

**A Comparison of Students' Responses to Automated  
and Manual Computer Literacy Assessments**

**By**

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**A dissertation submitted in partial fulfillment of the requirements for the  
degree of Master of Education [Higher Education]  
in the Centre for Higher Education Studies  
School of Adult and Higher Education  
Faculty of Education  
University of KwaZulu-Natal**

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**2009**

## **Acknowledgements**

I would like to express my deepest gratitude to my supervisor, Dr Sioux McKenna for her continuous inspiration, guidance, support and above all her endless patience.

To the staff and management of the International Hotel School, thank you for your support and encouragement.

I would especially like to thank my dearest daughter, Danielle, who has put up with an absent minded and preoccupied mother for the last two years. You have been so patient with me. Thank you for the sacrifices you have made so I could complete this dissertation.

To the love of my life, Klaus Arpe, thank you for your understanding, patience and encouragement.

Finally I dedicate this work to my dearest grandmother Majorie Chetty and my mother Valerie Chetty who have been my constant inspiration and motivation to reach for my dreams.

## **Abstract**

The aim of this research was to determine the differences in student responses of two forms of assessment, automated and manual in terms of measuring student capability in the computer literacy programme, The International Computer Drivers Licence.

Computer Literacy studies are an integral part of many academic programmes and have become a basic requirement for securing certain employment. Many academic programmes utilise recognised computer literacy qualifications rather than developing their own. In this case study, assessment within one of the most prestigious programmes, the International Computer Drivers Licence (ICDL), is the focus of attention. This qualification has become a benchmark for such computer literacy certification.

Formal assessments are conducted to complete the certification. The certifying body, The ICDL Foundation, that controls this qualification, allows institutions to select from two modes of assessments. The modes of assessment are paper-based 'manual' (traditional) assessments or approved automated assessment software that is commercially available through different software suppliers. Manual assessments are available from the ICDL Foundation and conducted by external examiners, whilst the automated assessments are designed by software companies and approved by the ICDL Foundation.

This case study looks at a comparison between students' responses of the automated assessments that uses simulation of major software packages such as Microsoft Word and Excel and a manual assessment. The focus of this study was to gain some insight into students' experience when taking the automated assessment and how it compares to a manual assessment.

A case study was conducted in which a group of volunteer students were requested to take two assessments on a particular section of computer literacy. The first assessment was the automated assessment followed by a manual

assessment which assessed the same outcomes as the automated assessment. During these assessments certain phenomena were observed and recorded. These observations were then qualitatively analysed and organised into themes. Scores of these two assessments were also compared to establish if the students showed marked differences between the two assessments. However the small sample size means that no conclusions could be made based on statistical differences.

Immediately after the two different forms of assessment, six of the students were interviewed. These interviews were conducted using semi-structured questions. The questions revolved around the students' perceptions of their responses to the automated and manual assessments and in particular how the students perceived both assessments. The transcriptions of these interviews were then qualitatively analysed and common themes were extrapolated.

The results of the study show that students' abilities were not always being assessed accurately in the automated assessment. The data in this study also shows that the automated assessment, whilst highly reliable and objective, does not present an authentic assessment environment. This resulted in high scores being awarded where students were not able to perform the same tasks successfully in the manual assessment. This calls into question the validity of the automated assessment and its ability to assess students' practical skills accurately. The interview data also suggests that the use of multiple choice questions and discrete tasks in the automated assessment further resulted in students adopting a surface approach to learning in their preparation for this summative assessment.

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# **Chapter One: Introduction**

This case study looks at the comparison between students' responses to an automated assessment and a manual assessment in a computer literacy programme offered at the International Hotel School in Durban.

The aim of this study is to compare the different student responses when taking an automated assessment and a manual assessment to establish if there is a difference between what students can do in a manual assessment and in the automated assessment. This was to ascertain the validity of the assessments in measuring student performance in the computer literacy programme at The International Hotel School. It is important to note that the capabilities being assessed are technical, proficiency-based skills rather than deeply theorised understandings of such skills. The practical ability to use such software packages as Microsoft Word and Excel is the focus of the assessments.

## **1.1. Background**

The International Hotel School is a private tertiary institution that offers a number of hospitality programmes to students within South Africa. It has three campuses based in Durban, Johannesburg and Cape Town and has a complement of over one thousand students country-wide. It is registered with the Department of Education and has two programmes accredited with the Council on Higher Education. The International Hotel School has adopted the International Computer Driver's Licence (ICDL) as a component of its qualifications. The European Computer Driver's Licence (ECDL) programme was established in Dublin Ireland in 1997. The international version (ICDL) was established in 1999 and is recognised as a global standard for end-user computing and is used as a benchmark by many companies for identifying competency in computer skills. The ICDL Programme consists of seven Modules which are individually assessed through a summative<sup>1</sup> assessment.

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<sup>1</sup> Summative assessments occur at the end of a learning process



Assessments can be taken through a manual paper-based mode in which case the assessment is designed by the ICDL Foundation and questions are administered on paper. The paper-based questions primarily take the form of instructions which students then undertake on the computer. The assessment can also be administered through an automated software application. The automated assessments are designed by software companies and approved by the ICDL Foundation. The ICDL Foundation have approved a number of different testing software from different software development companies. Currently, the International Hotel School does not use the manual mode but utilises automated testing software which is approved by the ICDL Foundation. The pass mark for assessments of each of the seven Modules is 75%.

The ICDL Module 1 consists of the theory of computers known as “Basic Concepts of IT”. In this Module a wide range of concepts are learnt, from the parts of a computer through to how they operate and how to maintain and use computer systems. This is a “theoretical” Module in the sense that it does not comprise a focus on software specific end-user practices. However it is not theoretical in the sense of overtly engaging in underlying theories. Students are required to answer a set of multiple choices questions in the summative assessment.

In Module 2 the focus is on gaining practical skills as students develop the expertise in using the operating system environment (in this case study the operating system used is Microsoft Windows XP). This Module forms the Foundation for students’ understanding in how the computer system operates and how best to organise and maintain a good filing system. The assessment includes multiple choice and practical questions where students must perform certain practical tasks or identify menus relevant to the use of the operating system.

Module 3 covers word processing skills (Microsoft Word 2003 is used in this case study). Students learn to format business and academic documents. Once again the skills learnt are largely practical where students create letters, projects, reports, minutes of meetings and bulk mail documents. They learn how

to use the various features in the software and when it is appropriate to use certain features in documents. The assessment once again includes some multiple choice questions and practical tasks in a simulated controlled environment.

