BRIDGING THE EXPECTATION GAP OF IT
COMPETENCIES BETWEEN ACCOUNTANCY
TRAINEES, SAICA AND EMPLOYERS

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ABBREVIATIONS USED

AAA : American Accounting Association
AECC : Accounting Education Change Commission
AICPA : American institute of CPA’s
AIS : Accounting information systems
AIS : Audit information systems
ANA : Assessment Needs Analysis
CA : Chartered Accountant
CA(SA) : Chartered Accountant South Africa
CAAT’s : Computer Assisted Auditing Techniques
CPA : Certified Professional Accountants
CTA : Certificate in the Theory of Accounting
DBE : Department: Basic Education
DoE : Department of Education
FEI : Financial Executives International
FPL : Food poverty line
IFAC : International Federation of Accountants
IMA : The Institute of Management Accountants
IS : Information systems
IT : Information Technology
LBPL : Lower-bound poverty line
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<thead>
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<th>Abbreviation</th>
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<tr>
<td>MS</td>
<td>Microsoft</td>
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<tr>
<td>MST</td>
<td>Maths, Sciences and Technology</td>
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<td>NEIMS</td>
<td>National Education Infrastructure management systems</td>
</tr>
<tr>
<td>NWU</td>
<td>North-West University</td>
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<tr>
<td>OECD</td>
<td>Organisation for Economic Co-operation and Development</td>
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<tr>
<td>PSR</td>
<td>Professional Skills Review</td>
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<tr>
<td>QE</td>
<td>Qualifying exam</td>
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<tr>
<td>RDP</td>
<td>Reconstruction and Development Programme</td>
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<tr>
<td>SA</td>
<td>South Africa</td>
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<td>SAICA</td>
<td>South African Institute of Chartered Accountants</td>
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<td>SPSS©</td>
<td>Statistical Package of the Social Sciences</td>
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<td>StatsSA</td>
<td>Statistics South Africa</td>
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<tr>
<td>TSR</td>
<td>Technical Skills Review</td>
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<tr>
<td>UBPL</td>
<td>Upper-bound poverty line</td>
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<td>UK</td>
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ABSTRACT

Key words: Accountancy trainees, employers, expectation gap, IT skills and competencies, lecturers, SAICA competencies, students.

The aim of this research was to identify where the expectation gap of IT competencies lies, between accountancy trainees, SAICA and employers. Existing findings and empirical research findings from this study were compared to the prescribed competencies of the professional body, SAICA, to identify where the gap lies and to suggest possible action plans to overcome it. The findings of this study suggest that the availability of technology and IT at schools is limited. Employers identified an overall expectation gap where trainees are not able to apply the basic IT competencies that should have been acquired at university to the practical working environment. The data collected also identified that IT competencies are not being taught at the same level at different universities through the different responses of students, lecturers and trainees, which leads to inconsistent exposure of accountancy trainees to IT prior to their traineeship. As IT competencies have a significant impact on the every-day working life of such a trainee, employers and SAICA expect that students would have obtained basic IT competencies before the start of their traineeship.
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• Any other person not mentioned above who was mistakenly left out.
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CHAPTER 1: INTRODUCTION, PROBLEM STATEMENT AND OBJECTIVES

1.1 INTRODUCTION

The South African Institute of Chartered Accountants (SAICA) (2010a:18), the governing body for Chartered Accountants (CA(SA)) requires members, trainees and students to obtain the skills to integrate Information Technology (IT) into all tasks undertaken by them. It is therefore important that the integration of IT starts at university level to ensure that all members, trainees and students comply with SAICA requirements to obtain the IT skills and competencies as prescribed by this body. Jones and Sin (2003:141-144) propose that students should develop certain skills and competencies to instil lifelong learning. Adetimirin (2012:382) concludes that due to the nature of our current information age, IT has to be adopted by both universities and students to improve different skills and competencies. From the research of seminal global professional institutions and professional bodies such as the American Accounting Association (AAA), 1986; Accounting Education Change Commission (AECC), 1990; International Federation of Accountants (IFAC), 1996 and researchers Adler and Milne (1997:191,199), the overemphasis of technical abilities of accountancy graduates was critiqued and it was suggested that other alternatives should be introduced to develop additional skills required by employers. Corbett and Willms (2002:8) state that employers are looking to employ prospective employees with a certain level of IT skills. Lee and Blaszczynski (1999:104) share this view, concluding that employers expect accounting students to learn several skills, including IT, to “enable the professional accountant to make successful use of the knowledge gained through education”. The specific IT competencies that trainees should acquire are outlined by SAICA (2009:45,111,120,136; 2010a:32-33) and could be seen as an indicator that there is an emphasis on the use of IT in the CA(SA) profession.

SAICA (2010a:18) defines competencies as “the ability to execute a task in the real world”. Mutula (2010:79) identified that in the changing teaching and learning environment of many South African universities, the average accountancy student does not possess the required IT competencies necessary for their studies and subsequently their preparedness for the workplace. He outlined that a reason for this may be
attributed to university students being IT illiterate when they finish high school. In 2009, SAICA introduced the Competency Framework to provide a high level description of all the competencies, including IT competencies, a prospective CA(SA) should possess on entry into the profession. SAICA accredited universities are given the freedom to develop and design their CA(SA) courses and curriculum in the way that best suits their needs (SAICA, 2010a:7-8). It is difficult to establish the level of IT skills that an accountancy student acquires before entering a post graduate degree or Honours degree (Certificate in the Theory of Accounting (CTA)) in Chartered Accountancy (CA) at any university, given the diverse backgrounds of all university students across South Africa (SA) which gives rise to the following questions: What should an accountancy student know and what should universities teach to meet the SAICA competency requirements for IT? What IT competencies should an exit level third year or honours student possess? What IT competencies do employers expect accountancy students to possess?

Kavanagh and Drennan (2008:283-284) and Jackling and De Lange (2008:373-374) assessed the skills of accountancy graduates just in general, with regard to technical and application skills. This finding is further supported by research done by Leggett et al. (2004:369), Crebert (2002:121) and Bennett et al. (2000:1), emphasising that over an extended period, analysis has focused mainly on the generic skills of stakeholders, but not on the specific skills relative to accountancy trainees.

1.2 PROBLEM STATEMENT

SAICA (2010a:32-33) identifies the requirement that accountancy trainees are expected to possess certain IT competencies when they enter the workplace. Specific IT competencies; such as applying spreadsheet software in a relevant accounting and business context, applying basic principles of database software in a relevant accounting and business context are required. The above acquired IT competencies will assist accountancy trainees in their practical learning and future working environment. Cretchley (2007:29) argues that a student’s utilisation of IT is directly affected by the adequate exposure to IT during their studies. Manda and Mukangare (2007:31) support this view by concluding that e-resources are affected by poor skills. Luambano and Nawe (2004:13) further explain that due to insufficient IT skills, some students just use IT for communicating over social networks. Virtanen and Nieminen (2002:147-148)
observe that students with good or satisfactory IT skills could manage basic to
advanced operating system functions. It is evident from the above that the current
accountancy trainee may not possess the required competencies as prescribed by
SAICA, due to insufficient or inadequate exposure to IT during their studies. As
indicated in the previous paragraphs, the literature regarding IT literacy is limited to
technical and application skills.

The research revealed a gap in international and national literature, indicative of a
limited focus being placed on specific IT competencies required by SA accountancy
students at university level, as specified by the relevant international professional
bodies. Moreover, another gap in the literature identified where there is limited focus on
the missing link between the university training, SAICA and employer requirements for
IT competencies and how to overcome this issue. The gaps mentioned above give rise
to the primary objective of this study and are discussed in the following paragraphs.

1.3 OBJECTIVES

1.3.1 Primary objective

The primary objective of this study was to identify current IT gaps between accountancy
trainees, SAICA and employers.

The anticipated contribution to the accountancy field is in the recommendation as
regards the integration of IT in accountancy programmes to enhance the quality of
employees delivered to the workplace. Several secondary objectives were derived from
the primary objective to aid in the answering of the research question.

1.3.2 Secondary objectives

a) Identify the level of exposure to IT students, lecturers and accountancy trainees
have during their studies and work life. Recommend any additional exposure
where a gap arises.

b) Identify whether lecturers and employers are aware of the SAICA guidelines
available for IT competencies that should be taught at university level and what
should be provided at an employer level. Recommend identified competencies
that should be considered and taught at university level but not at employer level,
and vice versa.
c) Identify and recommend specific IT competencies perceived to be important by the different parties.

d) Identify and recommend specific IT competencies to be integrated at university level based on students’ and accountancy trainees’ actual IT competencies.

e) Identify and recommend possible strategies where a gap between accountancy trainees, SAICA guidelines and employers are evident.

1.4 RESEARCH METHODOLOGY

This study is based on a mixed-method research consisting of a literature review and an empirical study. Swart (2013:9) and Mouton (2011:56) illustrates that the accounting literature available refers to Welman (2012) and Creswell (2010) as the authority in research methodology.

1.4.1 Research design

Swart (2013:8) and Mouton (2011:56) argued that the research design relates to the logic of the study, while the research methodology includes the process of data collection. The conclusion that may be drawn from the above is that the first step in solving the research problem is to perform a literature review while the second is to perform an empirical review for analysing and interpreting the collected data.

1.4.2 Research methodology

Collins et al. (2006:67) demonstrate that mixed-method research may be applied in various disciplines. The research indicated that in at least 13 fields; for example, management and organisational research, library and information science research, law, and programme evaluation, have been identified in literature where this method was applied. As Onwuegbuzi et al. (2007:125) point out the mixed method involves qualitative and quantitative approaches where the major focus is on qualitative results.

The literature above draws attention to the importance and relevance of the mixed method for this research, which consists of both quantitative and qualitative methods.

Mouton (2011:86-87) explains that a literature review should include scholarly work by other researchers that is relevant and could contribute to the research. Creswell et al. (2010:26) argue that new as well as historical literature may be applied to support the
relevance of the topic and to identify the gap or flaws in literature. This study includes a comprehensive review on the development of the literature since the beginning of this century.

1.4.3 Empirical research

Mouton (2012:99) and Creswell et al (2010:258) contend that surveys may be used as a form of data collection. Previous research undertaken on the use of IT in accountancy curriculums also made use of surveys. Creswell et al. (2010:156) point out that there are several survey methods that may be used to collect data; the method should be selected by the researcher.

In this study, empirical research was based on a questionnaire prepared on the Likert scale. The content of the questionnaire was categorised and coded as follows:

- Section A: Demographic information
- Section B: Exposure to and use of IT
- Section C: Perception of IT competencies
- Section D: Actual IT competencies
- Section E: IT integration and gap analysis.

The purpose of the questionnaire was to compare the expectation of the workplace regarding IT competencies and the actual IT competencies taught to prospective accountancy trainees at universities. The questionnaire was sent out to four participant groups, which included accountancy students, lecturers, trainees and employers.

SAICA (2014c:3-13) states that there are 15 accredited universities participating in SAICA’s accredited programme. The questionnaires were sent to the relevant universities to be answered by accountancy students and lecturers. Due to the small population, the research was limited to a qualitative research method by applying coding and classification of responses. The accountancy trainees and employers population consisted of all the 645 listed SAICA training officers in 2014 (SAICA, 2014d).
1.5 ETHICAL CONSIDERATIONS

According to the North West University (NWU), the issue of ethical consideration deals with confidential information. Information gained was reported on an aggregated and not on an individual level. The questionnaires did not infringe any human rights. All participants participated on a voluntary basis and were not forced to participate nor victimised if they decided not to participate in answering the questionnaire. Permission was obtained to use their responses as part of this study from all the said participants, prior to them taking part in the study. As stated, individual information was not reported on and was presented in aggregate.

1.6 OVERVIEW OF THE STUDY

This study was presented in the following chapters:

Chapter 1: Introduction, problem statement and objectives

In this chapter, the introduction to the study as it links to the research problem and the objectives, was discussed.

Chapter 2: Literature review

Chapter 2 reviewed literature from peer reviewed journals, professional publications and relevant textbooks, to support the study.

Chapter 3: Research design and methodology

Research methodology and design, questionnaire design, population sizes and sampling methods was discussed in Chapter 3.

Chapter 4: The collection, analysis, and interpretation of data

In this chapter, an analysis of the data collected through the questionnaires was presented and resulting recommendations was given.
Chapter 5: Conclusions, limitations and recommendations

Possible recommendations for further research, possible changes to the accountancy curriculum through IT integration and limitations encountered were entertained in this chapter.
CHAPTER 2: LITERATURE REVIEW

2.1 INTRODUCTION

The expectation gap between accountancy trainees, SAICA and employers was identified in part through the review of the appropriate literature. Creswell (2014:25) explains that a literature review is necessary to enable the researcher “to limit the scope of the study to a needed area of inquiry.” The results of other studies, which closely relate to this one, were considered (Creswell, 2014:27-28). As explained by Creswell (2014:28) the literature review was used as a benchmark to compare the results of the findings of this study, aiming to provide a detailed outline of the topics and integrating what other researchers have done and stated. The views and topics from other researchers aided in the design of the most appropriate data collection method.

This study focused on accountancy trainees’ exposure to and implementation of IT, covering the period from being learners at school, to students at university and ultimately becoming an accountancy trainee at a professional employer. The study concentrated on the expected practical IT competencies prescribed by SAICA for a potential CA(SA) by considering the learning regimen described above up to and including such a time as these students become trainee accountants.

2.2 MASLOW’S HIERARCHY OF NEEDS

Chapter 1 illustrated that various studies identified an expectation gap between accountancy trainees, universities and employers. Studies performed by Corbett and Willms (2002), Lee and Blaszczynski (1999), Adler and Milne (1997), IFAC (1996), AECC (1990) and AAA (1986) found that accountancy curricula are overemphasizing technical skills, a consequence of which is the insufficient exposure of students to the IT skills required by employers. To understand how a person develops into a professional, it is important to undertake a review of the literature starting with Maslow’s (1943:370-382) hierarchy of needs.

Maslow (1943:370-382) argues that people are motivated to achieve certain needs that he described in a hierarchy of five stages. Physiological needs have to be met first, to enable people to thrive in any environment. They need to satisfy their basic needs of food, water and warmth to enable them to function productively in society. Secondly,
after their physiological needs have been satisfied, they will strive for safety. Safety is underpinned by security and shelter in the form of money, homes or even fear from everyday threats. Thirdly, people strive for a sense of belonging. This can be to friends, family or the community, which includes affection and love from others. Fourthly, they need and strive towards self-esteem. When they feel confident in themselves and where they belong, they are motivated to master ideals through the achievement of a personal goal. These goals may include educational, independence, status and prestige goals. Finally, when these needs have been met, there is a striving for self-actualisation, the final stage in his hierarchy, which Maslow (1943:382-383) argues that only one in a hundred people will achieve. This stage refers to a person realising his or her personal potential, when they seek personal growth and self-fulfilment. He argues that the reasons why so few will ever reach this stage stem from the fact that society bases rewards primarily on esteem, love and other social needs. Maslow's five stages as discussed above, are illustrated in Figure 2-1.

Figure 2-1: Maslow’s original hierarchy of needs

Source: Maslow (1943:370-382)

The conclusion that may be drawn from Maslow’s theory, from a psychological perspective, is that when basic needs are left unsatisfied, people are motivated to
achieve them. The lower, more basic levels in a person’s hierarchy of needs need to be met first before a higher level can be reached. As one need is met, one can move on to the next need. McLeod (2014) explains that people are always motivated in “becoming” and never remain the same due to the fact that they are always motivated to reach the next need. Maslow (1970:240; 1943:373) and Sengupta (2011:103) explain that as one need in the hierarchy is met, the lower levels’ percentage of satisfaction will decrease when the next level is met. They also explain that a new need will gradually emerge and will never disappear completely. Students not fulfilling these needs, as per Maslow’s hierarchy, may also not perform to their full educational potential.

2.2.1 Maslow’s hierarchy of needs applied to the education of an accountancy trainee

As accountancy professionals enter different stages in their development at the level of scholar, university student or even at career level, they will always need to grow themselves in their professional settings. Applying Maslow’s psychological model to the development of accountancy professionals, Figure 2-2 is an interpretation and illustration of their growth needs. The basis of their growth needs initially rests on their education when they are scholars, then students and, ultimately, employees. The educational needs of accountancy trainees’ start with the mastering of skills at Primary and Secondary school level (lowest level) first. Only after the needs of this level are met will they be able to move up the hierarchy towards the next level. The model was developed to illustrate the hierarchy in learners’ development into students and ultimately, into professionals in careers. The impact that IT has on this developmental process will be discussed further in paragraph 2.2.2.

Figure 2-2 illustrates the relationship between Maslow’s hierarchy of needs and the development of a potential accountant from being a scholar up to a professional accountant. Applying Maslow’s hierarchy of needs to education at each level should be translated to fit the educational world. Needs 1 and 2, translated, may be illustrated through children requiring basic needs, such as food, water and shelter. Needs 3 and 4, translated, may be illustrated through teenagers constantly trying to fit in with their friends and family. Need 5, translated, may be illustrated through the young adult realising their place in society and striving to be more. Learners in primary and secondary school will strive to meet needs 1 and 2, as in Figure 2-1. Maslow (1970:23) supported by McLeod (2014) explains that if a learner is tired and hungry, they will find it
difficult to focus on learning. A learner’s full potential will only be reached once they feel emotionally and physically safe and accepted within the classroom. University students will also strive to meet needs 1-2, with need 3 added as the percentages of the importance of the needs start to shift. The said students will still strive towards the fulfilment of their physiological needs but to a lesser extent compared to primary and secondary school learners. For students, their role in their community, friends and family becomes more important. Love and affection starts to play a more important role and determines their sense of belonging. After accountancy, students obtain their degree and embark on their postgraduate studies to obtain an honours degree; they will add need 4 to their “fulfilment list”. Confidence will now be relatively high due to them graduating, imbuing them with a higher level of self-esteem. Need 4 will be limited to their exposure to the real world and their perceptions of the workplace. Once a traineeship begins, need 4 will enjoy a greater percentage of importance because the reality of what will be expected of them is now known. Traineeship will go hand in hand with independence. Accountancy trainees will be responsible for their own development and promotion at work. Need 5 will typically only enjoy attention for a few accountancy professionals. As already mentioned, Maslow is of the opinion that only one in one hundred people will ever reach this needs level.
Figure 2-2 illustrates that in a manner similar to Maslow’s hierarchy of needs, in education, the needs or requirements of the lower levels must first be satisfied before higher need levels may be reached. Before a person’s physiological and safety needs may be met, they need to meet their educational needs at primary and secondary school levels. The belonging and self-esteem needs of a person’s education will be met during university, honours, their traineeship year and/or career. For the fortunate few, their self-actualisation need, will also be reached during their career.

The conclusion that may be drawn from the comparison between Figure 2-1 and Figure 2-2 is that psychological needs will always be present during a learner’s or student’s or trainee’s development. When considering Maslow’s hierarchy of needs and personal experience, the level of importance in the different stages of Figure 2-2 will vary from very important to less important in the development of a trainee accountant from being a learner to an employee. The level of importance will be different for every
person and will constantly change as their circumstances change. Table 2-1 is a comparison between Maslow’s theory and development of accountancy professionals per needs level and academic level based on the literature review.

### Table 2-1: Comparison of the level of importance of Maslow’s needs to Figure 2-2

<table>
<thead>
<tr>
<th>Maslow’s needs</th>
<th>Primary and Secondary school</th>
<th>University</th>
<th>Honours CTA</th>
<th>Traineeship</th>
<th>Career</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Physiological</td>
<td>Very important</td>
<td>Less important</td>
<td>Less important</td>
<td>Less important</td>
<td>Less important</td>
</tr>
<tr>
<td>2. Safety</td>
<td>Very important</td>
<td>Very important</td>
<td>Less important</td>
<td>Less important</td>
<td>Less important</td>
</tr>
<tr>
<td>3. Belonging</td>
<td>Very important</td>
<td>Very important</td>
<td>Very important</td>
<td>Very important</td>
<td>Very important</td>
</tr>
<tr>
<td>4. Self-esteem</td>
<td>Very important</td>
<td>Very important</td>
<td>Very important</td>
<td>Very important</td>
<td>Very important</td>
</tr>
<tr>
<td>5. Self-actualization</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Very important</td>
</tr>
</tbody>
</table>

Source: Figure 2-1 and 2-2 combined

Table 2-1 suggests and supports Maslow (1970:29-32; 1943:373) and McLeod’s (2014) view that as a person moves up the hierarchy, the lower level already met will not disappear but, rather, holds less importance. Learners who do not meet the basic needs as illustrated by Table 2-1, will not experience the physiological need as less important at university level and honours level.

#### 2.2.2 Maslow’s hierarchy of needs applied to IT

The effect of IT on the different levels, as suggested by Figure 2-2, starts from as early as primary and secondary school level. Learners need to be exposed to IT at an early age to awaken a sense of curiosity in this regard. Several studies identify that there is an increased availability of IT and that the role it plays in everyday life is constantly increasing (Brynjolfsson & Hitt, 2000:24; Byron, 2008:3-4; Rockart & Morton, 1984:84). Every phase in Figure 2-2 will enjoy a different level of exposure to IT. Primary and secondary school learners will be introduced to different introductory levels of IT. The availability of IT at schools will differ, resulting in SA learners not being uniformly exposed to the same level of IT. As learners enter university and become students, they will be required to perform basic skills acquired at primary and secondary school level. As students, they will build on their foundation knowledge of IT, to master more
advanced IT skills. Throughout their studies, students will need to use IT, not only for examination purposes, but for communication and social needs as well. When students enter the workplace, they will be required to keep on expanding their IT knowledge. The emphasis, however, should be on the reality that employers will expect accountancy trainees to have attained good foundation knowledge, not only in accountancy topics, but in IT as well.

2.3 INFORMATION TECHNOLOGY ERA

It is important to consider the determining concepts to understand from where the IT era and IT issues originate. The need for technology will be less for learners and students in SA who barely have enough to eat every day. Their focus is on survival and not on a luxury such as technology (Maslow, 1943:372-375). In SA there is an ever growing problem where the availability of technology is limited to students from privileged backgrounds (Census, 2011:65-66). Alvermann (2002:viii) outlines the reality of a widening gap between students with ready access to technology and those who struggle to make ends meet.

Brynjolfsson and Hitt (2000:24), Bresnahan et al. (1999:342) and Rockart and Morton (1984:87) argue that throughout the twentieth century, the price of computers declined due to computers becoming “faster, smaller, cheaper, more flexible, and easier to network together.” Rockart and Morton (1984:87) explain that the increased availability of new generation software, leading to more ‘user-friendly’ software, will allow different generation users to utilise computers with greater ease. This, and other changes in technology, has led to the increased demand for IT.

Byron (2008:3-4) argues that the older generation will often keep young people away from new technology as a result of their own lack of mastery over the necessary knowledge to assist the young people. The above author also states that the increased availability of technology places the older generation in a difficult position. Parents tend to avoid technology rather than being regarded as not knowledgeable by their children. The author further argues that the Internet places IT at young people’s fingertips and allows them to have access at the click of a button. Along with the availability of technology comes risks and threats. Young people need to attain the skill to filter useful information that is able to be used in the appropriate settings. The importance of technology in the business environment should be outlined, and young people need to
be aware of the requirements in the workplace that deal with IT related issues, including the increased availability of technology.

Statistics South Africa (StatsSA) identified through the 2011 Census (2011:65) that the number of households with computers increased by 12,9% from 8,5% (2001) to 21,4 % (2011). In 2002, Alvermann (2002:3) identified that 71,0% of teenagers in the United States who have access to the internet used it extensively for their school reports. A survey conducted by Statistics Canada (1999:21) found that from 1998 to 1999 the use of a computer per household for more than 20 hours per week increased from 38,1% (1998) to 47,0% (1999). Furthermore, it is argued that, with an increase in the availability of technology to young people, they spend increasing amounts of time, engaging through the internet for social and educational purposes. Alvermann (2002:6) supports this view, contending that the more technology becomes available, through affordability or accessibility, the more young people have the “ability” to become a “…producer as well as a consumer” of information.

Galbraith et al. (1977 cited in Brynjolfsson & Hitt, 2000:24) explains that the role of computers is important due to “most of our economic institutions and intuitions emerging in an era of high communications cost and limited computational capability.” They define IT as “computers as well as related digital communication technology.” IT provides institutions with the option of reducing the costs of their coordination, communications and information processing. Thus, owing to the benefits of IT and ultimately computers, more institutions are being affected by computerisation.

Studies performed by Bogdanović (2012:35), Yengina et al. (2010:5763-5765), Seke Mboungou Mouyabi (2010:1178), Concannon et al. (2005:501-506), Le Grange (2004:87) and Engelbrecht (2003:20) found that globally, universities are increasingly utilising e-learning as a teaching aid. Some of the reasons for the increased use of IT, as identified by the above authors include, but are not limited to, the following: 1) to increase the quality of learning, 2) due to a change in student demographics and new technologies, 3) the advancement of the information age, 4) rapid retrieval of information, 5) to be more competitive in the education era, 6) to encourage self-management amongst students, 7) to provide and promote life-long learning that is up to date, accessible and affordable, 8) to increase the effectiveness of distance learning and 9) to provide flexible education. It may be deduced from the above that IT plays an
important role from the early stages in education. These skills will be transferred to the workplace and they impact the business environment.

Rockart and Morton (1984:84) make the case that we find ourselves in an era where computer technology now impacts significantly on corporate life. This, despite the fact that IT was primarily developed to automate paperwork. They further explain that successful firms use IT to support business strategies, integrating IT with the organisational structures. The authors critique firms’ use of IT only for the purpose of the latter. They believe that IT can be applied “productively to create new opportunities for the business.” Included in their view of the productive use of IT are new ways to manage the firm and the identification of new markets (Rockart & Morton, 1984:85). It is the view of the authors that IT has passed through three eras of use. In the first two eras, the computerisation of paperwork took place. The first era included the automation of accounting functions. The second era accounted for the change in the emphasis from systems aiding accounting to those assisting first line operational personnel. The first two eras merely enabled companies to process paperwork faster. Keen and Morton and Rockart and Treacy (1982 cited in Rockart & Morton, 1984:86) identified the third era in IT development as IT being used to provide information to all levels of management, facilitating data analysis and communication of results and other facts. The authors argue that the changes in the third era have been effected by changes in technology hardware and software. As a result of computers being employed in day to day business, managements have adopted personal computers and are becoming more computer literate. Toong and Gupta (1982 cited in Rockart & Morton, 1984:86) identified that 70.0% of more than two million personal computers sold at that stage were in the possession of professionals, including managers. Rockart and Morton (1984:86) established that as technology changes, so does the management thereof.

