year of study and included: do not include, 1st year, 2nd year, 3rd year or final year of study and honours. This limits the answers to five points, starting at 0 points for do not include, 1 point for 1st year, 2 points for 2nd year, 3 points for 3rd year or final year of study and 4 points for honours, where possible (De Vos et al. 2018:212). For raw responses from participants captured as words by Google Forms on an MS Excel spreadsheet, the text (1st year, 2nd year, 3rd year or final year of study and honours) were assigned their relevant numbers (1–4).

Where possible, all questions were kept short and to the point, well-ordered, had a logical flow and similar questions were grouped. Table 1 outlines this in a structured manner.

The initial questionnaire was sent to a statistical specialist for analysis and scrutiny. The required adjustments were made and consequently sent to a representative sample of lecturers. After the initial development, the guidance from Creswell et al. (2010:155) and De Vos et al. (2018:195) were followed in conducting a pilot study. Rattray and Jones (2007:237) argue that the best group to carry out a pilot study on, is a

TABLE 1: Questionnaire groupings with reasons.

Questionnaire question group	Reason for question group
Section A: Demographic information	
University employed at and curriculum currently teaching	To ensure only relevant participants, accountancy lecturers from the two selected universities are included in the data analysis
Section B: Perceptions of ICT integration into core accountancy modules: how and when	
Teaching of MS Word, MS Excel, 'other' ICT programmes, data security in the accountancy curricula (when).	To identify the perception of a scaffolding approach linked to Bloom's taxonomy on when which ICT competencies, as identified through literature and SAICA's competency framework, should be taught and are being integrated.
ICT integration at university level: per module, per competency.	

Source: Stumke, O., 2021, 'Development of an integrated information and Communications Technology competency framework for prospective Accountancy professionals', PhD thesis, North-West University, South Africa.

ICT, Information Communication Technology; SAICA, South African Institute of Chartered Accountants.

representative sample of the planned population. For this study, they represent the lecturers teaching in the accountancy programme, not part of the selected sample. All suggestions and comments received from the participants were considered and the questionnaire was amended where necessary. This was to eliminate any interpretation anomalies, ambiguous questions, irrelevant questions and any possible spelling and grammar errors.

After obtaining the necessary ethical clearance, the amended self-developed questionnaire was distributed to the target population by sending an email to the department heads with the relevant link to the self-developed questionnaire. The department heads were requested to invite the accountancy lecturers involved in the accountancy programmes to participate in the research by completing the questionnaire. This resulted in limited control over to whom and when the request to complete the questionnaire was distributed. The initial request indicated that participants had 1 month to complete the questionnaire. A reminder followed this initial request 2 weeks after the initial request.

Ethical considerations

An application for full ethical approval was made to the Economic and Management Sciences Research Ethics Committee (EMS-REC) of the North-West University. Ethical consent was received on 02 May 2019. The ethics approval number is NWU-00118-19-A4.

Written informed consent was obtained from all individual participants involved in the study. All data collected cannot be linked to an individual as no personal information such as name, surname, contact details or address were asked. The only information asked was related to the institution employed. Furthermore, the researcher stored all data gathered electronically with a unique password. Individual-level data will not be disclosed, and will only be utilised in an aggregated form for the purpose of advancing research goals.

Population and sample composition

With SAICA raising the bar in terms of developing work-ready graduates and employers voicing their concern on the work readiness of graduates in terms of ICT, these two stakeholders form part of the qualitative research population.

The 11 traditional and six conventional SAICA-accredited universities comprise the population for this research's quantitative part. Welman Kruger and Mitchell (2005:52) regard testing an entire population as impractical. For this reason, a representative sample of the entire population should be selected (Creswell et al. 2010:146). The sampling frame is based on the lecturers of the SAICA-accredited universities. This is because of the research placing focus on the ICT competency teaching approach in the accountancy curriculum, therefore targeting the lecturers. The population is, however, limited to one traditional university and one comprehensive university, based on prior experience of Swart (2018:2013), which indicates that universities usually provide low response rates.