Module 4 looks at spreadsheet skills (Microsoft Excel 2003 is used in this case study). In this Module students learn to draw up income statements, balance sheets, budgets etc. They learn how to create different formulae, analyse data and produce graphs from the data. The assessment comprises multiple choice questions and practical simulation type questions.

Module 5 consists of database creation and manipulation (Microsoft Access 2003 is used in this study). Students learn the skills of creating a database and capturing data. They are also exposed to data manipulation which includes different types of searching and querying techniques. Once again the automated assessment includes multiple choice questions as well as practical tasks in a simulated environment.

Module 6 includes presentation skills (Microsoft PowerPoint is used in this study). In this Module students learn how to create a slide presentation, include graphics and present their ideas as would be required in business. In this Module students learn to develop their creative skills and apply these skills in a practical way. Assessments include multiple choice questions and relevant practical tasks in a simulated environment.

Module 7 looks at using the Internet and Email to communicate effectively in a business, academic and social environment (Microsoft Internet Explorer 7 and Microsoft Outlook 2003 are used). This Module allows students to look at different ways of researching material and how to communicate using email. In this Module they are exposed to business etiquette in email communication and the responsibilities of using the internet and matters of security. Most of the assessment questions in this Module are multiple choice type questions. However some questions require students to perform practical tasks such as accessing various menus to indicate how a task would be completed.

It is important that students are able to assess their own learning and learn from their mistakes. The ICDL Programme does not require continuous assessment for the certification. There is only one prescribed summative assessment at the end of each Module. From a constructivist perspective and in keeping with the current teaching and learning culture it is considered useful in any educational practice to provide feedback to students that enhances learning. In the case of the International Hotel School, lecturers usually do conduct formative assessments but these are not a requirement for the certification or the ICDL Foundation and do not count towards the final score. Feedback after the summative assessment is limited. If students do receive feedback it is after their assessment and only students who have failed are likely to pay sufficient attention to benefit from this but not without the cost of a supplementary assessment (Refer to Chapter Four, Section 4.4).

A number of our students come from previously disadvantaged backgrounds and learning on the ICDL Programme may be their very first encounter with computer technology. The technical terms seem to be foreign and difficult for them to understand. This brings added anxiety which further disadvantages these students. In computer literacy programmes, it is typically assumed that students are capable of reading and writing and have a good understanding of the written language (Ruthven, 1984). When considering some of our students, it is evident that this assumption may be problematic. The inequalities of the past have resulted in a poor education system with little or no technical resources in many schools (Chisholm, 2005). Students find it difficult to read and write English, creating a language barrier where students are unable to understand English terms. The introduction of technical terms can therefore be more daunting and creates more pressure on students learning computer literacy concepts. According to Brosnan (1999), students who are anxious about working with computers often perform poorly because they concentrate their cognitive efforts on things such as worrying about performance. As a result they take longer with tasks and make more mistakes. This problem is further exacerbated when a summative assessment is the students' only chance at proving their ability. Farmer and Eastcott (1995, p. 89) state that the solution to

the problem would be to introduce “continuous assessment” as this would allow for multiple opportunities for feedback and continued learning. In this study at the International Hotel School, this aspect was considered in that students did mini assessments and formative exercises to practice their abilities during their class time so that students were prepared for the assessments. This is in line with the idea of assessment *for* learning rather than only *of* learning (Ramsden, 2003; Knight and Yorke, 2003).

## **1.2. The assessment issues**

The ICDL assessments can be administered using a manual paper based assessment or any of the approved automated software options. In the manual mode assessment the students are given the questions on paper and provided with the electronic data that they need to access and make changes to. In certain questions they are required to create documents or add certain layout and formatting features to the document as per the question paper instructions. These features may include adding text, deleting text, changing the font, creating tables, adjusting line spacing, adding formulae, changing page settings etc. Printing or saving a document to external media such as a disk is required to enable easy marking which is completed by the external examiner. At present the International Hotel School does not use such manual assessment.

The International Hotel School uses automated assessments developed by a software company. In this software the assessments are conducted in a controlled and simulated computer environment. The software displays set scenarios in a simulated version of the application being assessed (e.g. Microsoft Word). The use of the software program being assessed is limited to that of the simulation program. Students are therefore working on screens which look identical to the software program being assessed. The question bar appears at the bottom of the window displaying instructions to complete certain actions such as applying a font change of some text. Once they complete the task the student must click the accept button to accept the changes and allow the software to instantly mark the question and move to the next question. While the screen may look like the original Microsoft software document, it is in

fact the simulation assessment program. (Automated and manual assessments are discussed in more detail in section 2.5.1 and 2.5.2.) The assessment therefore limits the user to the relevant menus or buttons related to the task that needs to be completed.

According to Selwyn (1997, p. 49), assessments are intended to measure students' "ability" but assessment devices can be "vague" or measure a limited set of abilities. Students have often complained after taking the automated assessment that they felt they should have done better or should have passed the assessment. Some students have said that they knew how to complete the question but their option was not available. Lecturers have expressed concern that some students who have done well in classroom assessments have failed in the summative assessment or vice versa. As a result of these anecdotal experiences, this research study was conducted to investigate this matter further to establish whether the students perceived the automated software is disadvantaging them and how their responses compare to a traditional manual method of assessment. The issue of "fitness for purpose" was considered when evaluating the automated assessments i.e. what are the assessments really testing and are they suitably designed to do this?

With the growing demand for automated assessments, this research will highlight the intricacies of automated assessments that use simulation. This study will also be relevant to other types of assessments involving technology.

In the following sections of this chapter, I will discuss Information and Communication Technology (ICT) and computer literacy and what it means to include these concepts in any higher education curriculum and how they impact on the working world. I will also elaborate on the technological influences on industry and the consequences of the technological developments on various industries. I will consider how technology has impacted on society today and how the inclusion of Information and Communication Technology (ICT) in curricula can contribute to the development of human capital to create a more efficient workforce that will ultimately help improve the economy of South Africa. It is important to understand that the level of computer literacy of graduates

impacts on industries that they enter and their job performance. I will discuss the influences of technology on higher education practices and the requirements for higher education to meet industry demands.