The above information gives rise to the notion that children should know more about IT from social, educational and business perspectives as they are growing up in the IT era. Paragraph 2.3 identifies several factors that influence the availability and use of IT at school level, which affect a learner’s knowledge and skills relating to IT when they exit school and enter university. A discussion on SA schools, in terms of providing learners with the necessary IT skills and competencies to prepare them for university and the workplace together with the fulfilment of their basic and educational needs, is provided in paragraph 2.4.
2.4 SCHOOL AND THE USE OF IT

Maslow (1943:375) argues that “Every person is capable and has the desire to move up the hierarchy...” in order to reach the highest level. This is often not possible due to lower levels not being met. The longer a person is deprived of something, the more they want it and strive to achieve it. The author explains that people’s motivation is derived from them seeking fulfilment and change through personal growth.

The needs hierarchy was subsequently adapted by Maslow to reflect a holistic approach to education and learning. Maslow considers the entire physical, emotional, social and intellectual qualities of an individual and how they impact on learning. “Before a student’s cognitive needs can be met they must first fulfil their basic physiological needs” (Maslow, 1943:373). When the basic needs are not met a student will not be able to successfully move on to the next need.

To understand the daily struggles currently faced by SA learners that directly impact on their use of IT, the following factors were examined in greater detail:

- Poverty, including access to personal computers and the internet
- Access to computer centres at school
- The importance of IT at school level.

2.4.1 Poverty, including access to personal computers and internet

The poverty ratio for SA in 2011 was 56.8% of the total population (Census, 2011:14). Poverty in SA may be directly linked to the unemployment rate. The breakdown of this Figure, per province, is illustrated in Figure 2-3. The poverty trends in SA published in 2014 for 2006 up to 2011 outlines the trends in poverty in the three national poverty lines as published by StatsSA in 2012 (Poverty trends, 2014:7). The three national poverty lines are the:

- Food poverty line (FPL)
- Lower-bound poverty line (LBPL) and
- Upper-bound poverty line (UBPL).
FPL is related to people who are unable to purchase the food required for them to enjoy an adequate diet. LBPL refers to non-food items that are acquired at the expense of food items. UBPL people are those who can purchase any food and non-food items they desire (Poverty trends, 2014:7). The three poverty lines are used to enable a clear distinction between poor and non-poor households (Poverty trends, 2014:6). Poverty trends, published in 2014 (2014:13), reported that poverty has dropped by 45,5% from 2006 to 2011. The successful implementation of social grants by Government has contributed to the reduction of poverty. The social grant consists of free primary healthcare, no-fee paying schools, social grants, Reconstruction and Development Programme (RDP) housing and many more aspects. This short term solution to improve the lives of the poor and to reduce the cost of living has subsequently become a livelihood for many South Africans (Poverty trends, 2014:6).

Key findings on the poverty trends between 2006 and 2011 concluded that 45,5% of South Africans were at that time living below the UBPL. When focus is placed on the extremely poor people living below FPL, the percentage of people has decreased from 2006 to 2011 by 6,0% to 20,2 % (Poverty trends, 2014:12). Identifying the number of people not living below FPL will serve as an indication of the percentage of people who are able to afford luxuries and not only focus on the basic needs to survive.
The reality of the poverty ratio is that more than half of the population do not have the financial freedom to provide, for themselves and their children, anything more than necessities. With limited to no money, struggling households will satisfy their basic needs, physiological and safety, first, as per Maslow’s hierarchy of needs (Figure 2-1). Physiological and safety needs will include food, shelter and security. As first priority, most households living below the poverty line will be restricted to meeting only these needs with their limited resources due to poverty. From the above, it may be deduced that social luxuries such as access to personal computers and the Internet will be on the bottom of the priority list of ‘should have’s’ for struggling households, which could lead to inequalities later in a child’s academic life due to a lack of IT exposure and skills that may negatively influence or impact on their development at university and professional career level.

Figure 2-3: 2011 % Unemployment per Province

Source: Census (2011:50)
Census (2011:66) reports the percentage of households without Internet access as 64.8%. Limited information is available on the reasons for this. The possible reasons could range from Internet access being too expensive to Internet not being required in the person’s every-day life. This limitation on the available reasons suggests that the current poverty ratio has some effect on households having access to the Internet.

**Figure 2-4: 2011 % of households with access to the Internet**

Source: Census (2011:66)

The conclusion that may be drawn from Figure 2-4 is that the current demand, for learners and students to have access to the Internet for both social and educational purposes, places a further burden on households. No Internet access in 64.8% of SA households means that a significant percentage of learners and students are being left behind in technology. As already mentioned, this situation results in a widening gap between students with ready access to technology and those who struggle to make ends meet.

Social grants towards no-fee paying schools indicate the SA Government’s commitment towards improving the lives of poor households. Learners can attend school without their parents having to give up any of their psychological or safety needs
Chapter 2: Literature Review

(Poverty trends, 2014:8). Schools will in return offer learners opportunities and resources not readily available at home.

2.4.2 Access to computer centres at school

SA schools strive to provide learners with the best and most appropriate resources and infrastructure to successfully complete their education. The Department of Basic Education’s (DBE) National Education Infrastructure management systems (NEIMS) reports for 2009 and 2011 reports on the following summary categories, numbers, detail and types within the educational infrastructure:

- Public ordinary and special schools on their own site per province
- Sites per province provided with electrification infrastructure. A site can have more than one type of source
- Sites per province provided with water infrastructure. A site can have more than one type of water source, for example a borehole and municipal water connection
- Sites per province provided with sanitation facilities. A site can have more than one type of sanitation facilities
- Site and the type of fencing on the boundary of the site. A site can have a combination of different types of fence
- Ordinary schools with own site indicating if a library is on the site and if it is stocked
- Ordinary schools on own site indicating if a laboratory is on the site and if it is stocked
- Ordinary schools with own site indicating if a computer centre for teaching and learning is on the site and if it is stocked
- Different facilities, indicating the number of rooms and the total size per type of room
- Building material used for walls for administration and learning space. There can be more than one type buildings where different types of building material were used to construct walls
- Facilities of rooms type, their sizes and numbers per site.
The data available provides a holistic view of what resources are available to learners at SA schools throughout the country. The focus was on the number of computer centres available at schools (NEIMS, 2009 & 2011) and the information available on computer centres provided evidence regarding the exposure of learners at school level to computers and IT per province. As indicated, IT exposure at school level will increase the level of skills and competencies of learners to awaken their IT curiosity.

In Gauteng, the majority of schools, 75.0%, are fortunate enough to have the infrastructure for computer centres compared to those in Limpopo and the Eastern Cape where only 11.0%, respectively, of schools have computer centres. In the former province this is due to the intervention of the Gauteng Online project (NEIMS, 2011:25). In only three out of nine provinces (33.3%) more than 50.0% of schools have access to computer centres (NEIMS, 2011:25). This puts the majority, 66.7%, of schools in the unfortunate position of not having the necessary resources to give learners IT exposure. The SA Government’s attempt to bridge the expectation gap with regard to technology has been significantly impacted through the unavailability of the necessary resources. Without these resources, the gap will not be overcome. Figure 2-5 illustrates only 2011 data relating to the percentage of schools with and without computer centres per province. The latest data available from 2011 was used with 2009 data, reflecting similar results with insignificant changes.
Figure 2-5 clearly indicates that there are not enough computer centres available per province to cater for all the schools. The DBE (2008:15) concludes that the percentage of SA schools with and without computer centres remained virtually unchanged from 2001 up until to 2011. This is further supported by the DBE’s NEIMS reports (2011:25; 2009:34) that illustrates limited, to nil, change from 2009 to 2011. The above raises the question: Why is there a lack of computer centres in certain provinces? One of the main reasons that contributes to this problem originates from the current poverty ratio.
Government strives towards bettering the lives of the poor and will strive towards meeting their basic needs first, such as housing, sanitation and food, which leaves little space for educational extras, such as IT, at school level. Poverty, combined with the budgetary constraints through the Government subsidy, identified by the DBE (2013a:7-32) constitute the main factors why certain strategies and resources in terms of IT, have not been implemented or utilised to their full potential in SA schools.

The poverty ratio per province is compared to the ratio of schools per province with and without computer centres. The 2011 statistics on poverty and the NEIMS report (2011:25) comprised the latest information available at the time of this study on poverty and schools with computer centres. The original information obtained for the poverty per province was obtained from the StatsSA Poverty Trends in SA (2012:12). The percentages of schools per province with and without computer centres were gathered from the NEIMS reports (2011:25, 2009:34) obtained from Table 9 for 2011. Figure 2-2 illustrates the relationship between poverty and the availability of computer centres in schools, per province in SA.

### Table 2-2: Poverty ratio vs availability of computer centres

<table>
<thead>
<tr>
<th>Province</th>
<th>Poverty ratio per province in relation to population</th>
<th>% Schools with computer centres</th>
<th>% Schools without computer centres</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gauteng</td>
<td>6</td>
<td>75</td>
<td>25</td>
</tr>
<tr>
<td>Western Cape</td>
<td>7</td>
<td>61</td>
<td>39</td>
</tr>
<tr>
<td>Northern Cape</td>
<td>11</td>
<td>51</td>
<td>49</td>
</tr>
<tr>
<td>Free State</td>
<td>12</td>
<td>22</td>
<td>78</td>
</tr>
<tr>
<td>KwaZulu-Natal</td>
<td>12</td>
<td>17</td>
<td>83</td>
</tr>
<tr>
<td>Mpumalanga</td>
<td>12</td>
<td>16</td>
<td>84</td>
</tr>
<tr>
<td>North West</td>
<td>12</td>
<td>22</td>
<td>78</td>
</tr>
<tr>
<td>Eastern Cape</td>
<td>13</td>
<td>11</td>
<td>89</td>
</tr>
<tr>
<td>Limpopo</td>
<td>15</td>
<td>11</td>
<td>89</td>
</tr>
</tbody>
</table>

Source: Census (2011:50) and NEIMS (2011:25)

The comparisons recorded in Table 2-2 illustrate the impact poverty has on the availability of IT at schools. Limpopo, being the province with the highest ratio of poverty in SA at 15,0%. Limpopo and Eastern Cape recorded the highest percentage of
provinces without computer centres at 89.0%. The Eastern Cape has the highest percentage of schools without computer centres and ranks second on the poverty ratio list at 13.0%, while Gauteng is currently reported as having the lowest poverty ratio in the country at 6.0% and ranks last on the list of provinces without computer centres at 25.0%. The Western Cape, reporting 39.0% of schools without computer centres, ranks as the second last province in terms of poverty at 7.0%. Figure 2-6 illustrates the secondary data recorded in Table 2-2.
Figure 2-6: 2011 Poverty vs availability of computer centres per province

Source: Table 2-2
The conclusion that may be drawn from Figure 2-6 is that poverty has a direct impact on the availability of IT resources in SA schools. Where a province reveals a higher percentage of poverty, it is likely to indicate a higher percentage of unavailability of computer centres. This emphasises the lack of exposure, on an educational level, which learners have to technology and ultimately IT, as a subject. The comparison illustrates the effect of poverty on the availability of IT at schools. The impact that the unavailability of technology will have on individual learners, should also be considered.

The percentage of learners per province, as a percentage of the national total, was compared to the availability of computer centres. The DBE (2013b:19) statistics on the number of students per province and the NEIMS report (2011:25) on schools with and without computer centres furnished the latest information available at the time of this study. The original information obtained for the percentage of learners per province of the national total was obtained from DBE (2013b:19) from Table 13. The original information obtained for the percentage of schools per province, with and without computer centres, was gathered from the NEIMS report (2011:25, 2009:34) and obtained from Table 9 for 2011. Figure 2-3 illustrates the relationship between the percentages of learners per province as a percentage of the national total.

Table 2-3: % Learners per province vs availability of computer centres

<table>
<thead>
<tr>
<th>Province</th>
<th>Number of learners as % of national total</th>
<th>% Schools with computer centres</th>
<th>% Schools without computer centres</th>
</tr>
</thead>
<tbody>
<tr>
<td>Northern Cape</td>
<td>2.2</td>
<td>1.1</td>
<td>1.1</td>
</tr>
<tr>
<td>Free State</td>
<td>5.4</td>
<td>1.2</td>
<td>4.2</td>
</tr>
<tr>
<td>North West</td>
<td>6.2</td>
<td>1.4</td>
<td>4.8</td>
</tr>
<tr>
<td>Western Cape</td>
<td>8.3</td>
<td>5.1</td>
<td>3.2</td>
</tr>
<tr>
<td>Mpumalanga</td>
<td>8.5</td>
<td>1.4</td>
<td>7.1</td>
</tr>
<tr>
<td>Limpopo</td>
<td>13.8</td>
<td>1.5</td>
<td>12.3</td>
</tr>
<tr>
<td>Eastern Cape</td>
<td>16.0</td>
<td>1.8</td>
<td>14.2</td>
</tr>
<tr>
<td>Gauteng</td>
<td>16.5</td>
<td>12.4</td>
<td>4.1</td>
</tr>
<tr>
<td>KwaZulu-Natal</td>
<td>23.2</td>
<td>3.9</td>
<td>19.3</td>
</tr>
</tbody>
</table>

Source: DBE (2013b:19) and NEIMS (2011:25)
The comparisons in Table 2-3 illustrate that KwaZulu-Natal ranks first in terms of the percentage of learners per province of the national total, indicating that this province needs to educate the most learners in SA. Compared to the availability of computer centres in the province, it ranks fourth in terms of availability. Gauteng, which ranks first in terms of the percentage of schools with computer centres per province, is second on the list of learners per province at 16,5%. The Northern Cape, being the province with the lowest percentage of learners of the national total at 2.2 %, is one of the provinces where more than 50 % of schools have access to computer centres. The Eastern Cape, ranking as the province with the lowest number of computer centres at 89,0%, accounts for 16,0% of learners, per province.

To understand the impact of the lack of availability of computer centres per province one needs to consider the number of learners per province. Figure 2-7 aims to illustrate whether there is a direct link between the numbers of learners per province versus the availability of computer centres per province. The information in Figure 2-7 illustrates the percentage of schools with and without computer centres against the percentage of learners of the national total per province. Figure 2-7 illustrates the secondary data in Table 2-3.
2011 Learners vs computer facilities

<table>
<thead>
<tr>
<th>Province</th>
<th>Learners as % of national total</th>
<th>% of schools with computer centres</th>
<th>% of schools without computer centres</th>
</tr>
</thead>
<tbody>
<tr>
<td>KwaZulu-Natal</td>
<td>23.2</td>
<td>17</td>
<td>83</td>
</tr>
<tr>
<td>Gauteng</td>
<td>16.5</td>
<td>75</td>
<td>25</td>
</tr>
<tr>
<td>Eastern Cape</td>
<td>16</td>
<td>11</td>
<td>89</td>
</tr>
<tr>
<td>Limpopo</td>
<td>13.8</td>
<td>11</td>
<td>89</td>
</tr>
<tr>
<td>Mpumalanga</td>
<td>8.5</td>
<td>16</td>
<td>89</td>
</tr>
<tr>
<td>Western Cape</td>
<td>8.3</td>
<td>61</td>
<td>84</td>
</tr>
<tr>
<td>North West</td>
<td>6.2</td>
<td>22</td>
<td>39</td>
</tr>
<tr>
<td>Free State</td>
<td>5.4</td>
<td>22</td>
<td>78</td>
</tr>
<tr>
<td>Northern Cape</td>
<td>2.2</td>
<td>51</td>
<td>49</td>
</tr>
</tbody>
</table>

**Figure 2-7: 2011 Learners vs. computer facilities**

Source: Table 2-3
The conclusion that may be drawn from Figure 2-7 is that the percentage of learners per province does not affect the percentage of schools in that province with and without computer centres. A further investigation should be carried out to evaluate the percentage of students per province who do not have access to computer centres. This data will provide an indication of the percentage of learners experiencing the expectation gap from school to university level in terms of readiness in IT.

The percentage of learners per province, as a percentage of the national total, was compared to the percentage of learners with and without computer centres. The DBE (2013b:19) information on the number of students per province and the NEIMS report (2011:25) on schools with and without computer centres represented the latest available information at the time of this study. The original information for the percentage of learners per province of the national total was obtained from DBE table 13 (2013b:19). The original information for the percentage of schools per province with and without computer centres was garnered from the NEIMS report (2011:25, 2009:34) obtained from table 9 for 2011. The percentages of learners from the national total with and without computer centres were calculated by multiplying the learners as a percentage of the national total by the percentage of schools with and without computer centres per province. Figure 2-4 illustrates the relationship between the percentages of learners per province as a percentage of the national total.
Table 2-4: 2011 % of learners of national total with and without computer centres

<table>
<thead>
<tr>
<th>Province</th>
<th>Learners as % of National Total</th>
<th>% of schools with computer centres</th>
<th>% of learners with computer centres of national total</th>
<th>% of schools without computer centres</th>
<th>% of learners without computer centres of national total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Northern Cape</td>
<td>2.2</td>
<td>51.0</td>
<td>1.1</td>
<td>49.0</td>
<td>1.1</td>
</tr>
<tr>
<td>Western Cape</td>
<td>8.3</td>
<td>61.0</td>
<td>5.1</td>
<td>39.0</td>
<td>3.2</td>
</tr>
<tr>
<td>Gauteng</td>
<td>16.5</td>
<td>75.0</td>
<td>12.4</td>
<td>25.0</td>
<td>4.1</td>
</tr>
<tr>
<td>Free State</td>
<td>5.4</td>
<td>22.0</td>
<td>1.2</td>
<td>78.0</td>
<td>4.2</td>
</tr>
<tr>
<td>North West</td>
<td>6.2</td>
<td>22.0</td>
<td>1.4</td>
<td>78.0</td>
<td>4.8</td>
</tr>
<tr>
<td>Mpumalanga</td>
<td>8.5</td>
<td>16.0</td>
<td>1.4</td>
<td>84.0</td>
<td>7.1</td>
</tr>
<tr>
<td>Limpopo</td>
<td>13.8</td>
<td>11.0</td>
<td>1.5</td>
<td>89.0</td>
<td>12.3</td>
</tr>
<tr>
<td>Eastern Cape</td>
<td>16.0</td>
<td>11.0</td>
<td>1.8</td>
<td>89.0</td>
<td>14.2</td>
</tr>
<tr>
<td>KwaZulu-Natal</td>
<td>23.2</td>
<td>17.0</td>
<td>3.9</td>
<td>83.0</td>
<td>19.3</td>
</tr>
</tbody>
</table>

Source: DBE (2013b: 19) and NEIMS (2011:25)

Table 2-4 indicates that the Northern Cape accounts for the lowest percentage of learners with no access to computer centres. This is in contrast to Figure 2-5, where the province ranks seventh across all provinces, with only 49.0% of schools not having access to computer centres. Gauteng lies at the bottom when it comes to schools with no access to computer centres at 25.0%. When this is compared to its ranking in terms of learners on a national level, Gauteng is placed seventh overall. KwaZulu-Natal has the highest number of learners in the country, having to educate 23.2% of SA’s learners. The unavailability of computer centres results in 19.3% of learners not having access to computer centres. All the other provinces lie on a similar rank for the number of learners on a national level compared to the availability of computer centres. Figure 2-8 illustrates the secondary data from Table 2-4.
Figure 2-8 illustrates that the majority of schools, 70.4%, across SA were without computer centres in 2011. In SA, where the poverty level represents at least half of the population, schools will have to fill the gaps, especially where IT, a perceived luxury, is concerned. With limited computer centres available per province, the following questions should be asked: Are the available computer centres enough in number and adequate to comply with the high demand for IT? What are the factors influencing the availability of computer centres across SA?
2.4.3 The importance of IT at school level

The DBE (2013a:42) identified a need for the specific focus on Maths, Sciences and Technology (MST) in a strategy developed in 2001. The development of the strategy emerged after investigations into poor performance, and a lack of exposure to these three specific areas was identified in SA schools. The aim of the MST implementation strategy was to place more focus on these subjects to strive towards the improvement of results, skills and awareness amongst learners and teachers.

To understand the process behind the implementation and availability of computer centres, together with the factors influencing this, the DBE had to investigate where the provinces were in terms of the implementation of the MST strategy. A task team was appointed by the Minister of Basic Education in 2013 to investigate the implementation of the MST strategy by means of detailed questionnaires and interviews (DBE, 2013a:6). The task team identified several issues regarding this strategy and possible factors influencing them. The DBE acknowledges the fact that SA has a long way to go towards the successful implementation of the strategy and will continue to improve the implementation plan (DBE, 2013a:2). To place SA’s current position in terms of tertiary and secondary education into perspective, a comparison was drawn between SA and the top educational countries in the world, as classified by the Education Poll (2014 & 2012).

The Education Poll (2014 & 2012) is conducted to monitor and rank over 200 nations. The top 20 educational countries are selected by students, teachers, and parents. They are then evaluated on their prior year ranking in the World Top 20 Poll, the amount invested in a country’s education system and the educational cost per student per year. Points are awarded to every category; the top 20 countries with the highest points are then selected (Education poll, 2014). The top 20 selected for 2014 and 2012 are listed in Table 2-5.
Table 2-5: Top 20 educational countries for 2014 and 2012

<table>
<thead>
<tr>
<th>2014 Top educational countries</th>
<th>2012 Top educational countries</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Japan</td>
<td>1. Finland</td>
</tr>
<tr>
<td>2. United Kingdom</td>
<td>2. South Korea</td>
</tr>
<tr>
<td>3. South Korea</td>
<td>3. Hong Kong</td>
</tr>
<tr>
<td>4. Finland</td>
<td>4. Japan</td>
</tr>
<tr>
<td>5. Netherlands</td>
<td>5. Singapore</td>
</tr>
<tr>
<td>6. Norway</td>
<td>6. UK</td>
</tr>
<tr>
<td>7. Denmark</td>
<td>7. Netherlands</td>
</tr>
<tr>
<td>8. Belgium</td>
<td>8. New Zealand</td>
</tr>
<tr>
<td>9. Canada</td>
<td>9. Switzerland</td>
</tr>
<tr>
<td>10. USA</td>
<td>10. Canada</td>
</tr>
<tr>
<td>11. Singapore</td>
<td>11. Ireland</td>
</tr>
<tr>
<td>12. Russia</td>
<td>12. Denmark</td>
</tr>
<tr>
<td>13. Ireland</td>
<td>13. Australia</td>
</tr>
<tr>
<td>14. New Zealand</td>
<td>14. Poland</td>
</tr>
<tr>
<td>15. Israel</td>
<td>15. Germany</td>
</tr>
<tr>
<td>16. France</td>
<td>16. Belgium</td>
</tr>
<tr>
<td>17. China</td>
<td>17. USA</td>
</tr>
<tr>
<td>18. Germany</td>
<td>18. Hungary</td>
</tr>
<tr>
<td>20. Sweden</td>
<td>20. Russia</td>
</tr>
</tbody>
</table>


The countries selected for the comparison were selected from the list of the top 20 educational countries listed in Table 2-5. Convenience sampling (“selecting haphazardly those cases that are easiest to obtain for our sample”, Welman et al., 2012:69) was applied in selecting the four countries for the comparison; they are all members of the Organisation for Economic Co-operation and Development (OECD) (2014). These countries were viewed as the most appropriate comparisons for their hierarchy in the world, based on their views and methods to better education. The initial information from Zee News (2012) placed Finland as the number one educational country, resulting in Finland as one of the countries selected for this study. The other three countries selected are United Kingdom (UK), New Zealand and Canada and are discussed below, as is relevant to the topic at hand.
The comparison focused on the main issues identified by the task team (DBE, 2013a:1-53) concerning technology currently dominating all the provinces in SA schools to a greater or lesser degree. The views and practices of the selected top educational countries in general, and specifically on technology at tertiary and secondary school level, are identified.

SA regards their teachers as the main factor in providing a quality education, which is in direct contrast with the findings by DBE (2013a:2, 51, 53) as there are few or no qualified and experienced teachers available to teach technology. Technology teaching becomes the responsibility of senior or science teachers. The lack of qualifications and experience leads to the lack of emphasis on the importance of IT as a subject by teachers in communicating with their students. DBE (2013a:16, 18, 19) recognises the importance of IT but fails to successfully implement its MST strategy in all nine provinces. The main issues listed by the different provinces are:

- The lack of communication on the MST strategy
- The large number of rural schools
- Curriculum outcomes are not clear
- Limited and unstable electricity supply to some schools
- Knowledge and experience of teachers are limited
- Limited to no technology resources are available
- Little to no technical support due to budgetary constraints
- Some public schools being encouraged not to offer IT as a separate subject
- Language barriers.

All of the factors mentioned above lead to the avoidance of IT rather than its implementation.

Finland emphasised that a solid foundation of learning should be established in early childhood. Finland’s teachers are required to obtain a master’s degree before they can be employed in any school system. This requirement ensures that all teachers are highly qualified. The curriculum is well planned and communicated to the different schools. As almost no poverty is reported in Finland, the learners will attend school ready to learn and not merely to satisfy one of their basic needs, such as food. However, there is a lack of utilisation of available technology due mainly to the lack of
integration of IT in teaching. The importance of IT has been identified and plans have been outlined to increase teachers and learners’ knowledge and skills. Finland has also acknowledged the need for the integration of technology into the early phases of education. Most Finnish learners are able to speak three languages, reducing the language barrier almost to being non-existent (Finland. Ministry of Education and Culture, 2012:3-60).

In the UK, scholar education is viewed as the basis of preparing learners for different opportunities, responsibilities and experiences in later life. The curriculum is well planned to produce educated citizens and is also well communicated. Mathematics linked to computing is identified as a major influence in learner education. It is the view of the Department of Education in the UK that a high-quality computing education will equip learners with skills to understand and change the world. From the age of five, basic computing is available as a subject. The level of integration is decided by the teachers. Learners from both privileged and underprivileged backgrounds attend schools leading to the presence of poverty through underprivileged learners. Learners are taught in English, which is not necessarily their first (home) language. Teachers therefore have the responsibility of identifying and addressing any language issues to ensure that the learners overcome any language barrier (England. Department for Education, 2013:5-237).

The New Zealand Ministry of Education strives to be the starting point for lifelong learners. The curriculum considers the importance of technology and the demand of the workplace. IT is identified as one of the specific learning areas. It is integrated into different learning areas and is not seen as only a subject on its own. Both privileged and underprivileged learners attend school. The New Zealand Ministry of Education is currently exploring IT as a teaching aid (New Zealand. Ministry of Education, 2007a:4-44).