As response rates from university participants are often limited, the most appropriate sampling method for this research is non-probability sampling based on convenience (Creswell 2014:156–157). The two selected universities and their participants are not identified in any way to protect their identity and to ensure the confidentiality of the participants.

As this research focussed on how and when ICT is integrated into the accountancy curriculum, the responses were collected from lecturers of the two selected universities (Stumke 2021:13). Deriving rationale from the literature on the low response rate, lower response rates are to be expected for web-based questionnaires (Saleh & Bista 2017:67). In addition, questionnaires with low response rates are deemed to be more accurate than those with high response rates (Krosnick 1999:540). With low response rates achieved by Fourie (2014:135) and Modisane (2019:102), reported at 1.79% and 0.53%, respectively, the response rate for this research is deemed adequate for further analysis and interpretation. The target population of the two universities are 50 lecturers in total. The total overall number of responses received was 30% (15) of lecturers.

Data analysis

When text data are converted into numbers, it is more useful as it is more adaptable and comprehensive (Creswell et al. 2010:110). This is achieved by assigning a number to every response received, resulting in a computer being able to analyse the responses. There are three main data coding categories: open coding, axial coding, and selective coding (De Vos et al. 2018:404). Strauss and Corbin (1990:58) contest that the lines between these three coding processes are artificial. As a result, the three different coding methods are used interchangeably.

Open coding is the coding process taking place as literature is reviewed (Wiesche et al. 2017:688). This research takes on the form of a literature review of Bloom's taxonomy and the different knowledge levels, SAICA's digital acumen and

employer needs or expectations of ICT competencies. This was performed to identify what, when and how ICT competencies can be integrated into the accountancy curriculum (Stumke 2021:186).

Axial coding occurs when data are changed in new ways, subsequent to open coding (Strauss & Corbin 1990:58). This research takes on the format of taking similar themes and data collected from the literature review, as outlined here, and developing a questionnaire to obtain further data for analysis.

Selective coding is where main data categories are selected and additional development is performed for categories not yet decided on (De Vos et al. 2018:413). This research takes the form of collecting data through questionnaires and assigning numbers to it for further analysis and interpretation.

The coding of the responses for this research assigned numbers to each response, limited to five answer options, summarised in a code sheet. A code sheet is kept to neatly categorised and group data into different themes (Kreuger & Neuman 2006:394). De Vos et al. (2018:252) state the importance of coding all responses, even non-responses.

For this research, the data were coded and divided into two main categories: (1) demographic information and (2) ICT use and integration. The demographic information mainly dealt with the university enrolled at and the modules taught. Included in the analysis and interpretation of the data were the demographic information, which was used as control questions to ensure that only respondents from the two selected universities and those teaching accountancy modules were part of the analysis. The second category dealt with the specifics regarding ICT and ICT integration into the modules of the two selected universities. The specific questions asked under these two headings (Stumke 2021:132) were: (1) When should Microsoft (MS) Excel and MS Word be taught? (2) What ICT integration is being implemented within your accountancy modules? and (3) Do the current assignments within your modules present your students with the opportunity to utilise ICT competencies?

All these questions indicate the current ICT integration and utilisation within the accountancy modules. This outlines the year of study, scaffolding approach to integrate ICT competencies and what ICT competencies are currently implemented in the accountancy curriculum for the two selected universities.

After receiving 15 responses from lecturers of the two selected universities, the responses were scrutinised to ensure that only lecturers teaching accountancy modules were included. It was found that all participants came from the selected target population and no responses were eliminated.

Findings

The target population for this research focusses on lecturers teaching accountancy modules from SAICA-accredited universities. The data collected from literature and the questionnaire were analysed and outlined in the next section.

Bloom's taxonomy: The scaffolding approach

Applying Bloom's taxonomy categories to accountancy education, the categories can be linked to the different years of study: 1st year, 2nd year, 3rd year or final year of study and honours year. Accordingly, the different years of study serve as the scaffolding approach as outlined by Bloom's taxonomy. Linking the 6 knowledge levels to at least 4 years of study, ICT learning outcomes can be developed in such a way that the basic knowledge is obtained in the 1st year of study, gradually moving up the scaffold until students are able to create their own work in their 3rd year or final year of study.