### **1.3. What is ICT?**

There are a number of definitions that explain the term ICT. According to a CHE document (Czerniewicz, Ravjee and Mlitwa, 2006), ICT encompasses many things but primarily includes computers and information and communication. ICT is the acronym for Information and Communications Technology. Other definitions indicate that it is a term which is used to refer to the various communications and computer facilities used in teaching and learning and other educational activities. In higher education the emphasis of ICT lies in the online or e-Learning aspects. It must be noted that whilst online learning is a major focus for education it is only a portion of what ICT includes. ICT may include the use of CDs, DVDs, computers, internet, video conferencing, email, administrative applications such as word processors, spreadsheets, databases, presentations and other multimedia technology. In ICT we have seen the development of new social media such as MXIT available for mobile communication, Facebook, Skype, Internet Chat sites and other interactive software which allow users to communicate and interact across the world. More and more ICT tools such the Internet and the World Wide Web are being used in classrooms to aid and support the teaching and learning process (Oliver, 2002). According to Oliver (2002), the use of ICT allows for flexibility and efficient delivery of learning concepts. ICT offers opportunities to customize education for students to learn in different ways and explore information through different electronic and dynamic media creating a far more interesting way of learning (Oliver, 2002, Wurst, Smarkola and Gaffney, 2008).

#### **1.3.1. Computer Literacy**

Computer literacy has become a buzzword since the development of the personal computer. In the late 1980's and early 1990's there was a major demand for computer courses and the need to become computer proficient and

able to operate a computer. People around the world realised that technology was infiltrating every aspect of business and it was therefore an advantage to have this skill. The development of technology has subsequently advanced to the point where computers are no longer a luxury but a necessity to survive in any business. It has therefore become a necessity that all those involved in any business become familiar with the basic concepts of using a computer to be able to stay in the business world and succeed in any job.

We can define computer literacy as having the basic understanding and knowledge of how a computer operates and a basic understanding in the use of software to create various business documents. Childers (2003) defines three levels of computer literacy. The first level he calls “the baseline level” whereby the candidate is familiar with turning the system on and off and printing etc. The second level, he defines as the “desired” level where the individual has a basic understanding of the filing system, document creation and sending emails etc. The third level is called the “target” level where the user is skilled in a range of abilities and can adapt to new software and hardware changes that may arise (Childers, 2003, p. 102).

According to Su (2008), students who are exposed to Information Communication Technology have quicker access to information. Su maintains students who take computer classes, exposed to computers and multimedia are influenced by this technology. The use of ICT is thus purported to help students understand concepts better. When students are familiar with the computerized environment, technology is not seen as a threat but rather as a tool to assist in the acquisition of knowledge. In contrast, those who are unfamiliar with technology may feel threatened with this type of media and so struggle to achieve their learning goals because they do not know how to work with the technology.

In a study Austin (1999), found nursing staff, with little computer literacy understanding, were not effective in dealing with technology in the work place. This is also evident in the hospitality industry. Students who attend computer training are far more efficient in the workplace and have a better understanding

of the needs of the hospitality business and seem to respond with confidence in comparison to those who do not attend computer training or have basic computer knowledge.

Epistemology is the study of knowledge and is concerned with questions such as: “What are the necessary and sufficient conditions of knowledge?” “What are its sources?” “What is its structure, and what are its limits?” (Steup, 2008) When considering computer literacy and education, we need to consider two types of knowledge. In philosophical terms, a priori knowledge is independent of experience (i.e. water is a liquid). It is truth that does not require further investigation or experience but knowledge acquired independent of experience (Russell, 2008). A posteriori knowledge is dependent on experience or empirical evidence. It is only through the experience or observation that knowledge is acquired (Russell, 2008). In computer literacy knowledge is acquired largely through experience (a posteriori knowledge). This is a very narrow explanation of a very complex set of philosophical ideas. However this is adequate for us to realise the significance of practical experience in order to become computer literate.

In the ICDL Programme, Module 1 is the only Module where most of the content is factual and not directly linked to practice and therefore knowledge is gained mainly without experience. The ICDL Programme in the main requires students to learn practical computer skills that are used in everyday business. The students learn the concepts using a computer and much of the learning is done through practical exercises with different scenarios and experiences. Whilst the programme does include some “theoretical” aspects where students are required to learn a few a priori facts, the majority of the learning takes place through experience of using the software in different contexts. This requires students to develop technical skills on when and how to apply various concepts to a task. The acquisition of this skill thus relies primarily on practical application and unlike most other subjects in higher education, there is very little in terms of theorising in the sense of a priori facts and almost no theory in the sense of a set of principles or philosophy that accounts for a particular phenomenon.



### **1.3.2. How technology has changed the world**

Much has been written about how technology has changed business operations and working relationships. According to Kozma (2005), a country's economic growth can be attributed to the effective use of knowledge. Technological innovations have brought about changes in production, distribution and have resulted in increased productivity. There is a lot more demand to produce goods and services at a faster pace with the use of technology. With technology, people have become more demanding and expect better and faster services. As a consequence of technology, new knowledge has promoted growth of economies. This creates a cyclical production of ideas, which leads to improved production of goods and services (Kozma, 2005).

Technology has also led to more collaboration of ideas and sharing of knowledge further aiding in the production and evolution of ideas. Technological inventions, such as the Internet and email, make it easier to expose more people to information with a wider reach and across different divides.

Industries are demanding higher quality skills and flexibility of their personnel. In order to stay in business and have a competitive edge, businesses must constantly keep up with the many technological advancements and organizational changes (Hellriegel et al, 2005). The demand for computer literate employees, who are able to use information technology effectively, is increasing, as businesses look to reducing their expenses and improve their efficiency (Oliver, 2002). Organizations are looking to increase the development, implementation and distribution of knowledge through technology. This has increased globalization and created more competitive markets. In South Africa, government is looking to improve the economy by increasing the knowledge base and implementing policies in institutions to promote the use of technology so as to advance the economic and social development of the country. Important South African Government documents such the Higher Education White Paper 3 (1997), the National Plan for Higher Education (2001), the National Research and Development Strategy (2002) and the Foresight ICT report (1999) call for education to equip graduates to have ICT competencies to

meet the changing technological demands that impact on society and influence an economy that is driven by information technology (Luckett, 2004).