Canadian Ministry of Education acknowledges the increasing impact of Science and Technology. IT is integrated into each of the different educational systems available. Parents and learners choose which of these educational systems best suits them. The curricula are well planned and communicated; the language of instruction is either English or French (Canada. Ministry of Education, 2007b:1-35).
After examining the findings of the DBE (2013a:1-53) and summarising the main issues around IT at school level, as already mentioned, a comparison was then drawn between SA and the four countries selected from Table 2-5 with regard to the central, identified IT issues. The information summarised in Table 2-6 was obtained from the latest available curriculums of the four countries selected.
Table 2-6: Summary of technology findings in different school systems of different countries

<table>
<thead>
<tr>
<th>Main issues</th>
<th>South Africa</th>
<th>Finland</th>
<th>UK</th>
<th>New Zealand</th>
<th>Canada</th>
</tr>
</thead>
</table>

Views on education

- "...the quality of an education system cannot exceed the quality of its teachers."
- Significance of educational technology as a teaching and learning resource is acknowledged.
- Some schools are not aware of the MST strategy.
- Learners are interested in using technology and are leaving the teachers behind due to the teachers' lack of knowledge.
- "A solid basis for learning should already be gained in early childhood for educational equality to be realised (7)."
- Importance of Information and Communication technology (ICT) is outlined (10).
- Every state-funded school's curriculum should be balanced and as one of its aims, prepare "pupils at the school for opportunities, responsibilities and experiences of later life” (5).
- Mathematics is seen as having the biggest influence on, amongst others, technology and communication (103).
- "A high-quality computing education equips pupils to use computational thinking and creativity to understand and change the world” (204.)
- The New Zealand Curriculum "...takes as a starting point a vision of our young people as lifelong learners who are confident and creative, connected, and actively involved” (4).
- The curriculum identifies what is deemed as important in education (4).
- "The impact of science and technology on our lives will continue to grow. Consequently, scientific and technological literacy for all has become the overarching objective of science and technology education throughout the world" (4).
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<table>
<thead>
<tr>
<th>Main issues</th>
<th>Authors</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>South Africa</strong></td>
<td>DBE (2013a:7-32)</td>
</tr>
<tr>
<td></td>
<td>Ministry of Education and Culture (2012:3-60)</td>
</tr>
<tr>
<td></td>
<td>Department for Education (2013:5-237)</td>
</tr>
<tr>
<td></td>
<td>Ministry of Education (2007a:4-44)</td>
</tr>
<tr>
<td><strong>School population</strong></td>
<td>• Large areas with rural schools.</td>
</tr>
<tr>
<td></td>
<td>• Almost no visible poverty.</td>
</tr>
<tr>
<td></td>
<td>• Learners from disadvantaged and advantaged areas attend schools.</td>
</tr>
<tr>
<td></td>
<td>• Learners from disadvantaged and advantaged areas attend schools with different ethnicity, belief, social and cultural backgrounds.</td>
</tr>
<tr>
<td><strong>Curriculum</strong></td>
<td>• Teachers expressed concern over expectations not being clear.</td>
</tr>
</tbody>
</table>
|                        | • “To provide high-quality mathematics, science and technology education for all learners and
|                        | • Increase and enhance the human resource capacity to deliver quality Mathematics, Science and Technology education.” | • Development plan was adopted on 15 December 2011 for 2012-2016, which targets the alleviation of “poverty, inequality and exclusion, to stabilise the public economy and to have sustainable economic growth, employment and competitiveness” (3). |
|                        | • Well planned and communicated.                                       | • Provides learners with the foundation of knowledge required to be educated citizens (6). |
|                        | • Revised in 2000 – 2002 to respond to the increased diversity of the population, more sophisticated technologies and the more complex demands of the workplace (4). |
| **Electricity**        | • Many schools have limited and unstable electricity supply.            | • No information available in documents.                           |
|                        | • No information available in documents.                               | • No information available in documents.                           |
|                        | • No information available in documents.                               | • No information available in documents.                           |
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### Main issues

<table>
<thead>
<tr>
<th>Qualified and experienced teachers</th>
<th>Authors</th>
</tr>
</thead>
<tbody>
<tr>
<td>South Africa</td>
<td>DBE (2013a:7-32)</td>
</tr>
<tr>
<td>Finland</td>
<td>Ministry of Education and Culture (2012:3-60)</td>
</tr>
<tr>
<td>UK</td>
<td>Department for Education (2013:5-237)</td>
</tr>
<tr>
<td>New Zealand</td>
<td>Ministry of Education (2007a:4-44)</td>
</tr>
</tbody>
</table>

* Few or no qualified and experienced teachers could be identified.
  * Mostly senior or science teachers have to teach technology based subjects, leading to the lack of emphasis on IT due to lack of qualifications and experience.

* Technology and communications training of vocational teachers should be increased (60).

* No information available in documents.

* No information available in documents.

### Technology as a teaching aid

<table>
<thead>
<tr>
<th>Authors</th>
</tr>
</thead>
<tbody>
<tr>
<td>South Africa</td>
</tr>
<tr>
<td>Finland</td>
</tr>
<tr>
<td>UK</td>
</tr>
<tr>
<td>New Zealand</td>
</tr>
<tr>
<td>Canada</td>
</tr>
</tbody>
</table>

* Little to no reference is made to IT as a teaching aid.
  * Where technology is used to aid teaching, it is limited due to lack of resources and proper training of teachers.
  * Many teachers can't perform basic IT functions such as typing exam papers.
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### Main Issues

<table>
<thead>
<tr>
<th>Technology resources available</th>
<th>Authors</th>
</tr>
</thead>
<tbody>
<tr>
<td>South Africa</td>
<td>DBE (2013a:7-32)</td>
</tr>
<tr>
<td>Finland</td>
<td>Ministry of Education and Culture (2012:3-60)</td>
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<tr>
<td>UK</td>
<td>Department for Education (2013:5-237)</td>
</tr>
<tr>
<td>New Zealand</td>
<td>Ministry of Education (2007a:4-44)</td>
</tr>
</tbody>
</table>

- Little to none.
- Those that are available are underutilised due to lack of knowledge on how to use it, unavailability of replacement resources (toners for printers), non-existent or erratic internet connectivity, updating of technology not provided, etc.
- Those that are available are underutilised due to lack of emphasis placed on the integration of technology into other subjects and teaching.
- No information available in documents.
- No information available in documents.
- No information available in documents, but illustrates that appropriate resources are available.

<table>
<thead>
<tr>
<th>Availability of technical support</th>
<th>Authors</th>
</tr>
</thead>
<tbody>
<tr>
<td>South Africa</td>
<td>DBE (2013a:7-32)</td>
</tr>
<tr>
<td>Finland</td>
<td>Ministry of Education and Culture (2012:3-60)</td>
</tr>
<tr>
<td>UK</td>
<td>Department for Education (2013:5-237)</td>
</tr>
<tr>
<td>New Zealand</td>
<td>Ministry of Education (2007a:4-44)</td>
</tr>
</tbody>
</table>

- Little to none.
- Cost of technical support not covered in the provincial budgets.
- No guidance provided in documents.
- No information available in documents.
- No information available in documents.
- No information available in document., but illustrates that appropriate resources are available.

<table>
<thead>
<tr>
<th>Technology as a subject</th>
<th>Authors</th>
</tr>
</thead>
<tbody>
<tr>
<td>South Africa</td>
<td>DBE (2013a:7-32)</td>
</tr>
<tr>
<td>Finland</td>
<td>Ministry of Education and Culture (2012:3-60)</td>
</tr>
<tr>
<td>UK</td>
<td>Department for Education (2013:5-237)</td>
</tr>
<tr>
<td>New Zealand</td>
<td>Ministry of Education (2007a:4-44)</td>
</tr>
</tbody>
</table>

- Little to no reference is made to IT as a specific and separate subject.
- Technology is integrated in sciences with more emphasis being placed on physical science and
- Plans have been put in place since 2011 to ensure development of students’ ICT skills (18).
- Teachers should use their own judgement about when ICT should be used in both primary and secondary school (104).
- Computing is offered from the ages of 5 up to
- Technology is identified as one of the eight specific learning areas and is a compulsory learning area from years 1–10 (16, 38).
- Technology is integrated through all the school phases. Technology is not
- Available as a choice for the learner (10).
### Main issues

<table>
<thead>
<tr>
<th>Authors</th>
<th>South Africa</th>
<th>Finland</th>
<th>UK</th>
<th>New Zealand</th>
<th>Canada</th>
</tr>
</thead>
</table>

- **South Africa**
  - little to no emphasis on IT.
  - Some public schools are encouraged not to offer CAT and IT as subjects due to them being 1) resource intensive, 2) tertiary institutions not regarding CAT as a designated subject, 3) limited specialised subject advisors available, 4) limited specialised teachers available, 5) software is expensive and not provided for in budgets and 6) resources available to teach the subjects are limited or non-existent.

- **Finland**
  - 16 as a foundation subject (3).
  - Computing builds on the knowledge obtained from the first phase (1) of teaching right up to the last phase (4). This enables learners to “use, express themselves and develop their ideas through, information and communication technology – at a level suitable for the future workplace and as active participants in a digital world” (204).

- **UK**
  - limited to a subject on its own but from the years 11-13 learners will work with few contexts but in greater depth (32).

- **New Zealand**

- **Canada**

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## Main issues

<table>
<thead>
<tr>
<th>Authors</th>
<th>South Africa</th>
<th>Finland</th>
<th>UK</th>
<th>• New Zealand</th>
<th>Canada</th>
</tr>
</thead>
</table>

## General comments

- Views at school level are cynical about the seriousness of expanding ICT in schools due to either lack of funding or successful projects being stopped.
- MST project targets a small group of learners, resulting in a minimal impact across learners at school level.
- Little support is provided against theft and for maintenance of computer facilities.
- Language barrier plays an important role from grade 4 when language of instruction moves from mother tongue to English.
- Overall lack of technology.
- Learners go to school ready to learn.
- Most students know three languages, English being one of them. This puts them at an advantage for this is lingua franca of all educational material.
- Teachers should develop appropriate lessons to develop and enhance learners’ knowledge and language skills (6-10).
- Learners receive education in English which is not necessarily their home language. Teachers have to ensure that these learners develop and are up to date with the curriculum and that they meet the required outcomes.
- Technology and IT is integrated well into the different available curriculums.
- English medium-schools with multi-cultural background learners (6).
- Technology and IT are well integrated with the different available curriculums.
- Education is available in English and French.
Table 2-6 illustrates where SA ranks, compared to the rest of the world in terms of IT education. It further outlines what needs to be changed to ensure the successful implementation of IT before learners enter university. The conclusions drawn from Table 2-6 are that since the period 2008 to 2011, no significant changes have emerged despite various initiatives from Government to increase the exposure of technology at school level in SA. Schools are not implementing the prescribed MST strategies as desired and too little has been achieved since 2001 (DBE, 2013a:5-17). While Finland ranked amongst the top five countries with reference to education, it has also not yet fully integrated IT in its day to day teaching, but is in the process of doing so. In contrast to SA and Finland, UK, New Zealand and Canada have integrated IT to such an extent that learners from the age of five years are already exposed to IT. Whereas not all of SA’s teachers possess the necessary skills to teach IT related subjects or utilise IT for personal or teaching, in the UK, New Zealand and Canada, the teachers have the confidence to fully integrate IT in the learning process. SA schools are faced with a language barrier where students receive study material in a language that they do not deem as their first or even second language. Finland, UK, New Zealand and Canada experience the language barrier to a lesser degree. Where it exists, it is addressed through learners either being able to speak at least three languages or in the class environment through additional support from teachers.

Many obstacles, for example teacher skills, electricity supply and budget constraints, still have to be overcome for the integration of technology at SA school level to produce good results. SA lags behind many countries, but has at least identified the need for the integration of technology at school level. The majority of SA schools will not be able to equip learners with basic IT skills by the time they matriculate, which will continue to contribute to an expectation gap between scholars and university requirements. The onus consequently falls on a learner’s next tertiary educational institution to identify the missing or underdeveloped IT skills. A temporary solution is then that universities should compensate, through additional learning, for the lack or insufficient foundation in IT to bridge the current gap. This will ensure that learners develop the correct and necessary IT foundation to aid them in their studies at university and, subsequently, in the workplace.
2.5 UNIVERSITY AND THE USE OF IT

Diverse factors are involved in the successful mastering of various competencies, including IT. Due to learners not receiving basic training and support in technology and IT as a subject at school, they will require more intense educational intervention to master the necessary competencies at the next phase of their education.

Students at university will strive to meet need number 3 of Maslow’s hierarchy. This need will not enjoy the same proportion of importance for all learners at this level. Learners obtaining a matric certificate may now struggle to meet their physiological needs due to their parents not fulfilling that role any more. Nelson et al. (2006:3) explain that due to different social and academic transitions experienced by students in their first year, special learning needs arise for most, if not all of them.

One area of special learning needs identified in the preceding information is IT. The problem statement in Chapter 1 illustrated that IT forms an important part in producing accountancy trainees with the required SAICA competencies. There is limited focus placed on specific IT competencies required by accountancy students in both national and international literature. Chang and Hwang (2003:449) propose that further studies should be undertaken on ways to improve existing accountancy curricula through the implementation of different IT subjects at undergraduate and graduate levels. Chang and Hwang (2003:448) also argue that certain IT topics receive low ratings of importance due to universities and employers not collaborating on the necessity of topics and due to lecturers perhaps not receiving adequate training to teach the subject. They also propose that lecturers should attend employer training to better their teaching and understanding of the different topics.

The lack of emphasis placed on IT in schools and in accountancy curricula will lead to a further expectation gap between universities and the workplace. Where schools do not have the necessary infrastructure to develop IT skills and universities are not placing enough emphasis on IT in the accountancy curriculums, trainees will start their traineeship lacking basic IT competencies that will further increase the widening expectation gap.
2.5.1 Accounting education and curriculum

Albrecht and Sack (2000:3) identify the use of technology as one of the major problems affecting accounting. The authors further argue that the current accounting curriculum is “too detailed and technical” and this will produce a good accountant, but not necessarily the right candidate for the workplace. Romney et al. (1996:57) support the view of the Bedford report (AAA, 1986) and that of the AECC (1990) that identify the importance of information systems as part of an accountancy education.

The following studies demonstrated the importance of IT in an accounting curriculum, whether as a separate subject or, preferably, integrated into the existing curriculum: Cheng (2002 cited in Wally-Dima, 2011:7) and Albrecht and Sack (2000:2) identify several studies (AAA, 1986, AICPA, 1998a and 1998b) emphasising the gap between accounting education and that which is demanded by employers. Further arguments include:

- University accountancy education programmes should place less focus on skills development and more emphasis on the teaching of technical accounting principles
- Universities place too much emphasis and attention on classroom teaching and not enough exposure is put on real life business situations
- Currently, accounting education focuses on the interest of the faculty rather than on the employers’ demands.

Theuri and Gunn (1998:101) demonstrate that these studies identified the need for accountancy programmes to be modified to “meet the future needs of accountants” and “to meet the changing needs of accountants and accounting students” (AICPA, 1998a and 1998b) as far back as 1917 (Walton, 1917 cited in Theuri & Gunn, 1998:101). Wally-Dima (2011:7, 21-22) supports these views based on the findings of her study, suggesting that the traditional accounting programmes of the University of Botswana lack the development of other learning activities important for the development of an accountant ready to enter the workplace. This supports the notion that graduates are not prepared to perform accounting duties when entering the workplace.
Albrecht and Sack (2000:2) propose that the content and design of the curriculum should be evaluated so as to place more focus on producing good businesspeople. The Ministry of Business, Innovation and Employment of New Zealand (2014:15) contends that graduates with strong basic skills will be required in the workplace due to the ever changing technology based nature of jobs. Cheng (2002 cited in Wally-Dima, 2011:7) supports the views held by Albrecht and Sack (2000:2), Richard (1993:24) and Williams (1993:76) that more emphasis should be placed on specific courses; for example, information systems and e-commerce, to name a few, in order to improve accountancy education. Williams (1994:208) adds additional weight to this view by further arguing that teaching accountancy students the effective use of technology will also lead to the improvement of accountancy education. He points out that skills and knowledge of students should be developed and that professional values should be enhanced. This indicates that accountancy curricula should focus on life-long learning and not just a transfer of information. Chang and Hwang (2003:445) draw attention to the fact that current accountancy programmes are so overloaded, there is little space for new IT courses to be introduced. This leads to their recommendations that universities should aim for the integration of IT into their already existing curriculum, as suggested and supported by IFAC (1995).

Wally-Dima (2011:8) examined the perceptions of accountancy educators and practitioners on what “other” skills should be taught at university and what importance the current skills carry at the University of Botswana in the accountancy curriculum. Chang and Hwang (2003:442) evaluated whether employers expose their accountancy trainees to more IT information than they receive at university. Bor-Yi Tsay (1992 cited in Theuri and Gunn, 1998:105) assessed the role of the accountant in the information technology age. He argued that accountants do not necessarily need to be experts in information technology but that they should “stay up to date”. He proposed that students should take a formal systems course. May and May (1989:233) examined communication skills in terms of which course/s should be developed and whose responsibility it was to impart those skills. Wong (2012:195), concurring with Bates and Poole (2003:xiii), argued that there is an expectation that universities constantly increase the level of technology in their everyday teaching to keep up with the continual adjustments in technology. This places added pressure on academics to deliver new
methods in “very short and often unrealistic time-frames”. The expectation evidenced in the literature was that students entering university need to be prepared and equipped with basic IT skills they obtained from school. However, the reality in SA is that due to various limitations, schools cannot provide learners with these skills and that this further contributes to and maintains the expectation gap. The said gap between school and university does not lessen the importance of IT; accountancy trainees increasingly do and will require all aspects of IT in the workplace.

SAICA (2012d:1) draws attention to the importance of IT through the planned changes to Part II of the QE examination, introduced in 2012. The proposed changes include accountancy trainees being required to write their Part II qualifying exam (QE) exam electronically. For these trainees to be able to do this, certain basic Microsoft (MS) Word and Excel functionalities need to be mastered. This further puts the onus on universities and employers to provide future accountancy trainees with the necessary exposure to the relevant IT competencies to develop the capacity to answer the examination in an electronic format.

Elliot (1992:61) critiques the current teaching approach of teaching each major subject in isolation taken by universities. He argues that this hinders students from integrating the different concepts across the different subjects and further, he goes on to criticise the education system for not making the importance of information systems (IS) in accountancy education clear. Romney et al. (1996:57) conclude that the approach taken by universities, as identified by the Bedford Report (AAA, 1986) deduces that students are of the opinion that IS is merely an add-on subject (a ‘nice-to-have’), but not of critical importance. Romney et al. (1996:58) in agreement with Raval (1991:62) argues that accounting information systems (AIS) courses being taken at a senior level, just before graduation, are inter alia, due to the fact that AIS courses and instructors receive lower points for student evaluations. He argues that this practice results in IS not having a significant impact in shaping the perception of the accountancy profession amongst accountancy students globally. The Bedford report concludes that IS should be one of the first topics taught. The study performed by Romney et al. (1996:58) focused on the integration of IS topics with all other topics within the accountancy curriculum. Their approach was that IS remained the first core topic and focus point throughout the
year, and their study demonstrated that although a large amount of content had to be covered in a very short time, students enjoyed the experience of learning more from the IS topics than from any of the other four core subjects (Romney et al., 1996:62-63). They also established that more students “accepted” the role of IS in accountancy and showed more interest in IS systems after being exposed to it constantly throughout their first year of study, concluding that:

- “Integrating IS concepts with other subject areas may help students better understand (a) the role of systems in accounting, (b) how IS concepts relate to other accounting areas, and (c) the overall objectives of accounting and financial reporting.

- Student’s [sic] perceptions of accounting may change as they study IS topics. This argues for having systems concepts taught at the beginning of their accounting classes, not at the end. The tacked-on approach of teaching systems at the end of the curriculum makes it much more difficult for students to understand the importance of systems concepts.

- Studying systems first may help students (a) integrate IS and accounting concepts, (b) understand the underlying accounting framework, and (c) better understand other functional areas of accounting”.

Howieson (2003:69) proposes that accountancy courses and teaching should aim to be more interdisciplinary and analytical. He identifies the need for IT systems to be taught not just for technical functions but additionally, how to use these systems for analysis and decision making as well. He further establishes that the World Wide Web should be used on a greater scale as a reference source. The first step in achieving this would be through the identification of the skills and competencies that should be included in an IT course.

Theuri and Gunn (1998:102) explain an AIS course as “...the primary course that accounting students take within which accounting specific information systems concepts are intertwined with the technical accounting education.” They argue that the first step in bridging the existing gaps between the academic process and practitioner needs lies within the identification of the skills needs for entry-level positions in computerised environments. The authors critique the reports (AECC, 1991; AAA; 1987; 1986) issued
by professional bodies that sought to provide an outline of what an AIS should contain. They argue that the course content was not necessarily in keeping with employer needs.

Employer concerns regarding the knowledge and skills required for entry-level professionals are further discussed in paragraph 2.6.

2.6 EMPLOYER EXPECTATIONS ON THE USE OF IT

Accountancy trainees entering the work place are relatively fulfilled at their lower needs levels, as per Maslow’s hierarchy of needs (Figure 2-1). The levels at the top of the hierarchy of needs now require to be met to a greater extent than the lower levels. If properly met, trainees will have a higher energy and performance levels. Trainees must be confident and have high levels of self-esteem to meet employer expectations, as well to move up the hierarchy.

Bor-Yi Tsay (1992 cited in Theuri and Gunn, 1998:101) as well as Novin and Pearson (1994:54) consider that the constant change in workplace requirements and thus the associated knowledge and skills’ needs of accountancy graduates are known to both universities and employers. SAICA (2010b:1) shares this view by periodically reviewing and revising the qualification process of prospective CA(SA)’s to maintain its standards and to keep the qualification relevant. The Bedford Report also concludes that the state of the accountancy curriculum is inadequate to meet the expanding accountancy profession.

Wally-Dima (2011:13,17) examined the views of the accountancy educators and practitioners on the importance of certain skills taught at university level. It was found that 55% of the accountancy educators and 68% of the accountancy practitioners were of the opinion that computer technology is an important skill to develop at university level. Theuri and Gunn (1998:101-102) argue that in part, the gap arises from the frequent changes in information systems technology. They identified two challenges regarding the changing of information systems technologies:

1. “The need for businesses to realign their processes in order to maintain their competitive strength, and
2. The need for educational programs to constructively adjust their curricula in order to remain a relevant force for providing employers (businesses) with better qualified employees.”

Chang and Hwang (2003:441) support the above argument by discussing the concerns raised by many in the accounting profession around the preparedness of accountancy trainees when they graduate and qualify. Graduates who have outdated or insufficient IT competencies and knowledge of accountancy may become underqualified business advisors (Allen, 2000:152). The Tertiary Education Strategy of New Zealand (Ministry of Business, Innovation & Employment, 2014:9) illustrates that employers are finding it difficult to attract employees with the preferred specific and transferable skills. They propose that all tertiary education institutes should make it a priority to deliver skilled and competent graduates to meet the labour market needs (Ministry of Business, Innovation & Employment, 2014:10). Moreover, employers and universities should work together to identify the types of skills most needed, then develop strategies on how to develop them. Siegel et al. (2010:44) shares this vision and argues that the need for curriculum change is necessary and should be done through the co-operation between employers and universities.

Siegel et al. (2010:44) explain that employers are faced with increased competition making it difficult to invest the time to train accountancy trainees in the necessary workplace skills required at entry level. Employers want their accountancy trainees to be able to “hit the ground running” when they start at their firms and to be productive from the start (Siegel et al., 2010:44). Findings on a research project performed by the Financial Executives International (FEI) and The Institute of Management Accountants (IMA) on the skills requirements of employers in America for entry-level accountants was shared with accountancy educators as early as 1994 and 1995 (Siegel et al., 2010:44). The findings indicated the willingness of the professional body to bridge the skills gap between universities and employers through a combined effort.

Wally-Dima (2011:10-11) points out that there is limited research on the type of knowledge and skills requirements for accountancy students to bridge the skills gap between accountancy trainees and accountancy employers. This research will identify the expectation gap on the practical IT skills between accountancy trainees, SAICA and
employers, which is the focus of this study. The author also outlines the continuous problem of changing information technologies, leading to different demands on the work environment of accountants and ultimately leading to new employer expectations of accountancy graduates information systems skills. The driving force behind the required skills of a trainee is their governing body, SAICA, which are discussed in paragraph 2.7.

2.7 SAICA COMPETENCIES: UNIVERSITY AND WORKPLACE

As Chang and Hwang (2003:442) note, IT consists of a dynamic nature and broad spectrum, resulting in making the design of a complete list of IT competencies that should be taught at university and employer level, difficult. As mentioned in Chapter 1, SAICA (2010a:18; 2012a:4; 2012b:30) emphasises that IT competencies will form part of almost all tasks performed by a trainee accountant. This study focused on the separate classification of practical IT competencies, as identified in their different guidelines (SAICA 2014a; 2012a; 2012b; 2010a) for universities (students) and employers (trainees).

The Competency Framework should not be used as the only document/guideline to determine which competencies, including those of IT, are expected from accountancy trainees to provide well rounded, well equipped competent and skilled professionals (SAICA, 2010a:4). This document should be used in conjunction with all available guidelines provided to universities and employers (SAICA 2014a; 2012). Due to the technical nature of the SAICA guidelines, all the competencies and guidelines referred to and illustrated in paragraph 2.7, Tables 2-7 till 2-12, has been included without any adjustments to ensure no technical or professional aspect being lost.