As basic ICT competencies could translate to only requiring lower-order thinking to define, repeat, explain, locate and identify certain aspects of the relevant software program, it links to the first two knowledge levels of Bloom's taxonomy: remember and understand. Once the basic knowledge is mastered, students would be required to move on to an intermediate ICT competency level. This entails solving, interpreting, preparing, comparing, examining, and even organising data. Linking to Bloom's taxonomy, the apply and analysis knowledge levels features here, with one part in the lower-order thinking and another in the higher-order thinking. Lastly, the requirements for students to critique, select, design, develop, formulate, and investigate aspects using ICT competencies links to Bloom's taxonomies final two knowledge levels, evaluate and create, in the higher-order thinking level. These ICT competencies represent the advanced competency level. As this is the highest knowledge level at a higher educational level, the last ICT competency level, expert competencies, are not deemed necessary to be integrated into the accountancy curriculum and can be acquired and developed in the working environment by employers. Table 2 outlines in what way Bloom's taxonomy can be utilised to design and integrate ICT competencies into the different years of study in the accountancy curriculum purely based on the themes identified from literature (Stumke 2021:254).

Table 2 serves as a possible guideline of the learning outcomes that can be formulated to assess ICT competencies in the

TABLE 2: Bloom's taxonomy categories linked to years of study to ensure a scaffolding approach.

Bloom's categories	1st year	2nd year	Final year	Honours
Remember	√	√	-	-
Understand	√	√	-	-
Apply	-	√	√	-
Analyse	-	-	√	-
Evaluate	-	-	-	√
Create	-	-	-	√

Source: Stumke, O., 2021, 'Development of an integrated Information and Communications Technology competency framework for prospective Accountancy professionals', PhD thesis, North-West University, South Africa.

different years of study in an accountancy curriculum, starting at a basic, lower-order thinking level, gradually building and moving towards a higher-order thinking level. This will enable students to master basic ICT knowledge first before they are required to apply knowledge in a practical way that will ultimately lead to the creation of their own work. With these guidelines, how lecturers perceive the integration of MS Excel and MS Word competencies to be integrated into the accountancy curriculum should be considered.

Comparing the ICT competencies: Employer expectations (theory) and questionnaire results (practice)

The data under Section B in Table 1 were assigned numbers based on the answers that could be provided and described in the analysis of each question to follow.

Question: When should MS Excel and MS Word be taught?

The first two questions in this section dealt with in which year of study, 'when', MS Excel and MS Word should be taught. These two software programs were used as a basis as they have been identified through literature as the two most popular ICT competencies accountancy graduates should possess.

For the two mentioned software programs, the specific competencies were grouped into four categories: (1) basic; (2) intermediate; (3) expert and (4) advanced. Respondents could select one of the following five options: (0) do not include, (1) 1st year, (2) 2nd year, (3) 3rd year or final year of study; and (4) honours (Stumke 2021:200). This ensures that the respondents understand the inclusion of ICT competencies in a scaffolding approach from 1st year up to honours as they are the developers of the integrated ICT activities within the accountancy curriculum, as evident from Bloom's taxonomy. Figure 1 summarises the responses.