According to Kozma (2005, p.118),

The improvement of educational systems and increased educational attainment are seen as primary ways that countries can prepare for these global, technology-based changes. And within education, ICT is seen as a way to promote educational change, improve the skills of learners, and prepare them for the global economy and the information society.

The implication is that higher educational institutions need to provide students with the necessary ICT skills as part of the graduate attributes for both the students' future employment and to facilitate improvements to the economy. South Africa's previously fragmented and inequitable education system has created an unbalanced educational knowledge base. At the International Hotel School, this is evident when assessing students' computer proficiency. Those students who have little exposure to computers struggle with computer tasks. Those students who have been previously exposed to computers are generally far more efficient with computer tasks. The need for educational development and transformation and the inclusion of ICT in curricula is imperative for many students especially those who have been previously disadvantaged. In his research study, one of Aungamuthu's (2009, p. 6) conclusions was that, "... while participants benefited in numerous ways from learning mathematics with the aid of ICT, their overall experience of ICT was constrained by the negative effects of the digital divide."

Technology has ensured opportunities for people to move in diverse directions and explore a wider variety of ideas. Technologies, such as Internet, email, electronic discussion groups and chat sites have enabled people with different ideas to come together and interact on different levels and be exposed to different things. This type of networking and interaction brings about new

possibilities for business. The results of individualisation<sup>2</sup> are that there are diverse demands on higher education to provide the individual student with a variety of opportunities and a need for more programme flexibility and technological knowledge to support the knowledge economy (Oliver, 2002, Jongbloed, 2002).

### **1.3.3. The impact of technology on Higher Education**

In recent years we have seen major advancements in technology. Technology has become the way of life and has infiltrated every sphere of the world. Whilst the world keeps evolving and changing, higher education institutions in South Africa and other countries seem to be slow in adopting ICT in their teaching and learning practices in general (Oliver, 2002; Czerniewicz, Ravjee and Mlitwa, 2006). According to a CHE research report (Czerniewicz, Ravjee and Mlitwa, 2006), higher education institutions have only recently started to look at strategies for the implementation of ICT. Some of the reasons cited for this interest in ICT are global trends where South African institutions recognize that they need to be part of the global knowledge economy and ICT provides a pathway to achieving this goal. As educators, it is important to keep up with the trends of technology and the growing demands of industry. To develop computer literate people there is an undeniable need to include information and communication technology (ICT) as part of higher education curricula.

There are a number of benefits of adding ICT to higher education qualifications. The most obvious is to provide students with a skill that will benefit them during their learning career, so when employed, they will have some basic computer literacy as technology is found in all industries of the world. Oliver (2002) maintains that ICT provides students with more access to a variety of

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<sup>2</sup> The concept of individualisation relates to educational practices and the increased focus on individual needs and the modification of situations to suit the individual rather than placing people in groups and addressing issues that are generic to groups of people which often leads to exclusion of other individuals.

information in different forms and contexts which provides a wider knowledge base. ICT also promotes a learner centered environment by providing the tools for students to inquire and research topics for themselves (Czerniewicz, Ravjee and Mlitwa, 2006). As a member of senior management at the International Hotel School, often I have encountered people with excellent qualifications but little computer experience or knowledge. These academics struggle with using technology as a tool in the classroom. Students who are comfortable with technology seem to find learning using technology so much easier and quicker. Jongbloed (2002) maintains that ICT makes people aware of different possibilities and gives them quicker access to information. We have seen a change from the industrial society that focused on mass production of goods to the network society where the focus is on producing customised products that suit individual needs with a short lead time. Working through networks, companies collaborate to enhance and modify products for different individual tastes and needs. One of the contributors of this change was the development of ICT. ICT enables information to be shared and changed at a click of a button. This has created a demand for variety, speed and constant change to improve products and services to society. With the growing demands for different products and services, companies require employees to be adaptable, versatile and multi-skilled. Educational institutions therefore have an important responsibility to ensure that graduates are fully skilled and competent to meet these demands in the workplace. ICT provides the key tools that support employees in their ability to be adaptable and versatile in their jobs. It is imperative that educational institutions and programme designers incorporate ICT into their programmes not just as a means to educate but also to make use of these tools to enhance and support the graduate in the workplace.

#### **1.4. National Documents**

In South Africa, many national documents have called for ICT to be part of the educational curricula. According to the Czerniewicz, Ravjee and Mlitwa (2007), many institutions in South Africa have implemented the use of technology to some degree in their curricula. However some institutions have made little progress in including ICT. Kozma (2005) maintains that it is not effective to have some educational interventions in a just few areas of education. He maintains

that it is “a concern for all countries but they are nowhere more important than in developing countries, where the resources are few and both the costs and stakes are high” (2005, p.119). In essence institutions in South Africa have a responsibility to provide all students with the same opportunities and to address the inconsistencies of the past.

Many institutions have developed policies for the use of technology in their programmes as well as incorporating basic literacy as a prerequisite Module for programmes. Some institutions have developed policies but not implemented them. According to Czerniewicz, Ravjee and Mlitwa (2007) there is a lack of organization across policy documents between institutions which could result in a misguided focus on unnecessary topics and an overshadowing of important issues. They recommend one national policy that is able to focus on the key issues and define a comprehensive policy.

Luckett (2004, p. 45) recommends that institutions should offer “programmes that include an appropriate media and technology mix.” The motivation for this requirement of institutions is that society is changing and ICTs are “considered a basic requirement” (Luckett, 2004, p.45). In some industries, technology is a necessity and being technologically skilled is regarded as having a competitive edge over other competing applicants in the job market. With this in mind it is essential for institutions to expose and prepare their students with technological skills in preparation for the workplace. At the International Hotel School, computer literacy has been included as part of the curriculum to provide students with these necessary industry skills. If we were to eliminate this component from the curriculum, we would be doing our students a great disservice in not providing an important opportunity in a baseline industry expectation.

In South Africa, there is evidence that there is a wide disparity between students who have been widely exposed to technology and those who have not had the same opportunities. This is a dilemma that institutions such as the International Hotel School must address to meet the needs of all students.

The introduction of computers and an ICT curriculum at schools will demand that tertiary institutions need to be more progressive in the use of technology when developing curricula. Curricula need to include more technology as students make these demands. Students have been identified as one of the driving forces for the increased use of ICTs (CHE, 2004, Czerniewicz, Ravjee and Mlitwa, 2007). ICT topics will advance students' knowledge and assist them in business and make them more confident in their future careers.