2.7.1 SAICA competencies: Students

SAICA argues that although the Competency Framework is presented in different groupings, it is highly integrated (SAICA, 2010a:32). The predominantly IT-related competencies are separately identified, but it should be noted that these competencies form part of the following specific competencies and should not be seen solely in isolation: Strategy, Risk Management and Governance, Accounting and External Reporting, Auditing and Assurance and Financial Management. The predominantly IT-related Framework competencies are illustrated in Table 2-7.
Table 2-7: Competencies in practical application of IT applicable to ALL specific competency areas

<table>
<thead>
<tr>
<th>Units</th>
<th>Elements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Applies appropriate IT systems/tools to business accounting problems</td>
<td>Applies spreadsheet software in a relevant accounting/business context</td>
</tr>
<tr>
<td></td>
<td>Applies basic principles of database software in a relevant accounting business context (Access, Computer Assisted Auditing Techniques (CAATs))</td>
</tr>
<tr>
<td></td>
<td>Applies internet tools (e-mail, web browser, FTP, other) software in a relevant accounting/business context</td>
</tr>
<tr>
<td></td>
<td>Applies professional research tools in the context of the external financial reporting syllabus</td>
</tr>
</tbody>
</table>

Source: SAICA (2010a:33)

The competency elements in Table 2-7 are those competencies that a trainee should be able to demonstrate when they write SAICA’s QE Part I. The levels of proficiency have, however, not been identified. These proficiency levels will differ, depending upon the trainees’ specific educational and training programmes (SAICA, 2010a:9). The proficiency levels have been determined for each competency area identified by SAICA (2010a:10). The first level, level A, refers to are the key ideas and principles of the specific area. The student and trainee are not required to demonstrate technical expertise or detailed knowledge. The second level, level I, includes level A competencies and students and trainees should be able to demonstrate and understand the requirements of a task. They should also be able to apply the required professional skills. At this level, complex calculations are not required. The final level, level X, includes both level A and I competencies. Students and trainees should be able to complete all elements of a task successfully and require an advanced understanding of the subject matter. The performing of complex calculations and deciding on an appropriate course of action is included. The levels of proficiency are illustrated in Table 2-8.
Table 2-8: Proficiency levels

<table>
<thead>
<tr>
<th>Level A – Awareness</th>
<th>Level I – Initiates the task</th>
<th>Level X – Completes the task</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Key ideas and principles</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Technical expertise or detailed knowledge not required</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Identifies &amp; explains significance and relevance</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Perform task on preliminary basis</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Understands requirements of the task</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Identifies &amp; applies the required professional skills</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Intermediate understanding</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Basic quantitative &amp; qualitative analysis (Excluding complex calculations)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Integration straightforward</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Completes all elements of task</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Problem is clearly identified &amp; thoroughly analysed, or situation is evaluated &amp; useful recommendations are made</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Relevant pervasive skills &amp; useful recommendations are made</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Relevant pervasive skills &amp; reflective capacity demonstrate at advanced level</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Advanced understanding</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Technical skills include complex calculations &amp; concluding on an appropriate course of action</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: SAICA (2010a:12-13)

Table 2-8 proposes that an accountancy trainee writing the SAICA QE Part I, should be able to complete all relevant tasks with confidence, including complex calculations. The competencies should be performed at an advanced level. SAICA (2010a:13-15) further provides universities with guidance as to the depth of knowledge and understanding required from students on the different competencies listed in the competency framework. The knowledge level is also divided into three levels. Level 1 requires students to only have knowledge and understanding of the core of the subject matter. The knowledge should be limited to only a broad conceptual level. Level 2 includes the knowledge of Level 1 and requires students to have a detailed knowledge and understanding of the central ideas and issues of the subject matter. Knowledge on complex and unusual/exceptional aspects is not required. Level 3 includes the knowledge of Level 1 and 2 and requires students to have in-depth knowledge and complete understanding of the subject matter. Knowledge on complex and unusual/exceptional aspects is expected. Table 2-9 illustrates the different knowledge levels.
Table 2-9: Knowledge reference list

<table>
<thead>
<tr>
<th>Level 1 – Basic</th>
<th>Level 2 – Intermediate</th>
<th>Level 3 - Advanced</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Summary:</strong></td>
<td><strong>Summary:</strong></td>
<td><strong>Summary:</strong></td>
</tr>
<tr>
<td>Core/essence of the subject matter</td>
<td>Central ideas and issues that comprise the substance of the subject matter (sound conceptual understanding)</td>
<td>Thorough knowledge &amp; rigorous understanding</td>
</tr>
<tr>
<td><strong>Includes:</strong></td>
<td><strong>Includes:</strong></td>
<td><strong>Includes:</strong></td>
</tr>
<tr>
<td>Significance, relevance, defining attributes</td>
<td>Detail, including procedural and numerical aspects specific to the subject matter</td>
<td>Complexities &amp; unusual / exceptional aspects; Sufficient depth to clearly locate content in the broader discipline &amp; to identify implications and relationships</td>
</tr>
<tr>
<td><strong>Excludes:</strong></td>
<td><strong>Excludes:</strong></td>
<td><strong>Excludes:</strong></td>
</tr>
<tr>
<td>Detail, including procedural or numerical aspects</td>
<td>Complexities and usual / exceptional aspects</td>
<td></td>
</tr>
<tr>
<td><strong>Objective:</strong></td>
<td><strong>Objective:</strong></td>
<td><strong>Objective:</strong></td>
</tr>
<tr>
<td>Candidate able to recognise issues when encountered and to seek further depth</td>
<td>Enable candidate to deal with issues and solve problems central to the topic</td>
<td>Enable candidate to perform tasks and solve problems with a high degree of rigour, exercising sound judgement</td>
</tr>
</tbody>
</table>

Source: SAICA (2010a:14)

Table 2-9 outlines what is meant by the different knowledge levels as identified by SAICA (2010a:2013-15). The knowledge levels are specifically indicated in the syllabus guidance provided for the core disciplines by SAICA (2010a:15). IT is viewed as an integrated part of all areas as identified by SAICA. Based on this, there are no specific knowledge guidelines relating solely to IT. Universities have to consider the related competency knowledge guideline and arrive at conclusions based on their own level of knowledge for the specific IT competency.

The conclusion that may be inferred from Tables 2-7, 2-8 and 2-9 is that trainees are expected to have basic knowledge of certain IT skills, as outlined by SAICA. The possible expectation gap that may arise could be due to inadequate detail being provided on how and at what knowledge level the specific mentioned competencies should be developed and taught at university level. This may lead to different interpretations of what is required by SAICA. Examination of the additional available guidelines provided by SAICA should be read in conjunction with the competency
framework, the specific compulsory skills and competencies identified, resulting to a detailed outline of topics to be mastered by accountancy students.

2.7.2 SAICA competencies: Trainees

SAICA (2012a:2-4) outlines IT competencies as one of the compulsory skills that should be acquired by accountancy trainees at the end of their articles of at least three years. This proves that IT should form part of the accountancy students' curriculum at university level and continue throughout a trainees’ training contract. SAICA concludes that all the competencies in the different guidelines should be met to ensure that accountancy trainees have the proper and required foundation of the required competencies when they start their professional careers.

The CA(SA) training programme prescribed competencies (SAICA, 2012a:4) outlines the different prescribed tasks that an accountancy trainee should master at the end of their traineeship. The CA(SA) training programme implementation guide (SAICA, 2012b:1-2) provides training officers (employers) with guidance and suggestions to implement and facilitate the learning process as identified by the prescribed competencies (SAICA, 2012a:4). The prescribed competencies linked with the detailed guidance are provided in the implementation guide. The specific competency has been grouped with the relevant scenarios within the work environment, as suggested by SAICA (2012a:4; 2012b:30-31). The prescribed competencies relating to IT for accountancy trainees are recorded in Table 2-10.
### Table 2-10: CA(SA) training programme prescribed competencies & implementation guide

<table>
<thead>
<tr>
<th>Prescribed competencies - Task to be performed</th>
<th>Implementation guide - Used in the following scenarios within the work environment:</th>
</tr>
</thead>
</table>
| Effectively uses IT applications including spreadsheets, word processing, presentation and e-mail | Spreadsheets  
1. Business reporting like Management Accounts  
2. Drafting of financial statements  
3. Drafting audit working papers  
4. Financial modelling - valuations  
5. Manipulation of data sets (sorting, filtering, converting, completing, sub totalling, cross-tabulating, formatting, splitting and joining of data sets)  
6. The creation of budgets |
|                                                | Word documents  
1. Drafting of letters like Management letters and Engagement letters.  
2. Drafting of financial statements  
3. Drafting audit working papers  
4. Report writing like audit reports or performance reports. |
|                                                | Presentations  
1. Presentation of financial data like interim reports and performance overviews.  
2. Presentation of business proposals to potential new clients.  
3. Used extensively in business meetings and project meetings. |
Prescribed competencies - Task to be performed | Implementation guide - Used in the following scenarios within the work environment:
---|---

**E-mail**
1. This is an effective business communication tool that can be utilised to communicate with:
   a. Clients
   b. Colleagues
   c. Suppliers
   d. Business associates
2. It can also be utilised as an effective daily planner which may assist with time managements.
3. It can also be used to maintain client data such as: names of contacts, contact numbers and addresses.
4. It also has a functionality to document and store notes.

**Effectively uses the internet as a source of information**
Trainees can utilise the Internet in order to:
1. Obtain technical information from SAICA’s website
2. Obtain information on the business environment of a potential engagement client
3. Expand their general knowledge on world events, economics and business news from websites as www.cnn.com or www.moneyweb.co.za for example.

**Applies procedures and controls to ensure integrity and security of personal IT resources, e.g. password protection, backup procedures, anti-virus measures, etc.**
Password protection is vital in order to ensure that confidential client or company data is shared with unauthorised individuals or entities.
2. Back up procedures are necessary in order to ensure that vital data is not lost, in the event where databases may become corrupted or if a major system failure occurs or in the event of a natural disaster.
3. Antivirus measures serve to protect confidential information or to protect data from being corrupted or deleted.

Sources: SAICA (2012a:4; 2012b:30-31)
Trainees are expected to have a basic knowledge of certain prescribed IT skills, as outlined by SAICA, when they start their traineeship. Table 2-10 lists the more advanced IT skills and competencies that trainees will acquire throughout their traineeship and which are not limited to MS Office applications. It demonstrates that to enable accountancy graduates to deal with the everyday working environment, universities need to cover topics relating to communication, research and data protection above any MS office applications already being taught. Only limited research has been done on what specific IT competencies are covered by different universities in SA in compliance with requirements deemed necessary by SAICA.

SAICA (2014a:4) clarifies that it is the responsibility of training officers (employers) to enable accountancy trainees to fully master these competencies by ensuring that accountancy trainees are able to perform the compulsory prescribed IT skills. Guidance is provided to trainee officers concerning the basic expectations of what should be made available to all trainee accountants. The facilities that should be made available to all accountancy trainees to achieve the required IT competencies are outlined in Table 2-11.
Table 2-11: Training officer environment to enable achievement of required IT competencies

<table>
<thead>
<tr>
<th>Criterion</th>
<th>Each trainee must have a reasonable opportunity to achieve the prescribed competencies relating to IT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indicators</td>
<td>Trainees have access to sufficient and appropriate information technology to enable them to meet SAICA’s prescribed competencies in respect of IT.</td>
</tr>
</tbody>
</table>
| Evidence  | 1. Evidence that trainees—  
  - have access to a personal computer or laptop for their individual use  
  - have regular and reasonable access to the internet to enable them to use the internet effectively as a source of information  
  - have regular and reasonable access to a personal office e-mail account to facilitate effective communication with SAICA  
  - are adequately trained on the use of appropriate software applications, including, where relevant, audit, financial, data processing, e-mail and spreadsheet applications  
  2. Trainees’ confirmation of the adequacy of IT resources and access thereto (based on discussions in the trainee interview) |

Source: SAICA (2014a:4)

Table 2-11 underscores the importance of exposure to the necessary facilities to enable the successful mastering of the compulsory IT competencies. Further emphasis is placed on the availability of training for mastery of the required skills. The training officer is thus also responsible for continuous development through regular training and access to IT components throughout the trainee’s contract period. The measurement of the mastering of these skills and competencies has to be proven through evidence. SAICA (2012c:10) explains that trainees have been tested on their understanding of certain
aspects of their development through the Education model, which includes their degree, honours degree and Part I examination. Their ability to perform tasks will be assessed throughout their training programme. The responsibility for the measurement of these skills falls on the employer. The following assessment processes are prescribed by SAICA (2014b:4):

- **Technical Skills Review (TSR)**
  “A form used as part of the assessment process to document and review the competence demonstrated by the trainee accountant in the relevant technical competencies prescribed by SAICA”;

- **Professional Skills Review (PSR)**
  “A form used as part of the assessment process to document and review the competence demonstrated by the trainee accountant in the prescribed professional competencies”; and

- **Assessment Needs Analysis (ANA)**
  “A form used as part of the assessment process to record a trainee accountants’ cumulative competence to date; analyse his development needs; and provide developmental and support plans on how these developmental needs will be addressed during the next evaluation period.”

The time frames that must be adhered to for the above mentioned assessment processes are listed below (SAICA, 2014b:20):

- At least one TSR and PSR form must be initiated and completed by trainees every two months;
- Within three weeks of completion of a TSR and PSR form, it must be reviewed by the reviewer;
- Within two weeks after the TSR and PSR form review has been completed by the reviewer, the trainee must finalise and sign the form;
- At least one ANA must be initiated and completed by trainees every six months;
- Within four weeks of completing the ANA, the reviewer and trainee must discuss it and sign it off.

All of the prescribed compulsory IT skills will be measured at all the stages mentioned above and have to be met at a level four proficiency. The rating scale is a prescribed
tool from SAICA to ensure that all trainees are measured or evaluated against the same criteria and consistently. Rating level 1 indicates that the trainee was not capable of demonstrating the required skill with input, assistance, supervision and intervention provided. Rating level 2 concludes that the trainee was able to perform the required skill but with constant input, assistance, supervision, intervention and guidance. The trainee would not be able to utilise the skill on his/her own without supervision. Rating level 3 concludes that the trainee was capable of performing the required skill but with limited input, assistance, supervision, intervention and guidance. The trainee would be able to utilise the skill on his/her own with limited supervision. Rating level 4, being the top rating a trainee is able to achieve, concludes that the trainee is capable of performing the required skill with no intervention. Trainees would be able to utilise the skill on their own with no supervision. It should be noted that a trainee on this level may still need to discuss aspects of the skill with a senior for confirmation or clarification purposes (SAICA, 2012c:13). Table 2-11 illustrates the rating scale applicable to accountancy trainees.

Table 2-12: Rating scale used to assess technical competencies and professional skills

<table>
<thead>
<tr>
<th>Rating level</th>
<th>Rating criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Not capable of performing</td>
</tr>
<tr>
<td>2</td>
<td>Capable with significant / frequent intervention</td>
</tr>
<tr>
<td>3</td>
<td>Capable with limited / periodic intervention</td>
</tr>
<tr>
<td>4</td>
<td>Capable with no intervention</td>
</tr>
</tbody>
</table>

Source: SAICA (2012c:10)

Table 2-12 demonstrates SAICA’s emphasis on developing accountancy trainees in giving them the opportunity to be aware of where they are on the rating scale, for them to seek assistance where needed.

From the information and guidelines provided by SAICA (2010a; 2012a; 2012b; 2014a; 2014b), it may be deduced that IT competencies will always form part of the compulsory skills that should be mastered by accountancy trainees. As previously stated, the main reason for this, as put forward by Novin and Pearson (1994) and Bor-Yi Tsay (1992, 62)
cited in Theuri and Gunn, 1998) relates to the continuously changing and fast growing IT environment of entities and their clients. This underscores the notion that universities should pay specific attention as to what IT skills are being taught and how they are taught. The following factors that may affect IT competencies in the university context can be identified:

- Design of the IT curriculum
- Availability of resources and equipment
- Integration of IT into every day scenarios
- Integration of IT into specific modules
- Integration of IT into all modules from first year to fourth (honours) year.

SAICA have noted improvement in their ITC results for 2014 (SAICA 2014c:1). As explained, they identify several contributing factors that have led to this: the adoption of the Competency framework (SAICA: 2010a) by universities and the quality of the accredited programme which suggests that universities are on the right track in terms of the design of their curriculum. The ITC exam does not require accountancy trainees to use any practical IT competencies - the improvement in the ITC results serves as no indication of the IT curriculum at university level, further adding to the lack of evidence of IT competencies at university level.

2.8  CONCLUSION

Maslow identifies a needs hierarchy where the lower levels must be achieved before a person is able to move on to the next level. Applying the needs hierarchy of Maslow to the education of accountancy trainees, the conclusion that was drawn illustrates that an individual's needs from primary and secondary school level must first be addressed before the trainee will be able to successfully move on to and master the next need. If the lower level needs are not met, that trainee will lag behind their fellow trainees. Where the hierarchy of needs are applied to IT education specifically, it was found that due to different contributing factors, several learners, students and accountancy trainees are hampered by a backlog and this hinders their ability to reach their full potential, where IT is concerned and may create a gap between accountancy trainees, SAICA and employers.
The influential work of researchers such as Brynjolfsson and Hitt (2000:24), Bresnahan et al. (1999:373) and Rockart and Morton (1984:87) identified the growing availability of technology from as early on as 1984. The global expectation that originates from their findings would be that due to the availability and easy access to technology, most, if not all young individuals would be exposed to it. Census 2011 (2012:65-66) indicates that the South African circumstances may be different from the above forecast. In SA, IT access is currently limited to the more fortunate few.

Poverty plays and important role in the lack of IT in SA. Where households are not able to provide technology at home, the onus will fall on schools to provide this service. The MST strategy implemented by government to improve the exposure to and emphasis on technology, has been proven to move at a slow pace. Schools have indicated that only a selected few are reaping the rewards of this strategy. The harsh reality is that where technology is available it is not utilised due to budgetary constraints, lack of funding or all parties not being fully invested in the project, to name a few factors. The conclusion that may be drawn is that SA schools are currently faced with insufficient infrastructure and skills to successfully implement technology.

The DBE (2013a) indicated that all learners at school level should be exposed to IT. The reality, as pointed out above, is different, due to a variety of factors, including poverty, budgetary constraints and lack of knowledge meaning that the exposure to IT at school level is constrained. Whilst government is striving towards the implementation of technology in schools, it has acknowledged that it falls short of successfully implementing these strategies. Consequently, many learners begin their university studies, with limited or no exposure to basic technologies while those studying towards an accountancy degree are now faced with the reality of having to complete assignments electronically, communicating via email and completing an IT module, to name a few items.

The question of “What IT competencies should an accountancy trainee poses to successfully complete their degree and ultimately equip them for the work place?” needed to be answered. SAICA provides guidance on its expectations of an accountancy student and trainee in terms of IT competencies. Nonetheless there is uncertainty regarding how universities are preparing accountancy students for the
workplace to ultimately comply with these SAICA regulations and guidelines. No clear examples of how the specific IT competencies should be taught or even how they should be integrated into the accountancy curriculum are currently available. As mentioned in Chapter 1, SAICA gives accredited universities the freedom to develop and design their own CA(SA) courses and curricula to suit their individual needs. The conclusion that may be drawn from this is that different universities will have different ways/methods of ensuring compliance with SAICA requirements. Every university will interpret and apply the IT competencies as provided by SAICA in their own way, leading to discrepancies between almost all accountancy courses and curricula where IT is concerned. Employers also have access to and comply with the available SAICA guidelines on required competencies. Employers expect accountancy trainees exiting university and entering their traineeship to at least possess the required competencies at the level indicated by SAICA.

Siegel et al. (2010:45) argues that the need for the academic community to change and better align itself with professional practices has been proven from the studies and reports during the past two decades. Some of these studies included “Information technology, workplace organization and the demand for skilled labour: firm-level evidence” (Bresnahan et al., 1999), “The ongoing preparation gap in accounting: A call to action” (Siegel et al., 2010) and “Accounting information systems course structure and employer systems skills expectations” (Theuri & Gunn, 1998) provides universities with employer perceptions of what they expect of accountancy trainees in terms of IT competencies when they enter the workplace. This research does however, not take the effect of technology from university entry level through to professional employment into account.

The world of technology is continually changing and fast growing. Children born in this era are members of the generation that are expected to use technology in their everyday lives. More and more young individuals are expected to have had some exposure to IT in their private and school capacity. This view is supported by the emphasis placed on technology in school curricula throughout the developed world where technology is integrated in most countries, the increased use of technology in university for their different reasons and employers utilising IT to better their working
environments and strategies. With the knowledge of the importance of technology there are many still to be done to successfully integrate basic and advanced technology skills into schools.

Through the analysis and interpretation of literature, the importance of integration of IT into the curriculum has been echoed by numerous researchers. The level and achievement of the integration goal is further addressed through the responses on the questionnaire discussed in Chapters 3 and 4.
CHAPTER 3: RESEARCH DESIGN AND METHODOLOGY

3.1 RESEARCH DESIGN

Creswell (2014:12) points out that the research design relates to the “types of inquiry within qualitative, quantitative, and mixed methods approaches that provide specific direction for procedures in a research design”. Welman et al. (2012:52) concur, stating that research design relates to the “plan according to which we obtain research participants and collect information from them”.

In investigating a suitable research design it is important to consider the expectations and elements identified in the literature review in Chapter 2. To determine the most appropriate data collection method for this study, the research previously undertaken was taken into account and the factors identified in the literature review were used to assist in developing the research methodology. To better understand IT competencies and the integration at school, university and employer level data were collected from all the relevant participants and compared for variances and similarities. The mixed method approach was used to obtain the relevant data from participants and is discussed below.

3.2 RESEARCH METHODOLOGY

As discussed in Chapter 1, this study utilised a mixed method approach, involving two techniques: qualitative and quantitative methods.

3.2.1 Qualitative method

Qualitative research, according to Welman et al. (2012:6-7), is also known as an anti-positivist approach. This approach suggests that the researcher will observe how a person reacts and responds to the situation being studied, from a distance. While Denzin and Lincoln (1994:4) clarify that the qualitative approach aims to establish the socially assembled nature of reality, Van Maanen (1979:520) explains that qualitative research is an “umbrella” phase “covering an array of interpretive techniques which seek to describe, decode, translate, and otherwise come to terms with the meaning of naturally occurring phenomena in the social world.” Welman et al. (2012:214) and
Creswell et al. (2010:110) add to the discussion by pointing out that the main purpose of qualitative analysis is to make sense of words by identifying themes and patterns, ideas, concepts, behaviours, interactions, incidents, terminology or phrases that will facilitate in the understanding of the words. Welman et al. (2012:188) and Stainback and Stainback (1984 cited in Welman et al., 2012:8) indicate that the qualitative approach is a “descriptive form of research” and is “presented in language instead of numbers.” Welman et al. (2012:213-214) and Creswell et al. (2010:110) additionally make clear that data collected should be reduced to “manageable and understandable texts.” The different concepts then need to be organised into coherent categories that will summarise and bring meaning to concepts: a process known as coding. Codes attach meaning to data by dividing data into similar groups/categories with similar meanings (Welman et al., 2012:214). The abovementioned authors also distinguish between different methods of coding. The method of coding selected for this study is discussed in detail in paragraph 3.3.2.

3.2.2 Quantitative method

As Welman et al. (2012:52), Creswell et al (2010:257) and Denzin and Lincoln (1994:4) make clear, the quantitative method, also known as the empirical review, is used to identify and evaluate trends and relationships between variables, making use of structured methods. The variables are ideally gathered through a random selection of participants from a large population. Welman et al. (2012:52) emphasise that the research design should indicate the number of groups used and whether these groups were randomly selected.

According to Welman et al. (2012:52), the population is the object of the study and includes individuals and groups. The research question is based on a population about which the researcher wishes to reach certain conclusions. The research question for this study focused on the gap between students, trainees and employers, with reference to the SAICA requirements. The population involved four types of respondents: 1) first year to fourth year students enrolled for an accountancy SAICA degree in SA; 2) the accountancy lecturers of these SAICA students; 3) SAICA accountancy trainees as well as 4) employers of SAICA graduates. For the students and lecturers all 15 SAICA accredited universities identified in the list of SAICA accredited programmes (SAICA,
Chapter 3: Research Design and Methodology

2014a) were selected. The accountancy trainees and employers population consisted of all the listed SAICA training officers; a total of 645, in 2014 (SAICA, 2014f).

Welman et al. (2012:55) and Creswell et al. (2010:146-147) point out that in most instances it is impractical to include all the members of the population in a research project. Consequently, researchers rely on just a sample of the population. They go on to state that in order to achieve in meaningful results the sample selected should be representative of the population. The sample selected should be a “miniature image, or likeness, of the population.”

Welman et al. (2012:56) propose two different types of sampling: probability sampling, which includes random, stratified, systematic and cluster samples or non-probability sampling, which includes accidental or incidental, quota, purposive, snowball, self-selection and convenience samples. Probability sampling allows the researcher to determine the probability with which the sample results deviates from the corresponding population. Non-probability sampling is frequently used for reasons of convenience and economy (Creswell, 2014:158 and Welman et al., 2012:56-57). The sampling method selected for this research was based on the probability sampling method. As explained by Welman et al. (2012:59), the most frequently employed type of probability sampling is random sampling. A clear distinction should be made between simple random sampling and stratified random sampling. Simple random sampling occurs when each member of the population has the same chance of being included in the sample and each sample of a particular size has the same probability of being chosen (Welman et al., 2012:59). Creswell et al (2010:153) stress that once the population and sample size is identified and selected, the data sources for collecting the relevant data need to be considered.

Mouton (2012:99) identifies the four main classes of data sources as: observation, self-reporting, archival/documentary sources and physical sources. Creswell et al (2010:258) propose that data collection may be done through existing, pilot-tested or self-developed instruments. Mouton’s self-reporting (2012:99) and Creswell’s (2010:258) self-developed instruments both include surveys, questionnaires, tests, scales and behavioural checklists. Mouton et al. (2012:174) argue that it is important to seek out as much previous research on the topic or related topics before the formulation
of data collection is started. He explains that if there is a need for comparison between previous studies and the current study, data will have to be collected in a similar fashion. Studies performed by Wally-Dima (2011:7-8), Theuri and Gunn (1998:106-107) and Romney et al. (1996:59-60), on the use of IT in accountancy curricula and the gap between accountancy education and employers, collected data based on questionnaires. In that these studies are similar to the current study and thus have a bearing on it, they can be said to support the decision to conduct the empirical study on a questionnaire/survey basis.

Creswell et al. (2010:156) identifies several survey methods in collecting data: group administration of questionnaires, postal, email, telephone and face-to-face surveys. It is the opinion of these authors that the type of survey should be selected by different research teams in that there are several available methods in collecting data; all have their advantages and disadvantages. Some may also be more relevant in different situations. The advantages in using questionnaires as a collection method include, but are not limited to, respondents being able to complete the questionnaire in a short space of time; it is easy and relatively cheap to do; respondents who do not live in close proximity can be reached and it has an optimal response rate. The disadvantages in using questionnaires as a data collection method include, but are not limited to, the primary researcher having limited control over the questionnaire in the field while the administration environment of the questionnaire cannot be controlled by the primary researcher.

The conclusion that may be drawn from the above is that the advantages outweigh the disadvantages when it comes to questionnaires. For this study, a self-developed questionnaire was designed. The empirical review used in this study was initiated with the development and design of the questionnaire, selecting the population and grouping the questions into related categories, in preparation for data analysis.
3.3 QUESTIONNAIRE DEVELOPMENT AND DESIGN

Creswell et al (2010:155) point out that surveys are the method most widely used by people to gather information. They further make it clear that the “correct” design of a survey should not be underestimated, due to the different ways available in conducting a survey; Mouton (2012:103) concurs with this position. Crowther et al (1994 cited in Creswell et al, 2010:156) proposes that the following aspects be taken into account in the design of a survey:

- “Sampling issues, including sampling strategy and size, as well as the minimum response rate acceptable and pilot studies
- Questionnaire design issues
- Data collection method, for example telephone, mail, personal interview and e-mail.”

The design of the questionnaire is regarded as one of the most important parts of the research process as this is the part where the data are generated (Creswell et al, 2010:158). The authors explain that questionnaire, in its final form, after taking into account different aspects should be “a natural, ready-to-use instrument to elicit information.”