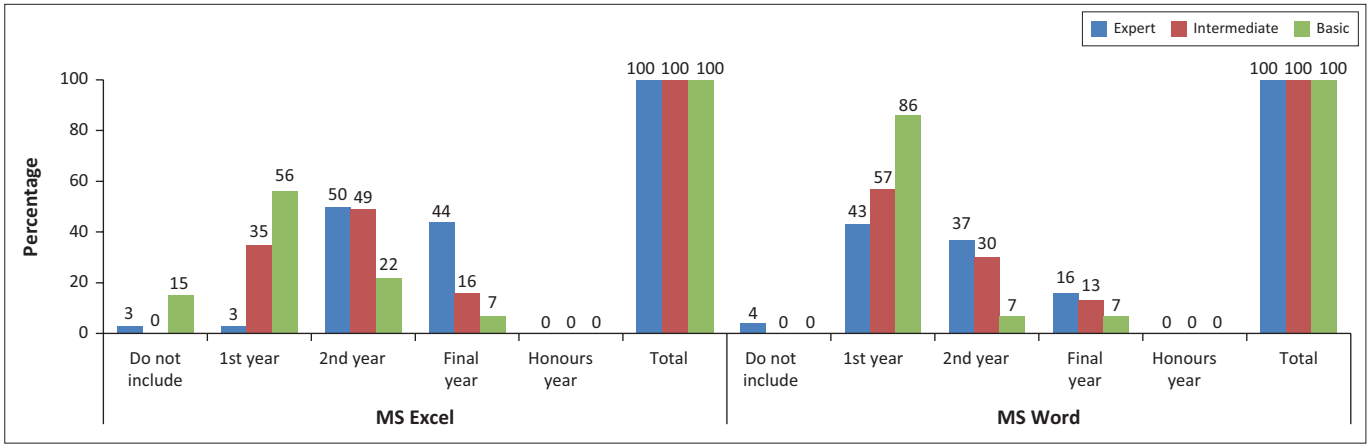
When compared with Bloom's taxonomy and as indicated in Figure 2, the expected pattern would be for basic competencies to constitute the majority of inclusion in the 1st year of study, followed by intermediate competencies in the 2nd year of study and lastly, with expert competencies in the final and honours year of study.

Based on the results illustrated in Figure 1, both MS Excel and MS Word, the majority inclusion of basic competencies are in the 1st year of study at 56% and 87%, respectively. This aligns with Bloom's taxonomy, where learning will occur in a scaffolding approach.

A clear anomaly is where 15% of respondents are of the opinion that basic MS Excel competencies should not be integrated at all into the accountancy curriculum. Deduced from this is that the lecturers who indicated the non-inclusion of MS Excel have not yet realised the value of ICT competencies being included at university level.

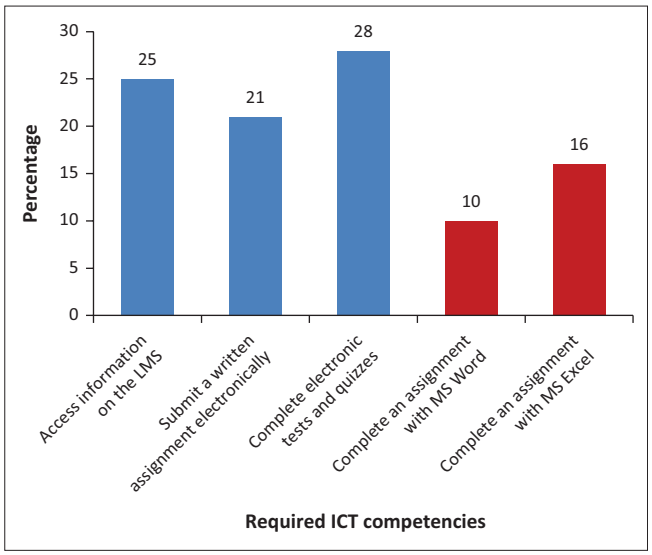
The inclusion of MS Excel in the 2nd year of study reveals that intermediate competencies are perceived to be integrated here with a response rate of 49%. In contrast, intermediate competencies like MS Word constituted a lower inclusion rate in the 2nd year of study at 30% compared with a 57% inclusion in the 1st year of study, not affording a scaffolding learning approach from the 1st year of study. This is not in line with Bloom's taxonomy.

The inclusion of expert competencies for both MS Excel and MS Word received the lowest inclusion rate in the final and honours year of study at 43% and 16%, respectively. This aligns with Bloom's taxonomy and employer expectations, where only basic MS Excel and MS Word competencies are required from graduates. The majority of the respondents indicated that expert competencies for MS Word should be included in the 1st year of study (43%), followed by the 2nd year of study (37%). This is not in line with Bloom's taxonomy because it will not follow a scaffolding learning approach starting from basic competencies and working towards an



Source: Stumke, O., 2021, 'Development of an Integrated information and Communications Technology competency framework for prospective Accountancy professionals', PhD thesis, North-West University, South Africa.