### **1.5. Preparation for the work place**

Academic institutions need to be more competitive in terms of their offerings to compete with each other nationally and globally. The intense focus on information processing and development of knowledge in all spheres of society implies that education has a crucial role in cultivating a knowledge base that is more technologically driven. Universities are no longer the sole providers of education. The demand for knowledge and skills has led to private companies and large organizations investing in education and training. This allows them to maintain or increase their competitive advantage in a highly competitive global market (Kozma, 2005). Universities need to beware of a complacency in this new environment.

Many organizations have created alliances and mergers to help them cope with this competition. The International Hotel School is an example of this. In order to maintain a competitive edge it has formed alliances with a number of other educational institutions to create offerings which are unique and which enable students to gain an education that opens more job opportunities both locally and internationally. This demands the need to keep abreast with technological advancements and provide students with the necessary skills required for the hospitality industry. One such alliance is that the International Hotel School created an alliance with the International Computer Drivers Licence Foundation (ICDL) to provide students with a qualification that is widely considered as a benchmark for computer literacy. No longer is it acceptable for graduates to simply have hospitality skills. It is vitally important that they are able to operate hospitality computer systems and have knowledge of basic software operations

such as word processing, spreadsheets etc. These are technological tools being used within the industry. If students have this experience they have a better chance of securing employment than a graduate with hospitality specific skills only.

The advancements in technology and communications have led to a rapid growth in international competition amongst business and industry, resulting in the increased demand for technologically skilled individuals. This places a greater demand on higher education institutions. As companies' and industries' needs continue to change, a "flexible and versatile workforce" is required leading to the need to retrain staff and keep up with the current technological developments (Jongbloed, 2002, p.416).

It is evident that whilst information technology has been in existence for the last forty years and widely used for the last twenty years, education has not necessarily embraced these rapid changes. It is also evident that technology has influenced changes in all industries around the world and transformed the world from an industrial society where craftsmanship was the order of the day to a knowledge society, where information can be accessed through your fingertips. The widespread interconnectivity across the globe has meant that information is shared more rapidly and everything works faster than before. Whilst higher education institutions need to consider their policies on the inclusion of technology in their programmes, they will also need to address technological issues and how these will impact on teaching and learning practices. Assessment practices that utilise technology, the focus of this study, are just one aspect that will need attention and further scrutiny.

## **1.6. Outline of this Study**

In this chapter I have provided an overview of the impact of technology on education, and its impact on students' lives whether it is in the classroom, in the workplace or society. This background emphasises the importance of developing graduates who are practically skilled and computer literate. These skills will enhance and support the future workforce and contribute to the efficiency and service delivery that is required in the growing global economy.

In the following chapters I will address the specific issues related to assessments used to test technical skills in computer literacy.

Chapter Two discusses the literature of assessment with a focus on the use of automated (computerized) assessments for testing practical computer skills.

Chapter Three discusses the methodology of the study highlighting the ways in which data was collected both through observations of assessment and through student interviews. This qualitative data is analysed in terms of common themes.

Chapter Four describes the findings and in particular considers the extent to which the assessments were valid and authentic. Other concerns arising from the data are also discussed.

Chapter Five provides some conclusions and recommendations and calls for a consideration of some of the issues raised in this study to ensure that assessment of computer literacy is as rigorous as possible.



## **Chapter Two: A Framework for the Research**

Assessment seems to have been the one part of the learning process that has been particularly under the spotlight in recent years. Rightly so, when we consider the powerful impact it has on students' learning, students' futures in terms of employment, institutional reputation and ultimately on economic and social development. In this chapter, various issues pertaining to assessment and how they relate to the context of this study will be considered. The chapter begins with broad issues of assessment and then moves to the current debates around computerized assessments in particular.

### **2.1. Traditional approach to assessment**

Many traditional approaches to assessment are aligned to early understandings of intelligence as developed in the work done on intelligence testing. The basic premise of intelligence testing was that intelligence is fixed, innate and genetically pre-defined. The psychometric model that developed out of these beliefs has long been the basis for educational assessment (Havnes and McDowell, 2008).

Traditional assessment has focused mainly on the measurement of student knowledge in discrete and limited contexts with little or no relation to how students may use this knowledge in relation to future contexts (Knight and Yorke, 2003). The traditional assessment model assumes that intelligence can be assessed through strict criteria and measurements. From these assessment outcomes, individuals can be placed into groups and ranked into categories of ability. The premise is that intelligence can be measured through observable characteristics. The model focuses on the measurement of human attributes according to set criteria which are defined as "the norm". Assessments are standardised and controlled to ensure high levels of reliability. Norm-referenced tests are products of the psychometric assessment model, whereby an individual's performance is assessed and compared against their peers (Gipps, 1994; Moss 1996). It stems from the influences of the Psychometric theories

where aptitude testing and scientific measurement were regarded as important to establish the level of student's intelligence and abilities (Gipps, 1994, Havnes & McDowell, 2008).

### **2.1.1. The Psychometric Model**

The Psychometric model has influenced and defined various theories of assessment. The assessment system (historically known as the examination system) has focused on grading students rather than assessment of learning (Tolley, 1989). According to Gipps (1994), the assumption is that skills and knowledge can be quantified through individual performance in a single assessment. This is deemed adequate to rank student performances as opposed to a series of assessment interventions that provide an understanding of the level of learning. In ranking students, a certain standard is defined as acceptable. Little can be derived about what the student has achieved or has not achieved.

The psychometric model focuses on replication and generalization of testing without considering the individual being assessed or that the test may have a bias which would disadvantage students of different cultural backgrounds or different genders or different life experiences (Gipps 1999).

Over the years researchers and educators have come to understand that unlike the measurement of velocity or temperature, human ability is not an exact science. The fact that the psychometric assessment is standardised also means that it does not allow for different approaches or solutions to the problem.