Welman et al. (2012:174) emphasise that a questionnaire should only include those questions that relate to the research question; a list of information that will be required to address the problem should be drawn up. Creswell et al. (2010:158-168) support this view, arguing that when designing the questionnaire there are five specific areas that should attract the focus of the researcher. The first part is the instructions, which should be simple, clear and concise. The scale that will be used should be limited to five. The second part relates to the appearance; the aim of the researcher in the design of the questionnaire should be to be: user friendly, neat and relatively brief. The third part relates to the completion time. Learners should be able to complete the questionnaire in 20 minutes and adults in 30 minutes. The importance of a pilot study is emphasised here to achieve a clear indication of how long it takes different respondents to complete the questionnaire. The fourth part relates to the question sequence. It is suggested that a questionnaire is started with a brief introduction of what the questionnaire is about.
Following on the introduction, easy-to-answer, non-threatening questions should be asked. Biographical details are considered as easy-to-answer and will put the respondent at ease. Questions of a similar nature should follow on each other and similar response questions should be kept together, the main aim being to not confuse the respondent. Welman _et al._ (2012:174), Mouton (2011:102-104) and Creswell _et al._ (2010:159-160) make the case for the wording of questions to be written in a way that will mean the same to all respondents. Guidance on the writing of questions is as follows:

- “Use language understandable by respondents, no slang or abbreviations”
- Questions should be clear and the respondent must know exactly what is being asked
- Avoid double questions
- Avoid leading questions
- Avoid asking knowledge questions, including memory questions
- Avoid asking hypothetical questions
- Avoid double-negative questions
- Avoid questions a statement with a “not” in it
- Formulate questions in the first person
- Formulate items as statements and not questions
- Avoid making erroneous assumptions
- Avoid long questions, be brief and focused
- Avoid asking sensitive questions that might offend your respondents.”

The fifth and last part relates to the type of questions. Two types of questions are identified: the first are open ended. Respondents are given the opportunity to respond with a word, phrase or comment. This question type is used to generate research hypotheses (Creswell _et al._, 2010:161). Welman _et al._ (2012:174) defines an open ended question as a question asked without prompting the participant for the answer. The second type of question is the closed or pre-coded question (Creswell _et al._, 2010:161; Welman _et al._, 2012:174). The data obtained from these questions are easier to interpret as respondents only select one or more options already listed. Bell (2005 cited in Creswell _et al._, 2010:161) identifies six types of closed questions. Every type
identified offers its own advantages and disadvantages and the relevance of the different types should be considered. The most popular scale used in closed questions is the Likert scale. The respondent’s attitude is measured through the use of such a scale. The most commonly used categories are ‘agree’ or ‘disagree’. A minimum of four and a maximum of six response categories should be used. An example of a four response category Likert scale is provided in Table 3-1.

**Table 3-1: Four response category Likert scale example**

<table>
<thead>
<tr>
<th></th>
<th>Strongly agree</th>
<th>Agree</th>
<th>Disagree</th>
<th>Strongly disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>I enjoy doing maths</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Maths will help me in my future career</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>I find the maths topics useful</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>I feel enthusiastic in the maths class</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>

Source: Creswell *et al.* (2010:168)

Therefore, in closed questions, participants do not have the option to be neutral or undecided on a question. All participants will have to answer the questions by either agreeing or disagreeing to a greater or lesser degree. Using a Likert scale of five, the middle option, “neutral” offers the participants the option of not having an opinion or preference. This results in data being less reliable for those participants opting to be neutral on some or all of the questions.

Welman *et al.* (2012:148) and Creswell *et al.* (2010:155) point out that it is compulsory to conduct a pilot study of a small representative group of the population. They explain that the pilot study provides good feedback on how participants interpret the questions. In addition to this, any feedback from the pilot study may lead to an adjustment to the questionnaire.

After considering the different views on the development of a questionnaire in the literature, the development of the self-developed questionnaire for this study is discussed in detail in paragraphs 3.3.1 to 3.3.9.
3.3.1 Literature review of the research question, including the review of existing questionnaires

The questionnaires used by Wally-Dima (2011:11) and Theuri and Gunn (1998:106) required responses from university lecturers and employers. They responded to two questionnaires with specific, tailored questions to address diverse questions as applicable to the different respondents. The focus of these two studies lay in the gap between education and accounting practice and the accounting information systems course structure as well as the expectations with respect to employer systems skills, respectively. These questionnaires made the importance of comparing the accountancy curriculum with the professional bodies’ requirements clear, and on this basis the current SAICA requirements for IT competencies at university level were used as the starting point for the questionnaire.

The research was conducted from an accountancy education perspective and although the concept of IT was addressed, the design of the questionnaire was not prepared on an IT basis. An IT questionnaire administered in February 2012 by a researcher at the North-West University Vaal Triangle Campus (Annexure 1) was reviewed to gain information on how to structure and group IT related questions. The said questionnaire’s central focus was on the different perceptions on computer-related academic programs and occupations. The questionnaire first addressed demographics of the participant. The participant’s high school career was then addressed through several questions relating to the IT subjects taken. The third section focussed on the participant’s encounters and perceptions of computer education and computer-related professions. The questionnaire was completed on ordinary paper. There were few instructions on how to answer the different questions in terms of select only one or multiple options. Most of the questions were phrased as questions and not statements as suggested by Creswell (2010:160).

The overall impression on the layout of the questionnaire was satisfactory. The question responses were presented in an easy format. The questions were grouped well. Similar questions relating to the different sections as identified in the questionnaire were kept together. The researcher made use of both open and closed questions. The length of
the questionnaire was appropriate and answered within 10 minutes. A Likert scale with five responses was used.

A second questionnaire conducted by SAICA was reviewed (SAICA, 2014d). The main focus of this questionnaire was on the future use of academic textbooks in print form or in the form of e-books. This questionnaire was administered electronically. An introductory email was sent out to relevant participants with the link to the online questionnaire. The questionnaire started with a brief introduction and purpose of the questionnaire. The questionnaire started with a brief introduction and purpose of the questionnaire. Participants also had to agree or disagree to having read the introductory information, voluntarily agreeing to participate in the questionnaire and being at least 18 years old. No demographics were asked of the participants and no clear grouping of questions. The researcher only made use of closed questions with a Likert scale of five responses. Throughout the questionnaire there was no indication of how many questions was left making it difficult to track the progress of the questionnaire.

The reviewed literature and questionnaires provided useful information that was taken into consideration in the designing of this research questionnaire with regard to the following:

- Comparison between SAICA’s requirements and university curriculums
- The use of a Likert scale with five of four responses
- Evaluate and explore different questionnaire options in terms of paper based or electronically
- The use of open and closed questions
- Grouping of similar questions
- The correct use of IT terminology.

3.3.2 Coding and categorisation

Henning (2014:104-114), Welman et al. (2012:214) and Creswell et al. (2010:105-109) clarify that there are various types of coding. The main types include open coding, in vivo coding, grounded theory and a priori codes. Open coding occurs as researchers develop codes as they read through data. In vivo coding relates to a master list of codes existing prior to going through the data of items/concepts the researcher hopes to identify. Grounded theory, according to Henning (2014:114-115), is achieved from a
researcher’s “own theoretical position and existing knowledge.” Creswell et al. (2010:107) explain that priori coding exists when a researcher identifies codes relevant to their study from other similar studies already performed. Thus, priori coding exists before the researcher analyses their data. A detailed explanation of what, and why, questions were grouped/coded into specific sections to analyse the data collected follows.

Section A: Demographic information

This section included seven questions (A1 – A19, Annexure 2) on the participant’s home language, year of study/employment, ethnic group, curriculum enrolled for and employment level. Due to the confidential nature of employer details, this participation group was only required to answer two questions on their type of training office and level of employment. The information gathered from these questions was used as a control to ensure that only accountancy students, lecturers and trainees were included in the final set of data. Any participants not fulfilling these criteria were excluded from the data analysis. This information was also used to determine if the sample was representative of the total population in terms of race, year of study (first year to honours level) /employment (all types of lecturers and accountancy trainees) and school back ground.

Section B: Exposure to and use of IT

In this section participants had to answer six questions (B1 – B28, Annexure 2), with several sub-sections, that indicated what was available and presented at school level in term of IT, the type of devices they own and /or to which they have access and how often they use these devices. Employers had to answer based on their perception of what their accountancy trainees have access to and how often they use different devices. The information gathered from this section indicated whether there was a possible backlog in IT due to the type of school attended, and whether students enrolled for an accountancy curriculum have had adequate or any exposure to IT when they enter university, throughout their studies and when they enter the workplace. The answers to these questions indicated the level of exposure the “teachers” of technology have, which they hope to ultimately convey to their students. The data gathered from
employers were compared to those of the accountancy trainees to gain insight as to whether what employers perceive is what accountancy trainees are experiencing.

Section C: Perception of IT competencies

Participants had to answer 11 questions (C1 – C75, Annexure 2), with several sub-sections, on their perceptions of their own level of IT competencies. They also had to indicate their awareness of the different SAICA guidelines available for IT competencies. Participants were required to indicate their opinions on what should be included in a university curriculum for the following IT competencies: general IT competencies, spreadsheets, MS Word, presentations, email communications, computers and professional research. Questions concerning their own competency levels and that of their fellow lecturers at university were also asked. The information gathered assisted in determining, first of all, if the participants were aware of all the SAICA guidelines available and to what extent they agree with the specific IT competencies that should be included in a university curriculum, as indicated by SAICA. It was interesting to anticipate whether there would be a difference of opinion between the various participant groups in terms of what should be included in a curriculum, or not. The questions were set so that the results would also indicate if there was a specific “greater” or “lesser” need for specific competencies. This section was structured so as to permit the results to clearly illustrate employer expectations. The “teacher” was again tested based on the different participant groups. The last question in this section was structured to give an indication of how comfortable participants are with new applications; i.e. a culture of “do it yourself” or “wait till someone shows me”. How participants rate their own competencies were compared to results of the IT competency test in section D, to illustrate that perception may not always be reality-based and that perception may influence reality.

Section D: Actual IT competencies

Only the competencies of accountancy students, lecturers and trainees were tested in this section, therefore no employers participated in Section D. To fully understand where accountancy trainees start to develop their competencies, this section was only for students (as the starting point as future trainees), lecturers (the people who have to
teach the competencies) and of course, the trainees. Seventeen questions (D1 – D50, Annexure 2) were set on general IT issues, MS Word and MS Excel. These three topics were chosen to enable all participants at least to be able to answer some, if not all, of the questions. Presentations, email communications and professional research tools, as outlined by SAICA, were purposely not included as those competencies might be relevant only to the more senior students, lecturers and trainees. The results of these competency tests were compared to the participant’s perceived knowledge on the different elements. This information illustrated whether participants indicated their levels of competencies congruently or whether their perceptions fall short of or exceed their competency levels. The information may also indicate specific areas where more or less focus should be placed at university level for certain IT competencies, based on the participants’ actual results.

Section E: IT integration and gap analysis

Ten general questions (E1 – E16, Annexure 2) were asked of all participant groups regarding the integration of IT. The views of participants were solicited concerning the overall preparedness of accountancy trainees in terms of IT, when they leave university. Participants also had the opportunity to indicate if employers should have any involvement in the curriculum design at university level, where IT is concerned; how IT should be taught and several open ended questions on the participant’s view of what other skills IT a student should be taught. These questions may shed light on the existing gap due to employers not being involved in the curriculum design of IT and whether universities are on the right or wrong track of how they are currently teaching IT as perceived by the different participant groups. These answers served as an indication for recommendations on how to bridge the expectation gap.

3.3.3 First draft questionnaire

In designing a new questionnaire, the above aspects of the existing questionnaires and literature were considered. The relevant elements identified above were also considered and included in the design. The first draft was designed to be conducted on a paper based approach. A brief summary of the first draft questionnaire is as follows:
• Brief introduction on the main focus of the questionnaire to inform participants of what the research would focus on and what the data would be used for
• Grouping of the different questions into the following sections:
  o Section A: Demographic information
    
    This section included four questions on race, age, home language, etc. As suggested by Creswell et al. (2010:158) the main purpose for these questions was to put the participant at ease before the “serious” questions started.
  o Section B: IT exposure at high school
    
    It is clear from the literature review in Chapter 2 that the IT gap starts at school level. The five questions included in this group were intended to identify whether participants had access and exposure to IT at this stage of their education, as well as the type of school from which they matriculated.
  o Section C: Encounters and use of computers
    
    The IT era has created an expectation that everyone does have or has had access to technology. The two questions in this section aim to identify if this is true or not.
  o Section D: Perceptions with regards to the use of computers and IT
    
    IT has an impact on everything and everyone. These 15 questions were intended to identify how participants rate themselves on a Likert scale of four (strongly agree, agree, disagree, strongly disagree). The questions cover the participant’s perception of their skills in the use of social networks and required IT competencies from SAICA’s prescribed requirements.
Section E: Perceptions of when and how computers and IT should be taught

The main focus of this section, consisting of 4 closed questions and one open ended question, was to gain insight into the participants’ views on how they think universities should teach IT competencies. This was to indicate how participants feel concerning whether universities meet the requirements of all the participants.

- Clear instructions on how to answer the questions
- Closed questions were used in sections A to E
- One open question was asked to determine what participants deem as IT and any other thoughts on IT
- Time to answer the questionnaire, 10 minutes.

3.3.4 Review of the first draft questionnaire by a statistical consultant

Upon completion of the first draft questionnaire it was reviewed by a statistical consultant to determine if the questions included in the questionnaire would provide relevant, useful and satisfactory data. The following recommendations were made and accepted:

- Consider an electronic questionnaire on SurveyMonkey®
- Design separate questionnaires for the different participants
  - Accountancy students
  - Accountancy lecturers
  - Accountancy trainees and employers of accountancy trainees
- Consider adding an IT competency test to compare the participant’s perception of their skills with his/her actual competencies
- Avoid double-negative questions
- Ask more open ended questions to avoid leading participants to the preferred answer.
Chapter 3: Research Design and Methodology

3.3.5 First pilot study conducted

After the necessary and recommended adjustments were made, a pilot group was selected. This step in the preparation of the research questionnaire is regarded as essential by Welman et al. (2012:148) and Creswell et al. (2010:155). The students and lecturer participants were selected from the North-West University (NWU) Vaal Triangle campus while the accountancy trainees and employer participants were selected from the Vaal Triangle. The selection was thought to be representative of the different demographics. The participants initially selected included:

- Accountancy students;
  - one first year
  - one second year
  - one third year
  - one fourth year (honours)
- Two accountancy lecturers
- One accountancy trainee
- Two employers of accountancy trainees.

Of the original participants selected, almost everyone voluntarily completed the survey with the exception of the second year accountancy student and one employer who opted not to complete the questionnaire at all. Comments and recommendations were received from some of the participants, including comments on the uncertainty of what was meant by certain questions. These comments were taken into account in the further adjustment of the questionnaire.

3.3.6 Additional adjustment of the questionnaire after considering the first pilot group’s responses

Following the completion of the first pilot study, the statistical consultant was again consulted to evaluate the responses received. It was identified that some questions displayed inconsistent responses. The demographics of the pilot group, with regard to the students, were not satisfactory and it was suggested that minor adjustments to the questions with discrepancies be made. A second pilot group was selected for evaluating the same questionnaires for consistency of the responses.
3.3.7 Second pilot study of the adjusted questionnaire

Additional adjustments were made to the draft questionnaire before a second pilot group of accountancy trainees were selected at the NWU Vaal Triangle campus. The selection consisted of three additional second year students not in the initial pilot study. Out of the additional participants selected everyone voluntarily completed the survey except for one second year accountancy student. No comments or recommendations were received from these participants. Following this phase the questionnaire was in a semi-final stage and only had to be reviewed by the SAICA professional body for input on the content. All responses received during the pilot group session were excluded from the final responses used in the analysis of the data in Chapter 4.

3.3.8 SAICA review of the questionnaire with adjustments made where necessary

The scope of this research reaches far beyond schools, universities and employers and SAICA, the governing body, is also an important stakeholder. To add value to this research and to obtain additional insight to the topic under discussion, a representative of SAICA in the professional development department was contacted to review the questionnaire. Several discussions took place where additional questions were added, certain questions were re-phrased and some of the questions were left out completely. The accountancy trainee and employer questionnaire was also split into two separate questionnaires. An additional suggestion was that, due to the confidential nature of employer information, no demographics be asked of them. The IT competency test for employers was also excluded as the focus was on the trainees and not on the employers.

This review process was seen as the most important, due to the fact that SAICA is the direct link to schools, universities and employers. It is aware of the current expectation gap and assisted in shaping the questionnaire to add value to the IT issue of accountancy trainees.

3.3.9 Final version of the questionnaire sent out to participants

Applying the random sampling method, as mentioned by Welman et al. (2012:59), the questionnaires relating to students and lecturers were sent out to all 15 SAICA
Chapter 3: Research Design and Methodology

In this chapter the research methodology and design were addressed. The mixed method was selected as the most appropriate in order to analyse participants’ personal views, perceptions and actual skills. A self-developed questionnaire was developed based on the literature review, existing questionnaires and SAICA guidelines. The development of the questionnaire was facilitated by a statistical specialist, pilot groups and a SAICA representative to ensure its high quality. Due to the personal perceptions and views of participants on IT related competencies, a Likert scale of four was used to “force” the participant to have an opinion and not be neutral on any question.

The development of the questionnaire took place in eight phases. The initial questionnaire was paper based with limited questions on a participant’s opinion on SAICA and actual competencies. After consultation with a statistical specialist, this was changed and the questionnaire was prepared as an electronic questionnaire on SurveyMonkey®. The first pilot group identified where questions needed to be adjusted
to be more clearly understood by participants and to be more representative of the population. After final adjustments were made, the questionnaire comprised five sections aimed at obtaining information regarding the participants’: 1) demographic information; 2) exposure to and use of IT; 3) perception of IT competencies; 4) actual IT competencies and 5) views on IT integration.

The questionnaire was administered to four groups of respondents to obtain the necessary data. Each individual group was given unique questions with similarities between the groups. The similar questions were used to draw comparisons and correlations and aided in identifying certain preferences and/or dislikes in specific and/or all groups. The questionnaires for the students, lecturers, accountancy trainees and training officers (employers) were grouped and coded into five sections. The interpretation and analysis of the data collected during this process is addressed in Chapter 4.
CHAPTER 4: ANALYSIS AND INTERPRETATION OF DATA

4.1 INTRODUCTION

In this chapter, comparisons were drawn between the literature review in Chapter 2 and the data gathered in terms of the methods applied in Chapter 3. Results of responses were analysed and comparisons drawn between similarities and differences identified in the literature and the empirical results. Anomalies were discussed according to the layout and classification of the data collection method (questionnaires) as explained in Chapter 3 and the comparisons grouped according to the responses from:

- Students
- Lecturers
- Trainees
- Employers.

Further data analysis of results between students and lecturers, trainees and employers, students and trainees and lecturers and employers was done. The analysis method is discussed in the following paragraphs.

4.2 DATA ANALYSIS METHODS

Data analysis in this study was based on a priori coding and involves statistical analysis for the closed-ended questions and content analysis for the open-ended questions.

The statistical analysis of collected data was performed using the Statistical Package of the Social Sciences (SPSS©) software, Version 22. Before information could be entered into the SPSS© system (Pallant, 2013:11) for analysis, a ‘codebook’ had to be prepared to convert the data into a format with which the SPSS© system was able to interface. The codebook required all questions to be identified, abbreviations assigned to them and codes assigned to each response. There are basic rules for naming variables that should be adhered to, to ensure that the data coded are understood by the SPSS© system. These rules are that variable names should be unique; begin with a letter; cannot include full stops; spaces or symbols; cannot
include words used as commands by SPSS© and cannot exceed 64 characters. An example of a codebook is illustrated in Table 4-1.

**Table 4-1: Codebook example**

<table>
<thead>
<tr>
<th>Variable</th>
<th>SPSS© variable name</th>
<th>Coding instructions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Identification number</td>
<td>ID</td>
<td>Number assigned to each survey</td>
</tr>
<tr>
<td>Sex</td>
<td>Sex</td>
<td>1 = Males</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2 = Females</td>
</tr>
<tr>
<td>Age</td>
<td>Age</td>
<td>Age in years</td>
</tr>
<tr>
<td>Marital status</td>
<td>Marital</td>
<td>1 = single</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2 = steady relationship</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3 = married for the first time</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4 = remarried</td>
</tr>
<tr>
<td></td>
<td></td>
<td>5 = divorced/separated</td>
</tr>
<tr>
<td></td>
<td></td>
<td>6 = widowed</td>
</tr>
<tr>
<td>Optimism Scale</td>
<td>Op1 to op6</td>
<td>Enter the number circled from Items 1 to 6</td>
</tr>
<tr>
<td>Items 1 to 6</td>
<td></td>
<td>1 (strongly disagree) to</td>
</tr>
<tr>
<td></td>
<td></td>
<td>5 (strongly agree)</td>
</tr>
</tbody>
</table>

Source: Pallant (2013:12)

The conclusion that could be drawn from Table 4-1 was that each question should have specific and unique abbreviations and that the coding instructions should be clear and concise.

The questionnaires used to collect responses for this study were converted to the codebook format to be compatible with SPSS©. Unique variables names were assigned to each question and the different response types were assigned numeric values to simplify the data. The codebook prepared for this study is illustrated in Annexure 2. The data gathered with more than one positive and or negative response type was further grouped to only represent two alternatives so as to be more representative and comparable. Where respondents had to provide a response
in terms of strongly disagree, disagree, agree and strongly agree, the responses for strongly disagree and disagree were grouped together and represent 1) disagree, 2) not being prepared, 3) not aware or 4) should not be included, in the relevant question context. The responses in terms of agree and strongly agree were grouped together and represent 1) agree, 2) prepared, 3) aware or 4) should be included in the relevant question context.

The results of the data analysed by SPSS© are discussed in the following paragraphs.

4.3 SECTION A: DEMOGRAPHIC INFORMATION

The number of responses for any of the four groups could not have been controlled in any way. The willingness of respondents to complete the questionnaire rested solely on the respondents themselves. The number of responses received for all the groups are discussed in the paragraphs that follow.

As stated, this study required responses from four respondent groups; students, lecturers, trainees and employers. Emails were sent out to at least two lecturers at each SAICA accredited university requesting them to circulate the relevant links to the online questionnaire amongst their accountancy students and colleagues. The email gave a brief overview of the study with instructions on how to access the questionnaire.

4.3.1 Student and lecturer questionnaires

The questionnaires sent out had to be completed within a two week period. After the initial deadline, 44 students from two universities and 10 lecturers from six universities completed the surveys. A follow-up email was sent out to all the original recipients in an effort to increase participation in the completion of the questionnaire. Overall, 114 student responses, with 84 usable responses from three different universities, were received. Question A3 (Annexure 2) was used as a control question to ensure that only responses from students enrolled in an accountancy curriculum were included in the study. The 30 unusable responses included students who were not studying towards an accountancy degree and were therefore excluded.
resulting in the 114 usable student responses. Question A15 (Annexure 2) indicated that 57.3% of all the student respondents were of traditional African descent.

Question A4 (Annexure 2) from the lecturer questionnaire was used to exclude any responses from lecturers who were not teaching an accountancy subject. The responses received from lecturers totalled 17, from seven different universities, all of which were usable. The lecturer responses represented 46.7% (7/15) of the entire university population.

4.3.2 Trainee and employer questionnaires

A separate email with the relevant instructions was sent out by the professional body, SAICA, to trainees and employers requesting them to complete the online survey. Question A5 (Annexure 2) from the trainee questionnaire was used to exclude any responses from trainees who were not employed at a SAICA accredited training office. A total of 289 responses from trainees were received, totalling 11.0% (289/2,618, (SAICA, 2014e)) of the total trainees currently registered, based on the trainees passing the 2014 ITC exams. All of the responses were useable, resulting in no exclusions.

Question A5 (Annexure 2) from the employer questionnaire was used to exclude any responses from employers who were not SAICA accredited training officers. A total of 89 employer responses were received, totalling 13.8% (89/645, (SAICA, 2014f)) of the listed SAICA training offices. All of the responses were useable, resulting in no exclusions. The respondent figures are summarised in Table 4-2.

<table>
<thead>
<tr>
<th></th>
<th>Students</th>
<th>Lecturers</th>
<th>Trainees</th>
<th>Employers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Replied before the deadline</td>
<td>44</td>
<td>10</td>
<td>289</td>
<td>89</td>
</tr>
<tr>
<td>Replied after extension was granted</td>
<td>70</td>
<td>7</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>Unusable responses</td>
<td>(30)</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td><strong>Total respondents</strong></td>
<td><strong>84</strong></td>
<td><strong>17</strong></td>
<td><strong>289</strong></td>
<td><strong>89</strong></td>
</tr>
</tbody>
</table>

Source: Responses on SurveyMonkey® and SPSS©
In all four questionnaires, respondents were asked to answer questions A7 to A12 (Annexure 2) on their year of enrolment/traineeship and/or status of employment. The inclusion of these questions was intended to identify whether the responses received were from different levels within that group to ensure transparency. The questionnaires were sent out to everyone and not only to a selected few (refer to paragraph 3.2.2; simple random sampling). The different levels within each group that responded to the questionnaires are illustrated in Figure 4-1 to 4-4.

**Figure 4-1: Student respondent profile**

Source: Responses on SurveyMonkey® and SPSS©
Chapter 4: Analysis and Interpretation of Data

**Figure 4-2: Lecturer respondent profile**

Source: Responses on SurveyMonkey® and SPSS©

**Figure 4-3: Trainee respondent profile**

Source: Responses on SurveyMonkey® and SPSS©
Figures 4-1 to 4-4 illustrate that the responses within a specific group are spread between different respondent profiles. The conclusion that may be drawn from this is that, through obtaining different views from the four respondent groups with different profiles, the responses were based on the perceptions and experience on all levels within the respondent groups. This offered a more holistic view and/or reflection of the perceptions and experience of the different groups. After evaluating the different types of respondents and their demographics, the data gathered through the questionnaires were analysed and are discussed in the paragraphs that follow, in regard to the specific questions.

4.4 **SECTION B: EXPOSURE TO AND USE OF IT**

4.4.1 IT exposure at school level of students

Paragraph 2.4.1 outlined the role that poverty plays in the lack of availability of technology in households. Question A18 (Annexure 2), included in the questionnaire for students, evaluated the respondent’s type of school attended before enrolling at university. The aim of this question was to identify the percentage of students who
attended public–previously advantaged, public–previously disadvantaged and private schools as an indication of the demographics of the students who completed the questionnaire. Figure 4-5 illustrates the percentage of student respondents per school type.

**Figure 4-5: Student respondents per school type**

Source: Responses on SurveyMonkey® and SPSS©

Figure 4-5 demonstrates that the majority of the respondents attended public–previously advantaged schools. Irrespective of this, the demographics of the students who completed the questionnaire was satisfactory in that all three types of schools where represented. The expectation from the literature was that poverty would play a role in the availability of IT at previously-disadvantaged schools. Paragraph 2.4.2 outlined that there was a lack of IT exposure in schools. The reasons for this include the unavailability of technology, budgetary constraints and lack of knowledge, to name a few issues. Question B1 (Annexure 2) evaluated the type of IT modules available at the specific schools attended by student respondents. The responses were intended to identify whether the unavailability of IT was limited to certain types of schools. The responses to question B1 are depicted in Figure 4-6 which addresses the primary objective identified in Chapter one that demonstrates the factors affecting the IT gap.
Figure 4-6: % Availability of IT per school type

Source: Figure 4-5, Responses on SurveyMonkey® and SPSS©

Figure 4-6 illustrates that IT is, to a small extent, unavailable in public–previously advantaged and private schools, while 55.6% of students in public–previously disadvantaged schools did not have any type of IT available at school level. The conclusion that was drawn from Figure 4-6 was that the data collected supports the view of the literature review on the unavailability of IT at schools. This may be limited to the more disadvantaged schools but, as demonstrated in Figure 4-6, all types of schools have some level of unavailability. The unavailability of IT at schools indicates that there is a possible expectation gap from as early as the first year at university due to the lack of IT exposure at school. An additional question that requires answering is: For those fortunate enough to have IT available, did it prepare them for university?