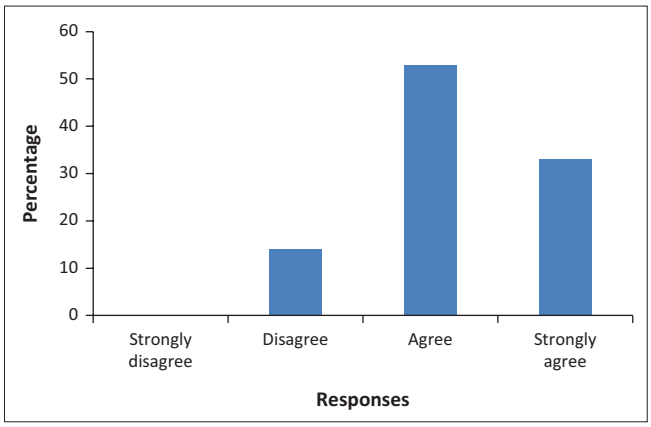
FIGURE 1: In which year of study (when) to integrate MS Excel and MS Word competencies in the accountancy curriculum.



Source: Stumke, O., 2021, 'Development of an integrated Information and Communications Technology competency framework for prospective Accountancy professionals', PhD thesis, North-West University, South Africa.

LMS, learner management system.

FIGURE 2: ICT competencies students are required to use in modules.



Source: Stumke, O., 2021, 'Development of an Integrated information and Communications Technology competency framework for prospective Accountancy professionals', PhD thesis, North-West University, South Africa.

FIGURE 3: Acquisition and utilisation ICT integration opportunity in assignments.

expert level. This could be because MS Word is seen as an 'easier' computer program.

MS Excel expert competencies inclusion was indicated as to be included in the 2nd year of study at 50%, which is also not in line with Bloom's taxonomy's scaffolding learning approach. This could be because of MS Excel being considered a more advanced computer program that should only be taught once students have gained appropriate knowledge or with more relevant assignments only available in the 2nd year of study.

Furthermore, the inclusion of ICT competencies received a 0% response rate in the honours year of study. Deduced from this is that all ICT competencies should have been acquired by the 3rd year or final year of study.

What ICT integration is being implemented within your accountancy modules?

Linking to the perceptions of inclusion of ICT competencies, respondents were asked to indicate what type of ICT competencies integration they require their students to perform or apply within their modules. Respondents could select all the relevant ICT competency options required in their modules as follows:

- nothing
- access to the learner management system (LMS)
- completion of electronic tests and quizzes
- submission of a written assignment electronically
- completion of assignments on MS Excel
- completion of assignments on MS Word.

The first three options (1 – 3) do not represent the integration of ICT but rather just use technology to perform a manual task.

In summary, MS Word made out a higher percentage of integration from the 1st year of study than MS Excel. Also, the perceptions of lecturers on when different levels of MS Excel and MS Word competencies should be included in the accountancy curriculum do not follow a scaffolding approach as outlined by Bloom's taxonomy. This indicates that students will not be adequately prepared with basic knowledge before they are expected to attempt more complex integrated MS Excel and MS Word tasks. How and when the participants are currently implementing ICT competencies is considered to support or disprove this conclusion.

The actual integration is where MS Excel and MS Word are used to complete an assignment. Figure 2 summarises the responses received.

Figure 2 confirms that the use of ICT within accountancy modules does not represent the integration of ICT but rather just using technology to complete a manual task. It is clear as the three options available for performing these tasks, excluding the integration of ICT, have the most responses at 25%, 21% and 28%. Conversely, the necessary ICT competencies that should be integrated into the accountancy curriculum, MS Excel and MS Word, are only required from students at 10% and 16%, respectively.