### **2.1.2. Criticisms of the Psychometric approach to Assessment**

The fundamental criticisms of the development of psychometric testing as a field of psychology had great impact on assessments generally. A major critique of this approach to assessment concerns the meaning of a score and the assessment of discrete concepts. According to Gipps (1994), one criticism of the traditionalist view is the assumption that a test score has the same meaning

for all individuals. This implies that if students achieve a particular score on a standardized assessment it has the same meaning. The model assumes that standardised scores are universally applicable and accepted regardless of the differences in people's skills or their context. The assumption is that the test is the same for any person taking that assessment. There is also the assumption that this meaning is understood by all. Consider the assessment of a student's ability to use computer software. If two students achieved 57%, what would this mean in terms of their proficiency? Are they equally proficient? Doesn't their relative measure of proficiency depend on how they each achieved that 57%? Gipps (1994, p.6) suggests that there is often an "assumption of universality" in assessments whereby students' performance is generalised as indicating competence in areas or aspects which were not assessed. The assumption, for example, would be that 57% would always mean the same level of competence even though two students who achieve this result may have performed very differently on different test items.

The sole focus on a final assessment to determine a student's ability is another criticism of the traditional model. This assessment usually occurs at the end of the learning process and has little impact on the learning process other than to inform the student, the teacher, the institution and other stakeholders of a mark. As a result the student receives no other opportunity to prove his ability or improve on these skills and the educator has no opportunity to check on learning gains.

Another criticism is that the traditionalist view assumes that constructs can be assessed in isolation thereby ensuring reliability in measurement. This type of assessment allows for one correct answer and is often called objective testing or convergent assessing (Rowntree, 1987). The assumption is that skills can be measured as single items. However it may be difficult to separate certain skills or bits of knowledge and assess them in isolation. Some skills cannot be assessed in isolation as they are dependent on other skills or particular contexts and when assessed as discrete items, the assessment is oversimplified and rendered "artificial" (Gipps, 1994, p.7). This issue is discussed later in chapter four and relates to the format of the ICDL assessments.

In assessing a technical proficiency, such as computer literacy, it is easy to assume that individual bits of knowledge can be objectively assessed. Unlike subjects such as Philosophy or Biology, technical proficiencies such as computer literacy can indeed be segmented into a series of discrete steps. However, I would argue that even here such an understanding can result in assessment that is over simplified. For example, you may want to test students' knowledge of opening a document. You may decide that if the student knows the "open button" or the "open menu" then that would be sufficient evidence that the student knows how to open a file. In this case I'm isolating an aspect of a task and assessing for knowledge. The question may be answered correctly (i.e. the button or menu may be identified correctly), however does this mean that the student can actually open the document? The student may be able to identify the correct buttons but may not be able to complete the task of opening a document or may not understand the steps required in opening a new document and retrieving it from where it has been stored. The question here is actually invalid if the test is designed to assess the learning outcome: "Open a document". In essence the result is a reflection of a single attribute, but we are interpreting and relating this score to a broader set of concepts.

If we consider the example above, the ability to apply a feature and knowing when to apply it cannot be separated without losing the value of the skill. From this we can see that isolating skills does pose problems as most skills, even in a technical subject such as computer literacy, are not one-dimensional but incorporate a range of items that together give meaning to the task. In a study, Hudson (1966b, cited in Rowntree, 1987, p.149) found that students who focused on clearly defined tasks ("convergers") did better in intelligence tests. However students who were focused on open ended tasks ("divergers") were "more productive with creative tests". While computer literacy is indeed a technical proficiency, I would argue that there are many workplace demands for divergent approaches to such literacy.

Standardized tests that are externally designed prevent the development of meaningful learning practices and diminish the professional role and skill of the

teacher (Shepard, 2000). In the case of the ICDL assessments, teachers may not view the final assessment. High stakes accountability tests create the perception that learning initiatives conducted in the classroom are not nearly as important as the external test. Instead students focus all their efforts on an assessment which offers either a reward or punishment, missing the entire purpose of education – the construction of knowledge (Shepard, 2000). This notion is supported when considering the ICDL assessments focus on a final assessment. Over the last decade we have seen a paradigm shift from this traditional psychometric model of assessment to more dynamic modes of educational assessment.

### **2.1.3. Norm-referenced Assessments**

Norm-referenced testing was developed in an effort to compare student scores with the assumption that all students have the same innate abilities. In norm-referenced assessment students' scores are compared (Brown & Knight, 1994). The use of norm-referencing grades means that one student's performance scores are determined in relation to other students' performance scores and students are labeled according to their marks. The standardization of tests ensures that reliability of the tests is maintained and objectivity is a vital requirement for the accuracy of measurement (Ellington, 1987).

The use of norm-referenced assessments encourages competition amongst students and results in the "fittest person" being selected to move on to another qualification or employment. Gipps (1999) maintains that the results of an assessment also determine the student's progress from a social and economic perspective. According to Gipps, students who achieve poor examination scores are often prevented from gaining access into other forms and progressive levels of education which in turn prevents them from moving forward socially, politically and economically. The ICDL Programme does not use norm-referenced assessments. However this does not prevent students from comparing scores and competing for better marks.

#### **2.1.4. Criterion-referenced Assessments**

Criterion-referenced assessments provide test scores that translate the student's ability and provide a description of what the student is capable of performing (Linn and Gronlund, 2000). The ICDL assessments can be considered to be a form of criterion-referenced assessment. The focus is on the students' ability to perform a set of tasks under standardized conditions.

### **2.2. New approaches to assessment**

The main focus of the traditional approach to assessment has been to measure the performance of the individual and make comparisons in relation to other students with the aim of replicating and generalizing results. Traditionally the ultimate purpose of assessment has been for selection into a programme or for certification of a qualification. The new approaches of assessment have changed focus to the individual learner and include a much wider assessment approach that includes the learner and teacher in the assessment process. It is a learner centred approach as opposed to a measurement centred focus. Assessment is now regarded as an important part of the learning process which helps in the construction or scaffolding of knowledge.

#### **2.2.1. Outcomes Based Education and National Qualifications**

In a counter to criticisms pointed at norm-referenced tests, curriculum based assessments or criterion-referenced tests were developed. This model seeks to assess an individual's performance against specific criteria of a curriculum (de Jager, 2002). Through a series of learning events the student is assessed to establish what is learnt in order to plan the next sequence of learning initiatives. The curriculum is broken into tasks (often known as unit standards) to help students learn manageable portions of the curriculum and build on previous knowledge. It works on a model whereby there is continuous assessment intermingled with learning initiatives which allows for the identification of strengths and weaknesses of the student's learning. Once identified, new objectives and strategies can be planned to help further learning to take place (Lunt, 1993).