Question E6 (Annexure 2) evaluated the student preparedness in terms of IT when they first entered university. This question was compared to the responses given by those who indicated that they had IT exposure at school (Figure 4-6). The aim of this comparison was to identify whether a gap exists between school and university in terms of the preparedness of students, due to IT being available, and students not
obtaining the necessary skills at school level that they need at an entry level for university purposes. The comparison aimed to support the finding in paragraph 2.4.2 on the lack of emphasis placed on IT in schools. The comparison is illustrated in Figure 4-7.

Figure 4-7: % Preparedness of students with IT available at school

Source: Figure 4-6, Responses on SurveyMonkey® and SPSS©

Figure 4-7 illustrates that although respondents had some form of IT at school, 64,0% of public–previously advantaged, 100,0% of public–previously disadvantaged and 20,0% of private school respondents are of the opinion that they were not adequately prepared for IT requirements when entering university. The majority of public–previously disadvantaged school learners consider themselves as not being prepared for IT when they enter university. This was anticipated, as paragraph 2.4.2 indicates that numerous disadvantaged schools record a lack of emphasis on IT due to various factors, as previously discussed. The perception of students who came from advantaged and private schools was however, unexpected. The data clearly indicates that no matter what type of school attended, there may still be a lack in the IT competencies students should have acquired at school level to prepare them for university.
This data identified that the level of IT exposure at school level, irrespective of the type of school, is from a student’s perspective, inadequate in preparing them for the IT requirements at university level. As identified in the literature review in Chapter 2, the reality of the lack of emphasis on IT at school level contributes to an expectation gap from school to university, leading to further expectation gaps for students with insufficient knowledge and exposure when they enter university, as they will struggle to “catch up” to their peers that had sufficient skills training and adequate exposure to IT when the latter entered university. Paragraph 2.7 addressed the point that all students are expected to make use of IT at university level. Assignments, additional resources and research are performed through the use of technology and are required by SAICA as a compulsory competency. The level of access and exposure to IT for the different groups was analysed and is discussed in the following paragraphs.

4.4.2 Access to technology

The literature review identified that students, lecturers and trainees are required to utilise IT on a regular basis for different reasons, including time management, simplifying tasks, keeping up with the latest trends and to improve learning, to mention a few. Questions B4 to B16 (Annexure 2) evaluated the respondents’ different locations of access to technology and the number of technological devices to which they have access. Employers answered these questions based on their knowledge/perceptions of their trainees’ access. The questions were grouped together and reflect a total number of locations of access and a total number of devices. Paragraph 2.5 and paragraph 2.7 emphasise that universities have IT facilities while training officers are required by SAICA to provide their trainees with regular internet access and a computer. The aim of these questions was to identify whether these requirements and assumptions are supported by the views of the different groups. The data is illustrated in Figure 4-8.
Chapter 4: Analysis and Interpretation of Data

Figure 4-8: % places of access to technology
Source: Responses on SurveyMonkey® and SPSS©

Figure 4-9: % Devices owned / have access to
Source: Responses on SurveyMonkey® and SPSS©
Figures 4-8 and 4-9 illustrate that all participants have access to a minimum of one location and to one device as regards technology. The conclusion that was able to be drawn was that universities and training officers are complying with the minimum SAICA requirements in providing students and trainees with basic technological facilities and devices. The anomaly between the perceptions of employers regarding the number of locations of access available to their trainees and those identified by the trainees, is significantly different. Employers perceived trainees as having access at fewer locations indicated by trainees. Where employers indicated that 59,6% of trainees have access to IT at only two locations, just 40,5% of trainees shared their view. Employers’ perception was that 11.2% of trainees have access at three locations which is less than the 24,9% of trainees who indicated that they have access at various locations. The conclusion that was drawn from the above was that the availability of locations of access does not drive the quality of access, nor how often participants have access to technology, nor does the number of technological devices they own or have access to and how often they use different applications. Although participants indicated that they have access to multiple technological devices and places of access, an additional point of interest would be to assess what the different participant groups perceive as important to include in an IT curriculum.

4.5 SECTION C: PERCEPTION OF IT COMPETENCIES

4.5.1 IT curriculum design

SAICA requires all potential CA(SA)’s to have mastered IT competencies as outlined in paragraph 2.7. The specific competencies are listed in their guidelines available to students, lecturers, trainees and employers. In addition to SAICA guidelines, paragraph 2.5.1 outlines that the curriculum design at university follows their own prescribed competencies, in conjunction with the professional guidelines specific to that university. Paragraph 2.6 further explains that trainees do not always meet employer expectations when it comes to IT competencies. Questions C9 to C13 (Annexure 2) evaluated lecturers’ and employers’ awareness on the available guidelines in designing an IT module for an accountancy curriculum. The responses from lecturers aimed to identify if the designers (universities) utilise the available SAICA guidelines in the design of their curriculums. A further result from these
questions was used to identify if the expectations of employers are founded on SAICA guidelines or not.

![% Awareness of guidelines available for curriculum design](image)

**Figure 4-10: % Knowledge on available SAICA guidelines for curriculum design**

Source: Responses on SurveyMonkey® and SPSS©

The conclusion that may be drawn from Figure 4-10 supports the literature due to both groups being aware, to a great extent, of the available guidelines in the designing of an accountancy curriculum. The responses from employers indicating that they are not aware were 5.2% and 10.4% on the use of SAICA’s competency framework and accreditation criteria respectively, indicating that there may be a misconception regarding the guidelines used in the design of IT modules within an
accountancy curriculum. This further indicates that employer expectations may, to a smaller extent, be based on “personal views” due to the lack of awareness of how IT is designed in an accountancy curriculum. The design of a curriculum is further open to a university’s own interpretation of the available SAICA guidelines. The guidelines are just that – guidelines – and universities have to decide how best to include opportunities in an accountancy curriculum to ensure that students acquire the necessary competencies.

Paragraphs 2.4.2, 2.5.1 and 2.6 described the underutilisation of IT at school, university and employment level. The inclusion of specific competencies in an accountancy curriculum at university will outline the level of utilisation of that specific competency. The responses may also indicate a possible expectation gap between what is being taught at university (lecturer’s responses) and what is expected by employers in terms of IT competencies that trainees should receive instruction on. Questions C16 to C21, C24 to C37, C40 to C44, C47 to C50, C53 to C56, C59 to C61 and C64 to C66 group the specific competencies required by SAICA for a prospective CA(SA) to acquire. The specific topics relate to the following competencies: 1) IT competencies in general, 2) Spreadsheets, 3) Word processing, 4) Presentations, 5) Email, 6) Professional research and 7) Computers. The responses by all participant groups to the above mentioned items are depicted in Figures 4-11 to 4-18.
Figure 4-11: % Inclusion in curriculum of IT competencies in general

Source: Responses on SurveyMonkey® and SPSS©
Figure 4-11 illustrates that all participants were more or less in agreement as to which practical IT skills should be taught and which should not. The first anomaly noted was the lecturers’ perception concerning professional research tools. Although they agree to the inclusion of this competency at 80.0%, it is significantly lower than that of the other three groups of participants. This may lead to a lack of emphasis from a university perspective due to not all the lecturers agreeing on the importance of inclusion in the curriculum. The next anomaly related to the inclusion of database software. Here, a mere 66.7% of lecturers agreed to the inclusion, which was in direct contrast to students and trainees who indicated their agreement on the inclusion at 94.5% and 92.2% respectively. Employers agreed to the inclusion at 85.7% with a disagreement regarding inclusion of 14.3%, a significantly higher percentage than any other group. Database software was ranked the lowest by lecturers, trainees and employers. This information may be an indication of where SAICA’s requirements are not clear regarding the extent of the inclusion of this competency. It may subsequently lead to a misconception amongst students on what will be expected of them when they enter traineeship, which is evident through their agreement to the inclusion of this competency. Lecturers further agreed, to a lesser degree, to the inclusion of advanced spreadsheet software. This view was shared by employers who disagreed with the inclusion of this competency at 11.7% which is again significantly higher than any other group. Lecturers agreed to the inclusion of all these competencies, but the degree to which these should be taught was clearly evident from the responses.

Paragraph 2.7.1 explained that SAICA required students to master at least the following practical IT competencies at university level:

- Spreadsheet software in a relevant accounting/business context
- Basic principles of database software in a relevant accounting/business context (Access, CAATs)
- Internet tools (e-mail, web browser, FTP, other) software in a relevant accounting/business context
- Professional research tools in the context of the external financial reporting syllabus.
The conclusion drawn from Figure 4-11 and the prescribed SAICA competencies outlined in paragraph 2.7.1 for students was that all participants agreed to a large extent on the inclusion of spreadsheet software, word processing software, database software, internet tools and professional research in an accountancy curriculum. The noticeable anomalies identified were that lecturers’ responses deviated to a large extent from those of the other respondent groups on the inclusion of advanced spreadsheet software and database software. Word processing software is not listed as one of the prescribed competencies for IT, but has received significant agreement on the inclusion in an accountancy curriculum. The lack of agreement on the inclusion of these competencies may indicate that there is an expectation gap between what SAICA prescribes that students should be proficient in, what universities are teaching and what employers expect of trainees.

The guidelines provided by SAICA only summarise the competency and provide inadequate guidance on how these competencies should be achieved through teaching at university level. The lack of “examples” may result in different groups interpreting these competencies in significantly different ways. For the researcher to better understand what each group perceives as important for the IT competencies listed by SAICA and other significant IT competencies, participants provided their views on the inclusion of specific listed skills within these competencies. These are recorded in Figures 4-12 to 4-17.
Chapter 4: Analysis and Interpretation of Data

Figure 4-12: % Inclusion in curriculum of spreadsheet software

Source: Responses on SurveyMonkey® and SPSS©
Figure 4-12 depicts employers’ expectations that trainees be able to perform an overall manipulation of data and agreed to the inclusion at an average of 95.8% with similar expectations of 97.9%, 93.3% and 92.4% respectively from trainees, lecturers and students. The overall manipulation of data includes sorting, filtering, converting, completing, sub totalling, cross-tabulation, formatting and splitting as well as joining of data. SAICA outlines spreadsheet software in general and no particular method as to how this competency should be achieved (taught) is specified. The lack of guidance is a clear indication that the participants are interpreting the competency variously. Lecturers and employers agreed to a lesser extent on the inclusion of spreadsheet software for drafting of financial statements at 73.3% and 87.5% respectively, which is significantly lower than the responses from students and trainees. Lecturers and employers are also in agreement on the inclusion of valuations at 80.0% and 83.3% respectively. Again, they have rated this competency lower than that expected (agreed) by students and trainees. Although there are certain differences, a large portion of all the groups are in agreement over what they would prefer to be taught in terms of spreadsheet in a university curriculum. Figure 4-12 provides a clear indication on what specific spreadsheet competencies are expected from employers and may be utilised and/or applied to an accountancy curriculum to reduce the expectation gap between students, lecturers (universities), trainees and employers with regards to such software competencies.

The responses as recorded and illustrated in Figure 4-12 were consistent with the views of the participants on the inclusion of spreadsheet software as indicated in Figure 4-11.
Chapter 4: Analysis and Interpretation of Data

Figure 4-13: % Inclusion in curriculum of word processing software

Source: Responses on SurveyMonkey® and SPSS©
Figure 4-13 indicates that all groups are in agreement on the inclusion of word processing software to a similar extent, with limited deviations. Lecturers are of the opinion that word processing software should be included for the purposes of report writing at 100,0%. The competency that was rated the lowest by all four groups was for the drafting of financial statements. Word processing software is not listed as one of SAICA’s prescribed competencies for students and need only be acquired later during a trainee’s professional training. The importance lecturers place on word processing software should not be overlooked. Word processing skills assist students with their professional writing and reading skills. The guidelines provided by SAICA may lead to an expectation gap between what lecturers deem as important skills for students to acquire, and ultimately trainees, to equip them for the workplace. The responses from students and trainees deviate to a minimal extent, indicating that they hold similar views on word processing software.

The responses represented by Figure 4-13 were consistent with the views of the participants on the inclusion of spreadsheet software as indicated in Figure 4-11.
Figure 4-14: % Inclusion of presentation software in curriculum

Source: Responses on SurveyMonkey® and SPSS©
Figure 4-14 provides evidence that trainees, students, employers and lecturers have the same views on the inclusion of presentation software in an accountancy curriculum. Two anomalies between the responses from employers and lecturers for the inclusion of presentation software were obvious and relate to presentation of interim reports and presentation of performance overviews. Employers rated these two skills as less important at 73,2% and 78,9% respectively, while lecturers' responses were 53,3% and 60,0%. The employers' and lecturers' disagreement responses were further supported by their significantly higher responses than that of students' and trainees' responses to all four questions. Overall, employers and lecturers agree, with minimal deviations, that the inclusion of presentation software is of lesser importance in an accountancy curriculum. These findings are in line with the SAICA requirements, as presentation skills are not a compulsory skill for students to acquire, but rather for trainees to master throughout their professional employment. Trainees and student responses deviate to a minimal extent, indicating that they have similar views regarding their preference for the inclusion of presentation software. The possible expectation gap that may arise will be between which skills employers and lecturers expect trainees and students to acquire in terms of presentation software, and what trainees and students expect to acquire.
Chapter 4: Analysis and Interpretation of Data

Figure 4-15: % Inclusion in curriculum of email

Source: Responses on SurveyMonkey® and SPSS©

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Figure 4-15 illustrates that students, trainees and employers are in agreement on the importance of the inclusion of email competencies in an accountancy curriculum with responses of 86,7%, 88,9% and 90,5% respectively. The most significant deviation between students, trainees and employers was on the inclusion of email as a business communication tool and daily planner. Students and trainees agreed on the inclusion at a lower average which was in contrast to the employers’ response rate. Employers viewed these two competencies as the most important to be included in for email competencies at 97,2% and 91,5%, which was significantly higher than any other group.

Lecturers had the lowest response rate on the inclusion of email as a daily planner at an average of 73,3%. Lecturers rated the maintenance of client data and email as a daily planner as the least important competencies to be included at 60,0% and 66,7%. The significant deviations between the different respondent groups were not expected as email communication is listed as one of the SAICA competencies that a student should acquire during their studies. There are no guidelines available on what and how this competency should be taught, which could lead to the different interpretations and views of the respondent groups.

Figure 4-15 illustrates the expectations of employers at a higher level than all the other respondent groups, which are in line with the SAICA requirements. In contrast to this, lecturers consider email communication as a less than important competency to be included in an accountancy curriculum. The conclusion drawn was that email communication, as an important competency to master to enable students to become well rounded trainees, is underemphasised during university studies. This could increase the expectation gap between employers’ expectations and university students’ proficiencies.
Figure 4-16: % Inclusion in curriculum of professional research

Source: Responses on SurveyMonkey® and SPSS®
As illustrated in Figure 4-16, professional research tools are deemed very important by all respondent groups. Students, lecturers, trainees and employers rate the inclusion of these competencies at an average of 91.4%, 91.1%, 93.4% and 94.8%. Employers are firm concerning their view on this competency and their rating of its inclusion reflected the highest percentage amongst the respondents. The specific competency employers agreed to was for obtaining information from professional bodies at 97.2%. Lecturers, trainees and students rated the use of professional research tools to expand a student’s general knowledge on world events, economics and business news from websites as the most agreed on reason for including this competency in a curriculum at 93.5%, 93.3% and 94.7% respectively.

The conclusion that may be drawn from the above is that all participant groups deemed professional research an important competency for students. This finding was anticipated because SAICA prescribes this as one of the required competencies to be acquired by students. The responses of students, lecturers and employers illustrated in Figure 4-11 are in line with the findings of Figure 4-16. Lecturers gave professional research tools a lower rating (80.0%) in Figure 4-11 where the inclusion rate in Figure 4-16 reflects a higher average inclusion rate (91.1%). The reason for the deviations may be that respondents were not aware of what professional research entailed, until they reached this specific question. This may lead to further expectation gaps due to the lack of examples in the SAICA guidelines as well as different views held by the respondent groups. The responses from trainees and employers remained similar in the two Figures.
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Figure 4-17: % Inclusion in curriculum of computer software

Source: Responses on SurveyMonkey® and SPSS©
Figure 4-17 demonstrates that students and trainees agreed on the inclusion of computer software with an average of 89.2% and 89.4% respectively, compared to slightly higher averages for lecturers and employers at 93.3% and 95.8%. The specific competency noted as the least important for these two groups comprised antivirus measures, and they rated this competency as 88.7% and 88.1%, respectively. Lecturers and employers agreed on the importance of this competency with minimal deviations. Lecturers deemed password protection as the most important competency at 100.0% where employers rated all competencies the same, at 95.8%.

General computer competencies have not been categorised by SAICA as a specific competency that should be included in a university curriculum. The main reason for this is that for every aspect of IT, general IT competencies such as password protection, back-up procedures and antivirus measures should be acquired. The conclusion drawn from Figure 4-17 was that students may not be adequately informed as to what will be expected of them when they enter their traineeship in terms of IT competencies, as SAICA’s competency framework does not list the specifics. These misconceptions may lead to students not paying enough attention to the IT competencies offered or not applying their gained knowledge for their professional benefit.

The overall conclusion drawn from Figures 4-11 to 4-17 was that the different respondent groups agree to the inclusion of different competencies at different levels. At first glance, basic spreadsheet software was deemed as important for all participant groups. When asked what specific competencies should be included for spreadsheet software, all respondent groups were in agreement on the inclusion of the specific competencies, with a clear preference for business reporting and the manipulation of data. Lecturers and employers agreed to a lesser extent on the inclusion of advanced spreadsheet software, which was in contrast to student and trainee views.

Although word processing software is not listed as one of the SAICA competencies that students should acquire during their studies, all respondent groups agreed that this is a very important skill to acquire. The responses on specific proficiencies to be
included for this competency revealed that all groups rated the use of word processing software for the use of drafting financial statements as the lowest / least agreed on competency to be included in a curriculum. Lecturers and employers were on average in agreement on the inclusion with minimum deviations.

Database software was viewed by students as one of the most important competencies to be included in a curriculum. Their view was shared by trainees and employers. Lecturers disagreed to a large extent and rated the inclusion at just 66.7%. No specific database software competencies were asked as SAICA just requires students to understand accounting packages per se. The lecturers’ views on this competency are deemed to be in line with the SAICA requirements. Due to the lack of guidance available on what is meant by database software, there is no clear indication as to what should be taught at university level and what not. The responses from students, trainees and employers thus cannot be seen as in contrast with what SAICA requires.

The use of internet tools was viewed as important by all respondent groups. SAICA lists this competency as inclusive of email and web browsers. The specific questions on what should be included in a curriculum in terms of email competencies revealed that lecturers viewed the use of email for the listed specific competencies as less important. This view was in direct contrast to employers’ expectations of students’ proficiency in this area. This discrepancy in opinion could potentially lead to an expectation gap.

Lecturers initially rated the inclusion of professional research tools the lowest out of all the respondent groups. Trainees, surprisingly, initially rated it the highest. When respondent groups had to answer specific questions on this competency, lecturers rated the inclusion of these competencies higher. The deviation could indicate that due to insufficient guidance on what professional research entails, the relevant groups are not always in a position to make informed decisions. This could also further lead to an expectation gap, because employers consistently rated professional research as important, initially and subsequently, with the specific competencies listed.
Presentation skills were not listed as an initial competency that should be included in a curriculum. The specific competencies for this topic were listed to obtain a view from all respondents on their view on the inclusion as a SAICA competency. The results indicated that all groups are in agreement on its inclusion.

There was a clear difference between expectations of students and trainees and lecturers and employers. After the perceptions of the different respondent groups were considered, it was important to evaluate where students and trainees perceived their knowledge level to lie. This is addressed in subsequent paragraphs.

4.5.2 Perceived vs actual IT competencies and skills

Paragraphs 1.1, 1.2, 2.2 and 2.5.1 outlined that accountancy curriculums place more focus on developing technical accountancy abilities, which hinders the development of other skills. Questions C1 to C8 (Annexure 2) evaluated the perceived knowledge of student and trainee respondents. Employers had to answer these questions based on their knowledge/perceptions of their trainee’s competencies. Lecturers were also asked the same questions to identify if the teachers that have to teach need certain necessary skills and abilities. The different IT competencies included those required by SAICA and other competencies for word processing software, social media and accountancy packages. The responses on the two types of competencies are individually recorded. The aim of these questions was to aid in the analysis of perceived versus actual knowledge. This comparison shed light on what students and trainees think they know, versus the reality of what they actually know. The actual competencies are discussed further in Section D: Actual IT competencies.
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Figure 4-18: % Perceived IT competencies - SAICA

Source: Responses on SurveyMonkey® and SPSS©
Figure 4-18 illustrates that there is an observable difference between the perceptions of trainees and employers. On average, trainees rated their SAICA IT competencies at 11,2% higher than their employers perception of their skills. The clear anomalies identified were between sending and receiving email and spreadsheet software (MS Excel). Employers perceive the competencies of their trainees as experts in these two competencies to be significantly lower, at 65,1% and 51,7% respectively. Trainees appear to have more confidence in themselves through their own ratings of 83,7% and 79,9% respectively. The perceptions as regards using search engines to browse the Internet by employer and trainees are similar and rate their expertise at 73,0% and 84,1% respectively. Further similar views are those of these two respondent groups on database software (MS Access). Employers agreed that trainees are not experts on this topic and rated their competencies on a beginner level of 82,0%. Trainees agreed on the fact that they are more on this level and rated it at 54,7%.

Students rated their expertise for sending and receiving email and the use of search engines to browse the Internet as the top two SAICA competencies at 90,5% and 87,0% respectively. Considering the findings in Figure 4-11, where students consider the inclusion of internet tools and professional research tools in general as important in an accountancy curriculum (78,6% and 82,1%) the result of this question was expected. In contrast to this, are the findings in Figures 4-15 and 4-16 where students rated the inclusion of specific email and professional research competencies in the curriculum as significantly lower than any other respondent group (64,0% and 67,5%). A possible explanation for the different responses from students could be due to their not being aware of what is meant by the Internet and professional research tools in general and thus, when agreeing on the inclusion thereof in an accountantcy curriculum, they may have had different outcomes in mind. The conclusion drawn from the above was that students are comfortable with communicating electronically and browsing the internet without specifically linking it to a required SAICA competency.

Students and lecturers rated their expertise on database software more as beginners than experts at a level of 45,2% and 11,8% respectively. Although this rating is similar to the views held by employers and trainees, database software is one of
SAICA’s prescribed competencies. This could lead to a possible expectation gap where lecturers are not sufficiently trained / educated in this area and as a result, students might not receive the necessary/adequate teaching on the topic due to the teachers not having the necessary knowledge and skills on this topic. This could also lead to an expectation gap between university and the workplace, where trainees did not receive the necessary training at the former and thus do not have the knowledge to apply in the workplace. To fully understand at what level the respondent groups’ rate themselves in terms of IT, their perceived competencies in other areas should also be considered. Figure 4-19 illustrates participants’ perceptions of their other IT competencies.
Figure 4-19: % Perceived IT competencies - other

Source: Responses on SurveyMonkey® and SPSS©
Figure 4-19 illustrates similar views to those in Figure 4-18. Employers again disagreed regarding the perceived competencies of trainees. Where employers were of the opinion that trainees are only 48.3% proficient in word processing software (MS Word), trainees rated themselves as having 80.0% proficiency. Based on the findings in Figure 4-11, employers expect trainees to be taught word processing skills at university level. The fact that employers rated trainees significantly lower than trainees rated themselves clearly indicates that there is an expectation gap between employers, SAICA requirements and accountancy trainees.

Trainees rated their presentation skills (MS PowerPoint) and professional accounting software (Sage Pastel) on an expert level of 58.8% and 36.4% respectively. This was in direct contrast to employers’ perceptions (15.7% and 19.1%), but consistent with what was expected in the study. Presentation software is not listed by SAICA as a prescribed competency at university level and beginner responses were expected. Although professional accounting software is listed by SAICA as a prescribed competency at university level, only an understanding of it is required. This may lead to different interpretations on the extent of what trainees should be able to do when they enter the workplace.

The only competency that trainees and employers seem to agree on was social media. Trainees and employers rated the competencies of trainees at expert levels of 79.7% and 79.8% respectively. These rates were expected and are not out of the ordinary.

Students’ perception of their word processing skills’ proficiency level was 89.3%. This rate is in line with the results from Figure 4-11 (94.5%) where they claimed to have a certain level of expertise in presentations at a level of 69.0%. The results of Figure 4-14 reflected a similar view, where students agreed to the inclusion of presentation software at an average rate of 72.0%. It could be argued that students are gaining this skill through self-education, as this competency is not a listed requirement by SAICA at university level. Professional accounting software enjoyed a beginner rating at 67.9% (Figure 4-19). This was expected, as most students only receive some training on this topic in their second or third year of studies. Similar to the trainees, students rated their expertise on social media at a relatively high 79.7%.
The expertise level of lecturers on word processing (82.4%, expert), presentation skills (88.3%, expert) and professional accounting software (67.9%, beginner) was as expected. Lecturers use word processing and presentation software on a daily basis and agreed to the finding of Figures 4-11. Professional accounting software enjoyed a beginner rating of 64.7%. This was expected as lecturers are limited in the use of professional accounting software on a daily basis and the inclusion in every module of an IT curriculum is not possible due to the workload as pointed out in paragraph 2.5.1. As mentioned earlier, although professional accounting software is listed by SAICA as a prescribed competency at university level, only an understanding is required. This may lead to different interpretations on the extent of what students should be taught at university level.

How participants rate their own competencies was compared to the IT competency test in section D to illustrate that perception may not always equal reality and that perception may indeed influence reality.

4.6 SECTION D: ACTUAL IT COMPETENCIES

Paragraphs 2.5 and 2.6 present the issue of an existing expectation gap between employers’ expectations and trainees’ actual IT capabilities when they enter the workplace. Responding students, trainees and lecturers answered questions on general IT competencies (D1 to D30, Annexure 2), word processing (D31 to D37, Annexure 2) and spreadsheet software (D38 to D50, Annexure 2). The aim of these questions was to establish the level of actual competencies for the most common IT categories in all three participant groups. The general IT competencies section included four questions with more than one possible correct answer, and two questions with only one possible correct answer. The word processing section included three questions with more than one possible correct answer, and four questions with only one possible correct answer. Spreadsheet software consisted of 13 questions on basic skills with only one possible correct answer, and two questions on advanced skills with only one possible correct answer. All questions with more than one possible answer were grouped according to participants correctly answering 100% (only the correct answers selected), 50% (selected at least one correct answer only) and 0% (none of the correct answers selected). Two questions
with only one possible correct answer were also included in this section and were grouped in terms of correct and incorrect. The three different responses are indicated through the following specific colours: 1) 100%, green, 2) 50%, orange and 3) 0%, red.