An additional aspect to investigate is whether the respondents are of the opinion that the opportunity of acquisition and utilisation of ICT competencies are included within their assignments within their modules provide students.

Question: Do the current assignments within your modules present your students with the opportunity to utilise ICT competencies?

This question serves as a control question to corroborate what lecturers perceive ICT competencies to be with regard to just merely using the computer or integrating ICT. Respondents were asked the question as to whether their modules provided students with the opportunity to

integrate ICT competencies by selecting one of the following options:

- strongly disagree,
- disagree,
- agree or
- strongly agree.

Figure 3 summarises the responses received.

Figure 3 identifies that there may be a misconception of what ICT competencies are perceived to be. The data indicates that most respondents, 86% (53% + 33%), are of the opinion that their assignments provide the necessary opportunity to acquire and utilise ICT competencies to their students. This contrasts with the findings of Figure 2, where most ICT competencies required from students are merely those that require students to use the computer for manual tasks and not integrating MS Excel or MS Word. Even though only 14% indicated that they do not provide the acquisition and utilisation of ICT competencies within their modules to their students, the concern is that the importance of ICT competency integration is not realised by some lecturers and as a result, some universities. This could further hinder the integration of ICT competencies to prepare accountancy graduates for the workplace.

Conclusion

More focus is being placed on the use of technology and computers within the accountancy field and higher education alike. The integration of ICT competencies is necessary for accountancy graduates to enable them to work in the digital workplace. The poverty and inequality of South African students hinder this process. Bloom's taxonomy must be considered to integrate ICT competencies into the accountancy curriculum in a structured approach. The ICT competencies to be integrated are MS Excel and MS Word competencies.

The scaffolding approach outlined by Bloom's taxonomy will enable educators to formulate the relevant learning outcomes on the correct knowledge levels. This will clearly outline to students how their ICT knowledge will start at a basic level, move to an intermediate level and finally concluding with expert competencies. These knowledge levels will gradually build up over the years of study to allow students to integrate and apply previous knowledge with new knowledge.

The integration perceptions of the 15 lecturers that partook in this study do not follow a scaffolding approach as outlined by Bloom's taxonomy. In addition, lecturers are implementing ICT in their modules in the accountancy curriculum, with the evidence pointing to the use of the computer rather than the integration of ICT competencies. This opens the opportunity for further investigation where specific assignments can be implemented to address the specific ICT competencies as needed. It also adds to the public perception that the accountancy curricula of several universities are lacking in the integration and not merely using the computer, of ICT competencies in their accountancy curricula.

This research contributes to the literature on the integration of which ICT competencies should be included at a beginner level and in which year of study and what level of the specific software program can be integrated to comply with the teaching taxonomy. Likewise, the allocation of ICT competencies to a particular academic year would enable educators to outline their learning outcomes with ICT-based assignments in mind. Furthermore, this may also aid in the integration of ICT competencies within the current South African context, where limited laptops and computers are available to our students.

A further contribution relates to the use of Bloom's taxonomy in the higher education context. Higher education predominantly uses Bloom's taxonomy as a basis for designing and implementing learning outcomes. Although Bloom's taxonomy is widely used in education, learning outcomes need to be tailored and made relevant to consider the intricacy and interrelation of learning. Higher education must keep up with the fast-changing business environment and aim to transform their learning accordingly. This research outlines that Bloom's taxonomy should be used to assist in the holistic learning approach, not in isolation. This could be more valuable for ICT integration in accountancy as it will promote a more comprehensive and inclusive learning environment focusing on the needs of accountancy employers and the change in the business environment.

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Author's contributions

O.S. acquired, analysed and interpreted the data.

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Data availability

As a result of ethical considerations and participants' consent, the data underpinning the study's results are not openly accessible. The data were exclusively used for this research purpose and were only disclosed in an aggregated manner. Access to the data is available through the corresponding author, O.S., upon reasonable request in a controlled manner as regarded appropriate.

Disclaimer

The views and opinions expressed in this article are those of the author and do not necessarily reflect the official policy or position of any affiliated agency of the author.

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