According to Allais (2003) Outcomes-based education (OBE) and the National Qualifications Framework (NQF) were introduced in South Africa because it seemed to be the solution to address the injustices of the previous political system. Huge disparities in standards and content of qualifications have come about because of the inequities of the Apartheid past. The NQF was one mechanism of stipulating what levels qualifications in South Africa are pegged at. These qualifications comprise unit standards with prescribed outcomes and assessment criteria, following the national policy of OBE. One of the fundamental concerns is that outcomes are developed separately from curriculum and the education providers. The lack of connectivity according to Allais has led to disjointed and isolated unit standards.

The model has been criticised for its focus on individual unit standards (Lunt, 1993). Ironically then one of the criticisms aimed at the OBE system is that of atomising knowledge. This same criticism had been levelled at the traditional approach to assessment which OBE sought to replace. Its focus on outcomes as opposed to the learning process and its inability to provide feedback on the learners learning strategies or their social interaction of the learning process is of concern (Allais, 2003). The assessments do not answer the how and why of success or failure of students.

Allais (2003, p.314) found that unit standards were strongly supported by criterion-referenced assessments which she refers to as “statements of attainment”. The implication here is that there is a limitation of criterion-reference assessments. When mapping subject content with unit standards, the focus is often too narrow and detailed. The result is a lengthy and drawn out learning process which reduces in meaning and purpose. This has resulted in a large and unmanageable education system that does not address the real issues of student learning.

Criticism was also launched against the model’s lack of consideration of the context in the assessment of the student. According to Ling (1999) the assessment of discrete tasks in the workplace is challenging. In the work place

tasks are not done in isolation nor are they done in the same manner every day. The nature of a task can change as a result of shifts in the context.

Outlining these issues has relevance because it highlights some of the issues related to this study. In section 4.8, I revisit the issue of discrete tasks in relation to the data arising from the observations and interviews in this study.

### **2.2.2. The Interpretive Approach to assessment**

The interpretive model offers a more equitable approach to assessment in that there are no comparisons between individuals. Learning is recognised as a process of the construction of knowledge as opposed to knowledge reproduction. Learning is seen as dependent on particular circumstances. The interpretive approach offers an alternative to the traditional psychometric perspective or the OBE approach. Followers of the interpretive approach believe that the traditional naturalist approach offers inadequate methods and goals for the study of social science phenomena. They believe that we cannot always comprehend human action or observe the reasons for human action. Individuals make decisions which change as they come to interpret and understand new things.

The interpretive approach focuses on the individual's perspective in how she thinks about her own experiences and perceives her world. This approach opposes the concept of generalised results and does not support the standardisation principles of the traditional model. The interpretive paradigm concentrates on understanding the learner's interpretations and actions of the tasks at hand and the learner's expectations of the learning process. According to the interpretive approach the meaning and understanding of social science is dependent on its context. Individuals, who experience different contexts, will present different results regardless of the standardised assessment (Gipps, 1999, Moss 1996).

In terms of acquiring knowledge, the interpretive view is that knowledge is not transferred from teacher to student, rather learning occurs by interpretation. Instruction is an intervention that supports the construction of knowledge. As a



consequence of these beliefs, the interpretive approach to assessment is one that allows for student and teacher interaction. Unlike the traditional approach where the teacher may be the administrator of assessments, the interpretive approach encourages teacher participation in the assessment process. While the interpretive approach has been widely used in the social sciences, it is less frequently applied in assessing technical skills such as computer literacy.

### **2.2.3. Constructivist Approach to Assessment**

Like the interpretive approach, the constructivist approach does not advocate that learning takes place by fixed or static means or that there is a true reality that exists outside of the individual learner. The constructivist belief is that there are many interpretations of reality and that knowledge is gained through a construction process (Moll, 2002).

This new culture of assessment has emerged from the constructivist development theory which has its birth in the theories of Piaget, Vygotsky and other psychologists and sociologists of the cognitive movement (Havnes & McDowell, 2008, Taylor & Marienau, 1997). The constructivist theory of assessment focuses on how assessment forms part of the learning process as opposed to simply measurement of what learning has occurred. The understanding is that learning takes place gradually and is influenced socially. The notion that a person knows only what he has constructed is key to constructivism (Von Glasersfeld 1989). According to constructivism the learning process consists of two parts, assimilation and accommodation. First the learner encounters a certain situation be it a new topic or an event. This situation is then associated with a similar previous situation (the person's point of reference or assimilation). At this point there is an expectation of a certain result or outcome. If the result is different from what was expected, the learner would become perturbed. This causes a cognitive change that results in the learner recognizing the situation as different. This is what Piaget refers to as "accommodation" (Von Glasersfeld, 1989). These learning encounters are referred to as schemas or mental models which change and evolve as new experiences are encountered (Clark, 1999). These schemas form the basis of

the person's understanding. So constructivism defines learning as an internal process of interpretations of the world in which learners make personal meanings through their experiences of the world.

Constructivist learning focuses on creating a supportive environment in which students can construct meaning and learning is self-motivated and engaging. It is a movement away from controlling student learning through assessment and using assessment as a means to help students understand what skills and knowledge are important. This progressive form of assessment gave rise to the concept of formative assessments (Tillema, 2009, see section 2.4.1 on formative assessment). In the past the focus was purely on summative assessments. Havnes and McDowell (2008, p.5) maintain,

The current situation is characterized by an attempt, both theoretically and practically, to re-establish a new balance system where the alignment of teaching and learning and assessment is based on research about teaching and learning.

From a constructivist perspective, learning is an active progressive process which means that assessment must also take the same format to be aligned to the learning process (Osberg, 1997). Constructive assessment focuses on how the student arranges and uses knowledge in different contexts that involves problem-solving, critical thinking and analysis. Assessment is part of a continuous process to allow the construction of knowledge and is not considered valuable if it tacked on the end of a learning process. According to Osberg (1997, p.17), assessments should be "performance based" allowing the student to display knowledge in a manner that they understand and which is "accessible to others"

Social constructivists believe that knowledge is constructed through social interaction. This perspective then requires assessment to be more diverse so that it supports the quality of learning and knowledge acquisition. Learning is a social activity that requires social interaction. Our beliefs and values are influenced by the people that we interact with, so it follows that we cannot

separate our lives from the learning process as these experiences further inform our learning (Hein, 1991). Social constructivists maintain the best learning environment includes interactions between the instructor, the learner and tasks to create understandings of the truth as a result of those interactions (Cooper, 2005). According to Ehmann (2005), the activities teachers initiate in the learning process will influence the type of learning approach a student will adopt and promote deep and meaningful interaction with these activities.