Employers are excluded from this section which just deals with the competencies of accountancy trainees tested.

4.6.1 Actual general IT knowledge

![Bar Chart]

Figure 4-20: % General IT knowledge - more than one possible answer

Source: Responses on SurveyMonkey® and SPSS©

Figure 4-20 illustrates that students, trainees and lecturers possess an average knowledge with regard to the basic IT questions. The percentage of participants whose answers were completely incorrect was the highest for students at 10,2%. This was an anticipated result as students still have to master certain IT skills during their years of study. The result of lecturers with 0,0% incorrect answers was satisfactory. The conclusion that was drawn from the above was that, on average, students and lecturers are able to employ basic computer competencies.
Figure 4-21: % General IT knowledge - only one possible answer

Source: Responses on SurveyMonkey® and SPSS©

Figure 4-21 illustrates that the trainees scored the lowest on the general IT questions at 85.9%. This result was unexpected as they sought to be in a position where they should have already acquired general IT knowledge during their studies that they are able and should be applying in the workplace. Students’ and lecturers’ results were more than satisfactory. The results in Figure 4-20, combined with this figure, illustrate that on average, current students (91.7%) have a better knowledge of general IT than trainees (84.4%). As expected, lecturers scored the highest on these tests with an average of 95.8%.

When compared to the perceived competencies in Figure 4-19, all three groups rated themselves lower than their actual knowledge. This implies that the three groups rated their competencies conservatively.
Figure 4-22: % Word processing knowledge – more than one possible answer

Source: Responses on SurveyMonkey® and SPSS®

Figure 4-22 illustrates that students obtained the highest correct score (82.4%) when answering practical questions on word processing. Lecturers and trainees obtained lower scores, but ones which were still satisfactory. The overall pass rate for the word processing was 100% for all participants. The questions asked related to basic word processing competencies, and the conclusion drawn was that all three groups had a good basic foundation.
Figure 4-23 illustrates that lectures had an advanced level of knowledge (96.2%) regarding more advanced word processing skills. Students scored the lowest on this section of the actual competencies test with an 85.6% pass rate. Although they obtained the lowest marks, this is still satisfactory. Trainees scored the second best marks for these questions.

Figures 4-22 and 4-23 combined illustrate that lecturers had a satisfactory knowledge base with respect to word processing software at 98.1% while trainees rated second at 95.5%. Students obtained the lowest score at 92.8%. Compared to the rating the individual groups gave themselves for their perceived knowledge on word processing, lecturers were the only group who rated themselves significantly lower at 82.4%. Both trainees and students had similar perceptions of their capabilities concerning their actual skills at 80.0% and 89.3%, respectively.
Figure 4-24: % Basic spreadsheet software knowledge - only one possible answer

Source: Responses on SurveyMonkey® and SPSS®

Figure 4-24 illustrates that lecturers have the required basic knowledge for spreadsheet software at 96.2%. Students obtained high marks at 85.3%, but scored the lowest on this section of the questionnaire while trainees obtained a slightly higher mark of 87.8%, just above students. The conclusion drawn from the above was that lecturers will be able to teach the basics as they have the necessary knowledge and skills, as proven through their actual test results. Although students and trainees did not score below average, they do not possess all the basic spreadsheet software knowledge required and additional instruction / education should be provided to ensure that their foundational knowledge of spreadsheet software is well developed.
Figure 4-25: % Basic spreadsheet software knowledge - only one possible answer

Source: Responses on SurveyMonkey® and SPSS®

Figure 2-25 illustrates that students do not possess the necessary knowledge for advanced spreadsheet software skills and obtained an average of 25%. Referenced against SAICA’s listed competencies, this result was expected, as basic spreadsheet software competencies are prescribed but advanced skills are not. Trainees scored a mark of 66.8%, which is above average. SAICA prescribes advanced spreadsheet software competencies to trainees and these should be developed during their traineeship. The result that trainees have a better knowledge than students but still a lower score than lecturers, was expected. The average for lecturers at 72.7% places them at the top for advanced spreadsheet software. The conclusion that may be drawn from the above is that lecturers will be able to teach advanced spreadsheet software with ease but that students and trainees have not yet mastered these skills.

Figures 4-24 and 4-25 were combined and compared to the perceived competencies rated by the individual groups’ views that students and trainees perceived their knowledge levels to be higher than they actually are. The average actual knowledge test for the two groups revealed scores of 55.1% and 55.1% respectively while the
perceived competencies were rated at 69,1% and 79,9% respectively. The conclusion drawn was that students and trainees require additional training and education where spreadsheet software is concerned. In contrast, lecturers rated their perceived competences at 76,5%, which was 7,9% lower than their actual average score of 84,4%. Where students and trainees need additional training and education, the lecturers are in a position to provide it. The existing lack of knowledge may create an expectation gap between employers, accountancy trainees and ultimately, students at university level.

4.7 SECTION E: IT INTEGRATION AND GAP ANALYSIS

Paragraph 2.5 points out that there is an expectation gap between employers and universities. This could possibly be overcome through collaboration between these two parties to prepare students and, ultimately, trainees for the workplace. All participants were asked to rate the overall preparedness of first year accountancy trainees when they enter the workplace (question E1, Annexure 2). The aim of this question was to identify further expectation gaps as identified by the different participant groups. The responses are illustrated in Figure 4-26.
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Figure 4-26: % Preparedness of first year accountancy trainees

Source: Responses on SurveyMonkey® and SPSS©

Figure 4-26 illustrates that lecturers feel that all first year accountancy trainees are beginners in terms of IT when they enter the workplace. Employers were of a similar view, perceiving first year trainees to be 90,1% beginners when they enter the workplace. The competencies prescribed by SAICA for students indicate that an understanding should have been obtained for some of the listed IT competencies and that those basic skills should have been acquired for the rest. The results recorded by these two groups were expected, based on the above. Trainees and students perceived a small portion of first year trainees to be proficient in IT when they enter the workplace. Although still at a minimum, the 20,8% for both groups was significantly higher than that of lecturers and employers. The expectation gap that emerged from this data was that employers and lecturers expect less of trainees than they perceive themselves to be capable of.

To further evaluate a possible expectation gap and to bridge this gap, Question E2 (Annexure 2) evaluated the perceptions of participants on the involvement of stakeholders in determining what should be taught in terms of IT at universities. The responses are illustrated in Figure 4-27.
Figure 4-27: % Involvement of stakeholders in curriculum design

Source: Responses on SurveyMonkey® and SPSS©

Figure 4-27 illustrates that all groups agree on the involvement of stakeholders in the curriculum design in terms of IT competencies. Lecturers (100,0%), students (93,8%) and trainees (93,3%) agreed to a larger extent on this involvement. In contrast, employers rated their involvement the lowest at 88,7%. The conclusion from the above is that some involvement from stakeholders would be welcomed by all groups. This step could assist in bridging the expectation gap between accountancy trainees, SAICA requirements and employers.

Paragraph 2.5.1 further drew attention to the practice of IT modules being taught in isolation. SAICA points out in paragraph 2.7.1 that IT competencies are integrated into all the competencies listed. Question E3 to E5 (Annexure 2) evaluated the perceptions of participants on the teaching method of IT competencies at university. The responses are illustrated in Figure 4-28.
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Figure 4-28: % Method IT should be taught

Source: Responses on SurveyMonkey® and SPSS©
Figure 4-28 illustrates that lecturers and employers would not prefer IT being taught only as a separate subject. They agreed to this by indicating that it should be taught as a separate subject at a rate of 63.6% and 53.5% respectively. Students and trainees had a similar response rate to this method with 72.3% and 75.9% respectively. The integration of IT into each individual subject was not the preferred method of lecturers and trainees, who agreed to this at 54.3% and 67.2% respectively. Students and employers rated the inclusion of this method in direct contrast to lecturers and trainees at 81.3% and 83.1%. The most significant anomaly relates to the lecturers’ agreement (100.0%) to the inclusion of IT as a combination of a separate subject as well as integrated into each individual subject. Students’, trainees’ and employers’ responses to the inclusion of this combination were very similar at 77.1%, 75.9% and 76.1% respectively. The illustrated data reveals that lecturers and trainees prefer the third, combination method and that employers and students prefers the second, integrated method. The overall ratings of all four groups indicate that the preferred method was the combined method at 82.3%, followed by the integrated method at 71.5% and lastly, the separate subject method at 66.3%.

In light of SAICA’s requirement for integration of IT into every aspect of their prescribed competencies, the combined method would be considered to be the most appropriate. Lecturers and trainees are thus in line with SAICA requirements. Due to employers’ preference for the integrated method, a possible expectation gap may arise, based on what students, and ultimately trainees, are actually taught at university, when compared to employers’ expectations.

In paragraph 2.5.1, the researcher outlined that accountancy students’ other skills should be developed to equip them for the workplace. Participants were asked to provide their views on what other skills could be acquired by using IT. Question E14 (Annexure 2) was an open ended question where participants completed their own answers. These answers were coded and grouped as follows: 1) soft skills, 2) advanced computer skills, 3) communication skills, 4) self-learning and 5) no additional skills. Soft skills include the following:

- Management skills
- Decision making
• Time management for work readiness
• Awareness of business environment
• Efficiency
• Confidence
• Critical thinking and analysis
• Discipline
• Due care
• Planning.

Advanced computer skills include the following:

• Budgets
• Analysis of data
• Advanced spreadsheet software (MS Excel)
• Data manipulation
• Auditing in terms of computers
• CAAT’s
• Specialised accountancy programs
• Communication skills
• Auditing programs
• Research
• Calculations
• Compilation of audit files and reviews
• Presentations
• Research.

A summary of the findings on this question is illustrated in Figure 4-29.
Figure 4-29: % Other skills acquired through IT

Source: Responses on SurveyMonkey® and SPSS©
Figure 4-29 illustrates that participants view IT as important in obtaining additional skills. Self-learning was identified as the most significant additional competency that might be gained through the use of IT. Employers, trainees and students rated advanced computer skills as the second highest possible additional competency that could be obtained through the use of IT at 30.1%, 32.1% and 22.2% respectively. Lecturers were of the opinion that no communication and soft skills are gained through the use of IT, in rating both at 0.0%. This was in direct contrast to the other three groups. A small percentage of each group agreed that no additional competencies could be obtained through the use of IT. This illustrates that all participant groups acknowledge that IT is integrated into various aspects of a professional’s educational and working environment that does not necessarily relate to IT.

Question 15 (Annexure 2) was an open ended question in which participants could provide their own thoughts in terms of IT on issues not addressed in the questionnaire. The responses of employers were focused onto identifying what they perceive the current expectation gaps between accountancy trainees, SAICA and employers to be. A summary of the direct employer responses is provided in Table 4-3. The responses listed are in no specific order and represent once-off comments on various thoughts from employers. The different views of employers added to the complexity of interpreting expectation gaps and expected IT competencies. The responses below are reported as they were written.
Table 4-3: Employer thoughts on possible IT expectation gaps

- Trainees need to be trained on the ethics of its usage - use, don't abuse.
- Less theory and more practical hands-on competencies relevant to the requirements of the business world.
- I think trainees must learn how to do an audit in a paperless environment.
- As businesses become more virtually operated and transactions more automated, IT awareness is critical to being effective. Trainees would be disadvantaged when having to learn IT skills only when employed, this could influence the intake depending on university IT incorporation.
- So important. Students do not know how to manipulate data to use for their advantage resulting in inaccurate information
- All students should be taught typing skills at school level - this is an indispensable tool for computer users.
- The trainees should be on at least a basic level when they arrive at work. The level currently is too low. Some have never been exposed to Excel and Word.
- Although Pastel is the preferred accounting software system, it must be recognized and noted that there are a number of other systems available in the market.
- Excel is vital.
- If trainees have formal training at school and university level in use of windows / Microsoft products + one accounting package (e.g. Pastel), one auditing software package (Caseware), compiling financials by mapping software, backup, etc. they will be able to focus better on the professional skills. Too much time goes into training staff to execute the basics in software tools.
- To a great extent I find that trainees rely on IT to do the "thinking". They are data capturers and do not understand the accounting or other processes behind the IT tool. Too much reliance is put on IT to produce the correct answer instead of using it to aid in processing time
- The trainees have IT skills but not specifically pertaining to the work they do.

Source: Responses on SurveyMonkey® and SPSS©
Table 4-3 provides insight into participating employers’ expectations and views on the IT competencies of their trainees. The most significant issue identified was that employers are of the opinion that even though trainees have IT skills, they do not know how to apply these in the workplace. This is consistent with the finding of Figure 4-21, that the employers (83,1%) are of the opinion that IT should be taught through an integrated approach with other related modules at university. This may provide students with the opportunity to apply their subject knowledge of IT to accountancy subjects. Employers also feel that too much time is currently spent on teaching trainees basic skills that should have been acquired at school and university level. It is further argued that trainees may be at a disadvantage when they are only introduced to IT on entering the workplace. Employers are also of the opinion that trainees tend to rely too much on technology to provide them with answers. Trainees capture data and do not understand how the “IT tool” works. They are not fully aware of what the “IT tools” may be used for; thus underutilising them.

The conclusion drawn from the above was that employers acknowledge that there is currently an expectation gap between accountancy trainees, SAICA and employers. The main gap identified was the use of IT skills by trainees in the workplace. Universities are contributing to this gap through focusing more on theory yet less on the practical aspects of IT. Different universities also place different levels of emphasis on IT skills due to the available SAICA competencies not providing guidelines on how the specific IT competencies could be achieved.

4.8 CONCLUSION

Responses from all four respondent groups were received. The data was extracted electronically from SurveyMonkey® and analysed through the SPSS© system. The results from the relevant questions were summarised and illustrated in the manner deemed most appropriate. The conclusions on the different sections were as follows:

The availability of technology at school level was found to be consistent with paragraph 2.4.1 as less satisfactory. 55,6% of students who attended public- previously disadvantaged schools had limited exposure to IT. In addition to this, even those students who had an IT subject at school felt to a large extent that they were not prepared for IT at university level. The conclusion drawn was that irrespective of
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the type of school attended, the IT curriculum at school level does not prepare learners adequately for university.

Lecturers and employers are aware of all SAICA guidelines available in the design of IT in an accountancy curriculum. This result was satisfactory, illustrating that the teachers and the employers are aware of what students and trainees should know for IT, as prescribed by SAICA.

Where participants had to indicate their perception of which specific IT competencies should be included in an accountancy curriculum their views reflected similar but sometimes dissimilar responses. Basic spreadsheet software was deemed as important for all participant groups, with a clear preference for business reporting and the manipulation of data. Advanced spreadsheet software was viewed as less important by lecturers and employers. Word processing software, not a listed SAICA competency, was viewed by all respondent groups as an important competency to be included in an accountancy curriculum. Students, trainees and employers viewed database software as one of the most important competencies to be included in a curriculum. Lecturers did not share the same view. Employers expect that trainees are able to work with and utilise internet tools. Included in this grouping were email communications that were viewed as less important by lecturers. This could potentially lead to an expectation gap. A possible interpretation of what research tools entail was identified. Lecturers did not rate this competency consistently throughout the questionnaire. Irrespective of this, all respondent groups agreed on the importance of including this competency in a curriculum. Presentation skills are not listed by SAICA as a prescribed competency. Participants indicated, however, that they agree strongly on the inclusion of this competency in an accountancy curriculum.

The perceived knowledge of participants was compared to their actual competencies. General IT knowledge was rated consistently by all respondent groups when compared to their actual knowledge. All participant groups’ actual knowledge scored above 85,0%. Word processing knowledge revealed similar results to those of general IT knowledge, with a score of above 85,0% for all groups. The actual knowledge was higher than participants’ perception of their knowledge. Basic spreadsheet software revealed that students and trainees require additional
instruction as their actual knowledge levels were not satisfactory. Lecturers scored above 96,0%, indicating that they had adequate basic spreadsheet software skills. Students and trainees scored low on advanced spreadsheet software. This was an expected result as SAICA prescribes that trainees acquire this competency during their traineeship. Lecturers scored above 70,0%, which was considered satisfactory as students are not required to acquire this skill at university level.

Based on the perceived and actual IT knowledge of participants, the perception of the groups regarding the preparedness of first year accountancy trainees was illustrated. Overall, lecturers and employers rated the majority as beginners, whereas students and trainees rated them as experts to a small degree.

In an attempt to bridge the current expectation gap between accountancy trainees and employers, participants were asked to indicate if they agreed on the involvement of stakeholders (employers) in the IT curriculum design. The responses indicated that all groups would welcome such a step. To further bridge the gap, respondents had to indicate their views on the method by which IT should be taught at university. All groups agreed to a similar extent that IT should not be taught as a separate subject. Lecturers and trainees preferred the combined method where students and employers preferred the integration method.

Due to SAICA’s guidelines not providing specific guidance on how IT competencies should be acquired, different universities interpret the mastering of these competencies in different ways. This could lead to various universities focussing on different aspects of IT in divergent ways. Students and ultimately trainees will be those who experience difficulty if they enter the workplace and have not received the necessary or adequate training.

Employers commented on several issues that they felt were not addressed in the questionnaire. The main gap relates to universities over emphasising practical skills, yet not teaching students and ultimately trainees on how to integrate these skills in the workplace.
CHAPTER 5: CONCLUSION, LIMITATIONS AND RECOMMENDATIONS

5.1 INTRODUCTION

Chapter 1, paragraph 1.2 outlined the problem statement for this study as follows: accountancy students and trainees not acquiring the basic IT competencies as prescribed by SAICA, due to limited focus being placed on specific IT competencies. The identified reason for and possible factor contributing to this was insufficient and inadequate exposure to IT during their studies. The primary and secondary objectives were developed, deduced from the above and as outlined in Chapter 1, paragraph 1.3.

The primary objective was to identify any IT expectation gaps between accountancy trainees, SAICA and employers. Supplementary to the primary objective, several secondary objectives were identified. The first of these relates to the level of exposure to IT that students, lecturers and accountancy trainees had. This information was used in identifying whether any respondent group had a backlog when it comes to IT education. The second of the secondary objectives relates to the awareness amongst lecturers and employers of the SAICA guidelines available. These guidelines provide both universities and employers with guidance as to what competencies, and specific to this study, IT competencies, are expected to be acquired by a prospective CA(SA). The data collected on this objective would aid in providing possible solutions in bridging the expectation gaps where lecturers and/or employers were not aware of the available guidelines. The third of the secondary objectives relates to the perception of all participant groups as regards what specific competencies should be included in an accountancy curriculum for IT competencies. These competencies not only focused on those prescribed by SAICA, but also the ones deemed important for all participants involved. The fourth secondary objective was to establish the actual IT competencies of students and accountancy trainees and to compare these to their perceived competencies. This information was supplementary in recommending any competencies that ought to be focused on, due either to low scores on the actual competency tests or to their importance as perceived by the participants. The last secondary objective related to possible strategies to bridge the expectation gap. This
objective was only addressed through open ended and close ended questions posed to all participant groups.

To answer the research problem and arrive at a conclusion on the research objectives, primary and secondary, a literature review was performed in Chapter 2 followed by an empirical study reported in Chapter 3, as were research design and methodology, while Chapter 4 contained data collection and analysis. In this chapter, the conclusions drawn throughout this study, the limitations of the study and possible recommendations will be summarised.

5.2 LIMITATIONS

Limitations to this study included the limited local literature available on the specific IT competencies required by employers for accountancy trainees. Without a guideline from employers the identification and possible recommendations for bridging the expectation gap proved to be complex.

The administration of the questionnaires to students and lecturers placed a significant limitation on this study. The timing of the questionnaire was not satisfactory as many students were busy writing exams and the questionnaire only reached a few before the deadline. Some participating universities also had ethical clearance concerns and this placed significant limitations on the questionnaire reaching respondents on time, while not reaching some at all.

5.3 CONCLUSIONS

Chapter 2 established that when Maslow’s hierarchy of needs is adapted to the IT education of accountancy trainees, the lower levels of education, primary and secondary school levels, should be met / achieved first before the next level can be attempted. This implies that where learners do not receive the necessary and adequate IT education starting on a primary and secondary school level, they will not be able to successfully master the next level of IT needs at university level.

The contemporary world view and expectations are that technology is readily available to all and that the members of the current generation are all IT literate and have already
been extensively exposed to technology. This has proven to be inaccurate in the SA context where poverty plays a significant part in the everyday lives of many households. Due to poverty, the exposure and availability of IT is limited to a selected, fortunate few.

Where households have been unable to provide young adults with exposure to IT, schools have had to fill the gap. The DBE identified the need for an increased emphasis on technology and implemented the MST strategy. Although government invested in improving technological skills in schools, lack of funding, knowledge and resources, to name a few of the issues, hindered the process so that the strategy was not satisfactory or successful. The consequence of this has been that learners now have to attend university with limited or no IT exposure and skills.

Students, with no or limited knowledge of IT, will fall behind their peers who had adequate exposure at school levels. Universities who offer an accountancy degree have to comply with the SAICA guidelines as regards the specific required competencies that should have been acquired by a potential CA(SA) on the completion of their studies. SAICA provides all universities with guidelines on its requirements and these institutions are left to implement the competencies in the way that best suits their programmes. This contributes to a possible expectation gap where emphasis is placed on different IT competencies by different universities. It is clear that the IT competencies acquired at university level form the foundation of what trainees will acquire throughout their traineeship.

Accountancy trainees starting a traineeship with a SAICA accredited training officer will be expected to have obtained the basic IT competencies as prescribed by SAICA at a university level. Employers also have to develop the IT competencies of their trainees over the course of their traineeship, as prescribed by SAICA. With an inadequate IT foundation, employers will have to invest more time and money to bring their trainees up to the correct standard to develop them further.

The literature review identified that where there is an expectation gap between what universities teach and what employers expect, the two parties should strive to work hand in hand in developing an accountancy curriculum with the basic IT skills to comply
with university standards, SAICA requirements and employer expectations. The most important aspect of IT that was identified by all the respondents was that IT and the development of IT remain essential. The factors identified in Chapter 2 contributed to the development of the most appropriate research method, as discussed in Chapter 3.

Chapter 3 established that the most appropriate research method for this study was the mixed method approach which included both qualitative and quantitative research methods. Both of these were used through the administration of a self-developed questionnaire. The questionnaire was developed with the aim of addressing the research problem through applying the factors identified in the literature review.

The design of the questionnaire considered suggestions on designing questionnaires and underwent eight phases where a statistical specialist and pilot groups were consulted and adjustments made where necessary. The final four questionnaires were sent out to a population consisting of all 15 SAICA accredited universities, 2 618 accountancy trainees and 645 registered training officers. The responses received from the participants were analysed and interpreted in Chapter 4.

The responses received were summarised in Chapter 4, which further identified any anomalies between participant groups. The responses on SurveyMonkey® were electronically extracted and analysed through the SPSS© system.

The majority of students from public-previously disadvantaged schools had limited exposure to IT. The learners who had exposure to IT from public-previously advantaged, disadvantaged and private schools felt that they were not adequately prepared for IT when entering university.

The awareness of SAICA guidelines was found to be satisfactory. Universities are aware of all these in designing their curriculums. However, due to the broad nature of the guidelines available from SAICA, different respondent groups reported different reactions as to what specific competencies should be taught at university level.

Basic spreadsheet software and data manipulation were indicated by all respondent groups as the preferred competencies to be included in a curriculum. All respondent groups felt that advanced spreadsheet software was less important. Database software
was deemed important by all groups excluding lecturers. Internet tools were also viewed as important, although email communication received a less than satisfactory response from lecturers. Also viewed as important were word processing and presentation skills, even though not listed as prescribed SAICA competencies.

A comparison of the perceived knowledge of participants with their actual competencies, revealed that participants’ perceptions rated lower than the actual. The actual knowledge of basic spreadsheet software revealed that students and trainees require additional instruction/education to fully master these competencies. Lecturers outperformed their own perceptions; this served as a reliable indication that they are on par with what they should be able to teach their students with regards to general IT competencies, basic spreadsheet software and word processing. Trainees rated their perceived skills as higher than their employers’ perception of them.

Concerning the question posed to participants on the involvement of employers in an accountancy curriculum, all respondent groups agreed to a large extent that this would receive great support. The participant groups further indicated that IT should not be taught in isolation while lecturers felt that IT should be taught as a separate subject and integrated into all modules. Employers supported this view by indicating that the integration of IT in all modules should be considered. Individual comments from employers were considered; the main theme echoed was that universities pay too much attention to the theoretical aspects of IT, while the integration of IT in the everyday working environment is trailing far behind.

The question concerning the possible expectation gap between accountancy trainees, SAICA and employers was investigated and it was found that this was true due to universities placing emphasis on certain competencies, with employers expecting different competencies when trainees start their traineeship.

5.4 **RECOMMENDATIONS**

Chapter 1 outlined the primary and secondary objectives for this study. These were considered as the main focus areas and were extensively researched through the
literature review and empirical study. The recommendations based on all the objectives listed in chapter 1, paragraph 1.3 are summarised in the following paragraphs.

5.4.1 Availability of technology

As identified in the literature review and the analysis of data, poverty plays a role in the availability of technology. I recommend that all students starting university should acquire a laptop or personal computer to enable them to become comfortable with technology and to enable them to perform educational tasks such as the completion of assignments, accessing electronic resources and performing research. Since the reality of poverty will place a limitation on the recommendation, universities should consider methods to assist students through possibly supply the required laptop/iPad as part of study materials instead of paper based materials.

5.4.2 IT exposure at school

The level of IT exposure of students entering university was proven to be limited by means of the literature review and the analysis of data collected. My recommendation would be that universities assess the level of IT competencies of students when they enter university and that all students should be exposed to IT in their first year of study. Those with less than satisfactory proficiency should be developed to an acceptable level with additional IT intervention on a continuous basis over the entire course of the student’s accountancy degree.

5.4.3 SAICA guidelines

The data analysis in Chapter 4 demonstrated that universities and employers are aware of the available guidelines that prescribe which competencies accountancy students and trainees should acquire. This study identified that there is an expectation gap where IT is concerned. Possible indicators or contributing factors could be unclear in the SAICA guidelines and different interpretations of the available guidelines and employer expectations might not be known. This study also established that the importance of specific competencies listed by SAICA which should be included in an accountancy curriculum was regarded in a dissimilar fashion between the different universities and
employer expectations. My recommendation is that a list of possible guidelines should be included in all SAICA documents to provide more guidance to universities and employers on what, in particular, students and trainees should be able to do and how these competencies could be achieved with regards to specific competencies. The recommendations on the specific competencies are as follows:

- **Spreadsheet software**

  All respondent groups agreed to the importance of this competency, with a clear preference by employers as regards the manipulation of data. The latter skill would be considered as advanced spreadsheet software, though, and is not required by SAICA. My recommendation is that students receive additional instruction on the basics of spreadsheet software and that advanced spreadsheet software competencies should receive some attention, as this is expected by employers.

- **Database software**

  Lecturers did not agree that the inclusion of this competency was significant. This could lead to a lack of emphasis at university level. My recommendation is that clear guidelines on how database software, and what database software, should be taught should be included in all SAICA guidelines, to ensure that this competency receives the necessary attention at university level so as to adhere to these guidelines and employer expectations.

- **Email communication**

  The inclusion of this competency was agreed to at a lower level by lecturers than the other respondent groups. This was in direct contrast with the importance rating given to it by employers. My recommendation is that clear guidelines on how email communication, and what email communication competencies, should be taught should be included in all SAICA guidelines, again to ensure that this competency receives the necessary attention at university level to adhere to SAICA guidelines and employer expectations.
Chapter 5: Conclusions, Limitations and Recommendations

- Professional research

The type of competencies with respect to professional research being included in an accountancy curriculum differed between the respondent groups. I recommend that clear guidelines on how professional research, and what professional research competencies, should be taught should be included in all SAICA guidelines, likewise to ensure that this competency receives the necessary attention at university level to adhere to SAICA guidelines and employer expectations.

5.4.4 Additional competencies

Competencies indicated by participants as more important and not included in the SAICA guidelines were: word processing, basic computer skills and presentation software. My recommendation is that these competencies should be reviewed by SAICA, lecturers and employers, after which a decision should be made on the importance of including them in an accountancy curriculum, possibly to aid students with report writing and basic computer skills.

5.4.5 IT integration

The overwhelming response indicated that IT should be integrated into all modules and not only presented as a separate subject at university level. I therefore recommend that the specific IT competencies as listed by SAICA should be integrated into all modules to ensure that students are constantly exposed to IT throughout the course of their studies, so that competencies and skills will have been developed in greater depth and not just on a theoretical basis. The integration will also aid students in applying IT skills in everyday workplace scenarios and developing other skills, for example time management, soft skills and self-learning.

5.4.6 Collaboration to bridge the expectation gap

The literature and empirical study identified that there is a current expectation gap between some of the prescribed SAICA competencies, what universities perceive and what employers expect in terms of IT. My recommendation is that employers, universities and SAICA should collaborate more closely to ensure that the needs of all
parties involved are met and satisfied at an acceptable level to bridge the expectation gap. This will ensure that all possible expectations are identified and possible solutions and methods to bridge the gap found. The expectations of all three stakeholders should be communicated and common ground should be found to teach students the basics to build on when they enter their traineeship.

The primary objective of identifying the current IT gaps has been addressed, as has the problem statement concerning accountancy students and trainees acquiring the basic IT competencies as prescribed by SAICA.

In bridging the expectation gap the accountancy education and professional societies will benefit as the expectation gap in terms of IT could be overcome.

5.5 CONTRIBUTION OF STUDY

The implementation of the recommendations discussed above will contribute towards a more informed understanding of the specific SAICA IT competencies that a prospective CA(SA) should acquire. This will also lead to additional and clearer guidelines as to how a specific competency may be addressed and/or achieved.

IT and technology represent the way of the future and SAICA, employers and universities should do everything in their power to equip prospective CA(SA)’s with the necessary skills to provide well-rounded individuals for the workplace. Further research should include which technical, application and IT competencies are required by a prospective CA(SA).
Annexure 1

Questionnaire  
Date: February 2012

Students have different perceptions (views) on computer-related academic programs and occupations. With this questionnaire we want to determine what some of these perceptions are and the factors that may have an influence on the choices students make regarding the computer-related fields of study.

PLEASE NOTE: You will NOT be identified in any way.

We request you to please be completely honest when you answer the following questions:

1. Is 2012 your first enrolment ever at an institute of higher learning? □ Yes □ No

2. When were you born (year)? __________

3. In which school at NWU (Vaal Campus) are you enrolled as a student?
   1 □ Behavioural Sciences  2 □ Languages
   3 □ Basic Sciences  4 □ Education Sciences
   5 □ Accounting Sciences  6 □ Information Technology
   7 □ Economic Sciences

4. What degree are you enrolled for (BSc / BA / BEd / BCom)? ____________________________________
5. What is your area of specialization (e.g. IT / CA / Psychology, etc.)? ____________________________

6. To what racial group do you belong?
1 □ Black/African  
2 □ White
3 □ Coloured  
4 □ Indian  
5 □ Other

7. Your gender?  
□ Female  
□ Male

8. Your native (home) language?
1 □ Afrikaans  
2 □ English  
3 □ Northern Sotho  
4 □ Sotho
5 □ Southern Ndebele  
6 □ Swazi  
7 □ Tsonga  
8 □ Tswana
9 □ Venda  
10 □ Xhosa  
11 □ Zulu
12 □ Other (please indicate) ____________________________

9. Are you a South African citizen (national)?  
□ Yes  
□ No
If No, please indicate your nationality: ______________________________________

10. What is your father's (or male guardian's) level of education?
1 □ None  
2 □ Primary school completed
3 □ High school completed  
4 □ Tertiary education (university/technikon/college) completed
11. What is your mother’s (or female guardian’s) level of education?

1 □ None
2 □ Primary school completed
3 □ High school completed
4 □ Tertiary education (university/technikon/college) completed

12. In which category does the annual (yearly) income of your household fall?

1 □ 0 – R 50 000
2 □ R50 001 – R 100 000
3 □ R100 001 – R 150 000
4 □ R 150 001 – R 200 000
5 □ R200 001 – R 250 000
6 □ > R250 000

The following questions are related to the high school that you have attended the greater part of your high school career:

13. What type of high school did you attend?

1 □ Public - previously advantaged
2 □ Public - previously disadvantaged/township
3 □ Private (independent) school

14. What was the composition of learners in the high school you attended?

1 □ Females (Girls) only
2 □ Males (Boys) only
3 □ Both genders

15. Did you take IT (Information Technology) as a subject in high school?

□ Yes □ No
16. Did you take CAT (Computer Application Technology) as a subject in high school?

☐ Yes  ☐ No

17. The language you’ve had most of your subjects presented in at high school:

1 ☐ Afrikaans  2 ☐ English  3 ☐ Northern Sotho

4 ☐ Sotho  5 ☐ Southern Ndebele  6 ☐ Swazi

7 ☐ Tsonga  8 ☐ Tswana  9 ☐ Venda

10 ☐ Xhosa  11 ☐ Zulu

12 ☐ Other (please indicate): ________________________________________________

The following questions reflect on your encounters and perceptions of Computer education and Computer-related professions:

18. Do have a computer at home?

☐ Yes  ☐ No

19. How many years have you been using computers? ________ years.

20. Have you ever written a computer program?

☐ Yes  ☐ No

If Yes, in which programming language? __________________________

21. Do you have any family member(s) who is employed in IT (Information Technology) profession?

☐ Yes  ☐ No

If Yes, give the title or brief description of the profession(s).
22. Have you ever heard about Computer Science as a field of study? □Yes □No

23. Have you ever heard about Information Systems as a field of study? □Yes □No

24. Have you ever heard about Information Technology as a field of study? □Yes □No

For each of the following statements, please tick the box that most closely reflects YOUR perception of Computer education and Computer-related professions:

25. I think Computer professions and qualifications are more difficult than other areas.
   1□Strongly agree   2□Agree   3□Neutral/No idea   4□Disagree   5□Strongly disagree

26. I think Computer professions and Computer related fields of study are boring and uninteresting.
   1□Strongly agree   2□Agree   3□Neutral/No idea   4□Disagree   5□Strongly disagree

27. I think that Computer professions are not highly respected professions in South Africa.
   1□Strongly agree   2□Agree   3□Neutral/No idea   4□Disagree   5□Strongly disagree

28. In my opinion Computer professions involve little interaction with people compared to other professions.
   1□Strongly agree   2□Agree   3□Neutral/No idea   4□Disagree   5□Strongly disagree
29. In my opinion Computer-related professions pay less than others.

1 □ Strongly agree  2 □ Agree  3 □ Neutral/No idea  4 □ Disagree  5 □ Strongly disagree

30. I think that jobs in Computer-related professions are less secure compared to others.

1 □ Strongly agree  2 □ Agree  3 □ Neutral/No idea  4 □ Disagree  5 □ Strongly disagree

31. I think there are too many Computer professionals unemployed and looking for a job.

1 □ Strongly agree  2 □ Agree  3 □ Neutral/No idea  4 □ Disagree  5 □ Strongly disagree

32. I think that Computer professionals usually have longer working hours compared to other professions.

1 □ Strongly agree  2 □ Agree  3 □ Neutral/No idea  4 □ Disagree  5 □ Strongly disagree

33. I think that a Computer profession is not suitable for females.

1 □ Strongly agree  2 □ Agree  3 □ Neutral/No idea  4 □ Disagree  5 □ Strongly disagree

34. My family does not want me to study computers.

1 □ Strongly agree  2 □ Agree  3 □ Neutral/No idea  4 □ Disagree  5 □ Strongly disagree

35. My high school had excellent computer facilities.

1 □ Strongly agree  2 □ Agree  3 □ Neutral/No idea  4 □ Disagree  5 □ Strongly disagree
36. I was counselled in the high school about Computer-related education and professions.

1 □ Strongly agree  2 □ Agree  3 □ Neutral/No idea  4 □ Disagree  5 □ Strongly disagree

37. I had IT (or CAT) in the high school which influenced my perception (view) regarding computers.

1 □ Strongly agree  2 □ Agree  3 □ Neutral/No idea  4 □ Disagree  5 □ Strongly disagree

Please answer the following if you are not studying towards an IT (Information Technology) degree:

38. I would like to study computers, but my maths mark and/or matric grade (APS score) is not adequate.

□ Yes  □ No

Please answer the following if you are studying towards an IT (Information Technology) degree:

39. I would like to study another field, but my maths mark and/or matric grade (APS score) is not adequate.

□ Yes  □ No

40. Please indicate how your perceptions (views) on Computer education and Computer-related professions were formed (you may tick more than one item):

1 □ Via parent(s) or guardian(s)  2 □ Via teacher in high school

3 □ Via career counsellor  4 □ Via friends

5 □ Via newspapers or television  6 □ Via Internet
Please add any other thoughts that YOU may have on Computer education and Computer-related professions that have not been covered in this questionnaire.

____________________________________________________________________________

____________________________________________________________________________

Source: NWU Vaal
## Annexure 2

### Coding instructions

| Question # | SPSS® code name | SPSS® variable name | Full variable name | Questionnaire question | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|------------|-----------------|---------------------|--------------------|------------------------|---|---|---|---|---|---|---|---|---|---|---|---|
| S.L.T1 A1  | univ            | University          | University where you are currently studying/employed/graduated | Confidential information |   |   |   |   |   |   |   |   |   |   |   |   |
| S.L.T1 A2  | univother       | University Other    | Specify other      | Confidential information |   |   |   |   |   |   |   |   |   |   |   |   |
| S.L.T2 S2  | currenrol       | Curriculum          | I am currently enrolled for the following curriculum | BCom CA | BCom accountancy or other |   |   |   |   |   |   |   |   |   |   |   |   |
| L2 A4      | teacurr         | Teaching curriculum | I am currently teaching for the following curriculum | CA(SA) only | Combination |   |   |   |   |   |   |   |   |   |   |   |   |
| T2, E1 A5  | empl            | Employed            | Company currently employed at | Audit firm with audit elective | Non-audit firm with elective other than audit |   |   |   |   |   |   |   |   |   |   |   |   |
| S.L.T3 A6  | gender          | Gender              | Gender | Male | Female |   |   |   |   |   |   |   |   |   |   |   |   |
| S4 A7      | ystud           | Year of study       | Year of study currently enrolled for | 1st year | 2nd year | 3rd year | 4th year | Hons |   |   |   |   |   |   |   |   |   |   |   |
| A8         | Lstatus         | Status of employment | Status of employment | Academic clerk | Temporary lecturer | Junior lecturer | Lecturer | Senior lecturer | Associate professor | Professor | Other |   |   |   |   |   |   |
| L4 A9      | Lstatusother    | Status of employment | Specify other |   |   |   |   |   |   |   |   |   |   |   |   |   |

### Section A: Demographic information

- **Questionnaire question:**
  - University where you are currently studying/employed/graduated
  - University Other
  - I am currently enrolled for the following curriculum
  - I am currently teaching for the following curriculum
  - Company currently employed at
  - Year of study currently enrolled for
  - Status of employment
  - Status of employment
  - Specify other

- **Coding instructions:**
  - Confidential information
  - Specify other
  - BCom CA
  - BCom accountancy or other
  - CA(SA) only
  - Combination
  - Audit firm with audit elective
  - Non-audit firm with elective other than audit
  - 1st year
  - 2nd year
  - 3rd year
  - 4th year
  - Hons
  - Academic clerk
  - Temporary lecturer
  - Junior lecturer
  - Lecturer
  - Senior lecturer
  - Associate professor
  - Professor
  - Other
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<td>S.L.T8; B1</td>
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<td>Which one of the following in terms of IT (Information Technology) was offered at your school?:</td>
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<td>In what language was the majority of your subjects’ study material available at school?</td>
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<td>S.L.T10; B3</td>
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<td>Select the number of different places where you have access to a computer (Home, work/school/univ, Gym, Internet cafe, Other)</td>
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<td>S.L.T11; B4</td>
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<td>Access to computer</td>
<td>Select all the device(s) that you own or have access to (Laptop/Netbook, Desktop computer (PC), Table, Smart phone, E-book reader, None of the above)</td>
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<td>S.L.T12; B5</td>
<td>(B11-16)</td>
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Section B: Exposure to and use of IT
## Coding instructions

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### Section C: Perceptions of IT competencies

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### Annexure 2

#### Coding instructions

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S.L.T19; E11
C47-52 prescurr1-6 Presentations curriculum I am of the opinion that universities should include the following in the curriculum as part of PRESENTATIONS
| Question # | SPSS© code name | SPSS© variable name | Full variable name | Questionnaire question | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|------------|-----------------|---------------------|-------------------|------------------------|---|---|---|---|---|---|---|---|---|---|---|
| C47        |                 |                     |                   | Presentation of interim reports | Strongly agree | Agree | Disagree | | | | | | |
| C48        |                 |                     |                   | Presentation of performance overviews | Strongly agree | Agree | Disagree | | | | | | |
| C49        |                 |                     |                   | Presentation of business proposals to potential new clients | Strongly agree | Agree | Disagree | | | | | | |
| C50        |                 |                     |                   | Presentation of project meetings | Strongly agree | Agree | Disagree | | | | | | |
| C51        |                 |                     |                   | Other (specify) | Strongly agree | Agree | Disagree | | | | | | |
| C52        |                 |                     |                   | Other (please specify) | | | | | | | | | |
| C53        |                 |                     |                   | I am of the opinion that universities should include the following in the curriculum as part of EMAIL COMMUNICATIONS | Strongly agree | Agree | Disagree | | | | | | |
| C54        |                 |                     |                   | Daily planner | Strongly agree | Agree | Disagree | | | | | | |
| C55        |                 |                     |                   | Maintenance of client data | Strongly agree | Agree | Disagree | | | | | | |
| C56        |                 |                     |                   | Documentation and storing of notes | Strongly agree | Agree | Disagree | | | | | | |
| C57        |                 |                     |                   | Other (specify) | Strongly agree | Agree | Disagree | | | | | | |
| C58        | emailcurr1-6    |                     | Email communication | | | | | | | | | | |
| Question # | SPSS© code name | SPSS© variable name | Full variable name | Questionnaire question | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|------------|-----------------|---------------------|-------------------|------------------------|---|---|---|---|---|---|---|---|---|---|---|---|
| C58        |                 |                     |                   | Other (please specify) |   |   |   |   |   |   |   |   |   |   |   |   |
| C59-63     | researchcurr1-5 |                     | Professional research curriculum | I am of the opinion that universities should include the following in the curriculum as part of PROFESSIONAL RESEARCH TOOLS |   |   |   |   |   |   |   |   |   |   |   |   |
| C59        |                 |                     |                   | Obtain technical information from professional bodies website | Strongly agree | Agree | Disagree |   |   |   |   |   |   |   |   |   |
| C60        |                 |                     |                   | Obtain information on the business environment of a potential engagement client | Strongly agree | Agree | Disagree |   |   |   |   |   |   |   |   |   |
| C61        |                 |                     |                   | Expand their general knowledge on world events, economics and business news from websites | Strongly agree | Agree | Disagree |   |   |   |   |   |   |   |   |   |
| S,L,T21;E13|                 |                     |                   | Other (specify) | Strongly agree | Agree | Disagree |   |   |   |   |   |   |   |   |   |
| C62        |                 |                     |                   | Other (please specify) |   |   |   |   |   |   |   |   |   |   |   |   |
| C63        |                 |                     |                   |                     |   |   |   |   |   |   |   |   |   |   |   |   |
| C64-68     | compcurr1-5     |                     | Computers curriculum | I am of the opinion that universities should include the following in the curriculum as part of COMPUTERS |   |   |   |   |   |   |   |   |   |   |   |   |
| C64        |                 |                     |                   | Password protection | Strongly agree | Agree | Disagree |   |   |   |   |   |   |   |   |   |
| C65        |                 |                     |                   | Back-up procedures | Strongly agree | Agree | Disagree |   |   |   |   |   |   |   |   |   |
| S,L,T22;E14|                 |                     |                   | Antivirus measures | Strongly agree | Agree | Disagree |   |   |   |   |   |   |   |   |   |
| Question # | SPSS© code name | SPSS© variable name | Full variable name | Questionnaire question | 0   | 1   | 2   | 3   | 4   | 5   | 6   | 7   | 8   | 9   |
|------------|-----------------|---------------------|--------------------|------------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| C67        |                 |                     |                    | Other (specify)        |     |     |     |     |     |     |     |     |     |     |
| C68        |                 |                     |                    | Other (please specify)|     |     |     |     |     |     |     |     |     |     |
| S.L.T23; E15 |                 |                     |                    |                        |     |     |     |     |     |     |     |     |     |     |
| C69        |                 |                     |                    | New applications       |     |     |     |     |     |     |     |     |     |     |
| C70-75     |                 |                     |                    | Rate lecturer/traine e competencies |     |     |     |     |     |     |     |     |     |     |
| C70        |                 |                     |                    | Rating your lecturer's IT competencies for the different subjects listed below over the course of your studies |     |     |     |     |     |     |     |     |     |     |
| C71        |                 |                     |                    | Accounting             | Novice |     |     |     |     |     |     |     |     |     |
| C72        |                 |                     |                    | Auditing               | Novice |     |     |     |     |     |     |     |     |     |
| C73        |                 |                     |                    | Financial management   | Novice |     |     |     |     |     |     |     |     |     |
| S.L.T24; E16 |                 |                     |                    | Management accounting | Novice |     |     |     |     |     |     |     |     |     |
| C74        |                 |                     |                    | Taxation               | Novice |     |     |     |     |     |     |     |     |     |
### Coding instructions

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<td>MS Excel</td>
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<td>MS Outlook</td>
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170
| Question # | SPSS© code name | SPSS© variable name | Full variable name | Questionnaire question | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|------------|-----------------|---------------------|-------------------|------------------------|---|---|---|---|---|---|---|---|---|---|---|
| D17        |                 | Click on edit menu and choose copy |                  |                        |   |   |   |   |   |   |   |   |   | X |
| D18        |                 | On the quick access toolbar you can find the copy icon |                  |                        |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| D19        |                 | Use a pen and paper to copy |                  |                        |   |   |   |   |   |   |   |   |   | X |
| S.L.T33    | D20-23          | paste1-4            | Different ways to paste text | Choose the different ways to paste (you may select more than one) |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
|            | D20             |                     | ctrl + V          |                        |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
|            | D21             |                     | Right click and choose paste |                        |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
|            | D22             |                     | Go to the edit menu and choose paste |                        |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
|            | D23             |                     | On your quick access toolbar you can find the paste icon |                        |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| S.L.T34    | D24             | google              | Google used to find info on internet | Google is a search engine and can be used to find information on the Internet |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   | TRUE | FALSE |
| S.L.T35    | D25             | docname              | Name of word document | The name of this Word document is |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   | File | Document | Test | This is not a Word document |
| Question # | SPSS® code name | SPSS® variable name | Full variable name | Questionnaire question | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|------------|-----------------|---------------------|--------------------|------------------------|---|---|---|---|---|---|---|---|---|---|---|---|
|            |                 |                     |                    |                        |   |   |   |   |   |   |   |   |   |   |   |   |
| S.L.T36    | D26             |                     |                    | Using a template       | X | X |   |   |   |   |   |   |   |   |   |   |
|            |                 |                     |                    |                        |   |   |   |   |   |   |   |   |   |   |   |   |
| S.L.T37    | D27-30          | saveword1           |                    | How to save Word file  |   |   |   |   |   |   | X | X | X | X |   |   |
| D27        |                 |                     |                    | Click on the little disk in the <Quick launch> menu |   |   |   |   | X |   |   |   |   |   |   |   |
| D28        |                 |                     |                    | Click on <File> and then <Save as> |   |   |   |   |   |   | X |   |   |   |   |   |
| D29        |                 |                     |                    | Just close Word, it will save the document |   |   |   |   |   |   |   |   |   |   |   |   |
| D30        |                 |                     |                    | ctrl + S               |   |   |   |   |   |   |   |   |   |   |   | X |
| S.L.T38    | D31-37          | wordtest1-7         |                    | Word knowledge test    |   |   |   |   |   |   |   |   |   |   |   |   |
| D31        |                 |                     |                    | Change the font type of your text |   |   |   |   |   |   |   |   |   |   |   | X |
| D32        |                 |                     |                    | Insert numbers and bullets to your text |   |   |   |   |   |   |   |   |   |   |   | X |
| D33   | Change the page layout of your document from portrait to landscape and vice versa | 1 | ✓ |
| ---   | Activate track changes on your document | 5 |   |
| D35   | Change the colour or your text | 4 |   |
| D36   | Change your text from upper case to lower case without re-typing the text | 3 | ✓ |
| D37   | Justify your text | 7 | ✓ |
| D38   | Locate a formula | 3 | ✓ |
| D39   | Change the direction of your text in a cell | 5 | ✓ |
| D40   | Change the currency of your amounts/figures | 7 | ✓ |
| D41   | Combine two cells into one | 6 | ✓ |
| D42   | Sort/filter your data | 9 | ✓ |
| D43   | Insert a Pivot table | 1 | ✓ |
## Coding instructions

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<th>SPSS© variable name</th>
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<td>S.L.T40</td>
<td>D44-45</td>
<td>vlookuptest1-2</td>
<td>Vlookup test</td>
<td>Answer the questions below with regards to the VLOOKUP function in MS Excel</td>
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<td>D44</td>
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<td>Where would the false statement be entered in the above diagram?</td>
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<td>D45</td>
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<td>Where would the “range” of data be entered?</td>
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<tr>
<td>S.L.T41</td>
<td>D46-50</td>
<td>sampleformul</td>
<td>Selecting a sample for testing</td>
<td>When you need to select a sample for testing, which of the following formulas can assist you</td>
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<td>Randbetween</td>
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### Section E: IT integration and gap analysis

<table>
<thead>
<tr>
<th>S.L.T42; E17</th>
<th>E1</th>
<th>prepared</th>
<th>Feeling on 1st year trainees’ preparedness</th>
<th>Overall feeling of first year Trainee accountant’s preparedness in terms of IT (at exit level of university)</th>
<th>Novice</th>
<th>Advanced Beginner</th>
<th>Proficient</th>
<th>Expert</th>
<th>Strongly agree</th>
<th>Agree</th>
<th>Disagree</th>
<th>Strongly disagree</th>
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<tr>
<td>S.L.T43; E18</td>
<td>E2</td>
<td>stakecurr</td>
<td>Stakeholders involved in curriculum</td>
<td>I am of the opinion that stakeholders, including employers should have some involvement on what should be taught as a minimum in terms of IT at university level</td>
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<td>Strongly agree</td>
<td>Agree</td>
<td>Disagree</td>
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<td>S.L.T44; E19</td>
<td>E3-5</td>
<td>itmmethod1-3</td>
<td>Method IT should be taught at university level</td>
<td>I am of the opinion that IT should be taught in the following manner at university level</td>
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### Coding instructions

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<td></td>
<td></td>
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<td>As a separate subject</td>
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<td>E4</td>
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<td>Integrated into each individual subject</td>
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<td>E5</td>
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<td>As a separate subject AND integrated into each individual subject</td>
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<tr>
<td>S,L,T45; E20</td>
<td>E13</td>
<td>facili</td>
<td>Facilities available to improve skills</td>
<td>What facilities and/or resources are at your disposal to improve your IT skills and competence?</td>
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<tr>
<td>S,L,T46; E21</td>
<td>E14</td>
<td>other</td>
<td>Other skills acquired through IT</td>
<td>What other skills required by CA's, can in your opinion, be acquired by using IT?</td>
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<tr>
<td>S,L,T49; E22</td>
<td>E15</td>
<td>otherthoughts</td>
<td>Other thoughts</td>
<td>Please add any other thoughts that YOU may have on IT competencies and IT-related skills of accounting students that have not been covered in this questionnaire.</td>
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<td>S.L45</td>
<td>E16</td>
<td>itentryuniv</td>
<td>Skills when entering university</td>
<td>What IT competencies do you think an accountancy student should possess when they ENTER university?</td>
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<tr>
<td>S,L51</td>
<td>E8-12</td>
<td>ityeartaught1</td>
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<td>In which year(s) of study do prospective CA(SA) students receive compulsory IT training as part of their curriculum at your university?</td>
<td>Open ended question</td>
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<td>E8</td>
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<td>1st year</td>
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<td>E9</td>
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<td>2nd year</td>
<td>Strongly agree</td>
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<td>E10</td>
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<td>3rd year</td>
<td>Strongly agree</td>
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<td>E11</td>
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<td>4th year (if 4 year degree)</td>
<td>Strongly agree</td>
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<td>E12</td>
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<td>Hons year</td>
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<tr>
<td>T45</td>
<td>E6</td>
<td>studitprepared</td>
<td></td>
<td>How prepared were you with respect to IT skills when you entered university once you had completed your matric year?</td>
<td>Novice Advanced Beginner Proficient Expert</td>
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<tr>
<td>S,L,T47</td>
<td>E7</td>
<td>univsupport</td>
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<td>My university provided me with the necessary support when I started my studies in respect of acquiring IT skills.</td>
<td>Strongly agree</td>
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Source: Henning (2014:104-114), Pallant (2013:11), Welman et al. (20112:214), Creswell et al. (20110:105-109), adjusted
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