In considering the various approaches to assessment, it is clear that there has been a major paradigm shift from the traditional to the more dynamic approaches to teaching, learning and assessment. According to Havnes and McDowell (2008, pp.3-4) a “new assessment culture” is emerging that is moving away from the traditional emphasis of a single score and ranking of students to a “contextual-qualitative paradigm” that focuses on explaining student progress and providing feedback. This assists and supports the student in the learning process. To be more effective assessment should encompass the diversity of student thinking and allow for the expansion of ideas and encourage critical thinking (Shepard, 2000). This will not be achieved through the traditional approaches of assessment.

Much of the debate of constructivism calls for authentic environments. Constructivism requires learning to be authentic and related to the world outside of the learning environment. An authentic learning environment is far more interesting and motivating to students (Gulikers, Bastiaens and Kirschner, 2008). It encourages them to develop skills and knowledge to use in the world outside the classroom (Shepard, 2000). According to Scholtz (2007) knowledge construction takes place within the context of real life situations and assessment should be integrated into the process of learning. John Biggs developed the concept of “constructive alignment” in which he maintained that knowledge is constructed and requires the learning experience to be aligned to the learners’ activities (cited in Walsh, 2007).

### **2.3. Characteristics of good assessment**

In this section I will briefly introduce some of the key characteristics of “good assessment”. Notions of what makes for good assessment is of course tied into one’s understanding of what assessment is for. In Chapter Four I will return to these characteristics in greater detail when discussing the data arising in this study. The literature highlights that the following characteristics should be considered when evaluating assessments. The assessment must assess the learning outcomes that it was intended to assess to be valid (Knight and Yorke, 2003, Ellington, 1987). The assessment must be interpretable and fair in that the assessment should provide information about the student’s learning and where the student needs to improve and the results must be easy to understand and details accessible (Chambers and Glassman, 1997 cited in Knight and Yorke, 2003). For an assessment to be fair the student must be aware of the objectives, the possible content, length of the assessment and what method will be used to assess the student (Ellington, 1987). Knight and Yorke (2003) also maintain that assessment must be affordable. Complex assessments may cost in teachers’ time and resources. The assessment must relate to authentic performances (Chambers and Glassman, 1997 cited in Knight and Yorke, 2003). Assessments should also be practical and not complex so that the outcomes are not overshadowed by the technical practicability of the assessment. Caution must be given when the assessment is set up for convenience as the validity and authenticity of the assessment may be lost (Ellington, 1987). The assessment must be reliable, that is if the same assessment is repeated, it should provide the same outcome (Knight and Yorke, 2003, Ellington, 1987). According to Knight and Yorke (2003), it is important that assessments are reliable, especially when the stakes are high. They go on to explain that assessments should be “fairly administered” and errors be minimized.

### **2.4. Types of assessment**

According to Lockett and Sayigh (2004) assessment tasks are designed to provide an understanding of student performance on tasks. Essentially assessment is required by teachers and students to determine what knowledge

has been gained through the series of learning processes. Without assessments we will never fully understand whether a student has progressed and to what extent she has developed. It is also important for the teacher to be able to evaluate her teaching practices and for the institution to evaluate the effectiveness of their courses in assisting students to qualify for certain certifications. Ramsden (2003) maintains that assessment should be about focusing on student learning and getting to know the students' strength and weaknesses and helping them to learn the curricula in a meaningful way.

Assessment can be seen as defining what is important in the curriculum. It defines what should be covered in the classroom and the depth of knowledge required (Rowntree, 1987). This has major implications for teaching and learning as it can be seen that if assessment does indeed define the curriculum then that which is not assessed is quite possibly not taught or not learnt. Ramsden (2003, p.182) claims that assessment "always defines the actual curriculum". Students expect that what they were taught will also be assessed. Morgan, Dunn, O'Reilly, and Parry (2004, p.11), maintain that it is problematic "when the assessment task requires performance that has not been taught or that does not match the desired learning outcomes."

Certain assessment methods will also be suitable for some students and not be suitable for other students (Knight, 2002). It is therefore more effective to use a range of different assessment methods to obtain a more accurate perspective of what the student can do (Lockett and Sayigh, 2004).

Assessments can be used for a number of purposes. Assessments can be diagnostic to identify the students' needs and gaps in knowledge and understanding. The curriculum can then be developed and adapted to address these issues. Assessments can also be summative measures of learning or competency. Summative assessments are final assessments at the end of the learning process and are used for grading students and provide an overall judgment of the students' capabilities (Rowntree, 1977, p.7). This type of assessment has also been greatly emphasized and much importance has been given to this type of assessment in the past. Lockett and Sayigh (2004)

maintain that assessments should primarily be used to develop and reinforce concepts in the learning process. Assessments should therefore be seen as fundamental part of teaching and learning to support the development of knowledge and to provide feedback to students for learning to improve the level of understanding.

When considering assessment as an integral part of teaching and learning, self assessment appears to provide students with valuable learning opportunities. According to Tan (2008) it is a necessary for students to develop skills to assess themselves to achieve a certain level of independence and emancipation in preparation for the working world. Students are empowered to make important decisions and gain confidence, improve their reflection skills and have a better understanding of their quality of learning (Knight and Yorke, 2003). Peer assessment is another approach to assessment which provides students with learning opportunities. Students learn from each other and are able to share knowledge. When instant feedback is given students are able to adjust their knowledge and understanding immediately (Knight and Yorke, 2003). According to Lockett and Sayigh (2004), it reduces the assessment marking load for staff and enables students to get a better understanding of the assessment criteria.

#### **2.4.1. Formative assessment and Summative assessments**

It is important to define the difference between a formative assessment and a summative assessment. Formative assessments are often used as continuous assessments throughout the learning process (Knight and Yorke, 2003, pp.16-17). Formative assessment should help to inform the student and be part of her learning process. The intention for implementing formative assessments is to give the student an opportunity to learn from the tasks she completes. According to Morgan, Dunn, O'Reilly, & Parry, (2004) formative assessment provides opportunities for improvement on the same task. Knight and Yorke (2003, p.32) define formative assessment as contributing to the learning process and also encouraging "loops of reflection and action". Formative tasks

provide scaffolding of knowledge, allowing the student to work towards the final goal which often culminates in a summative assessment.

A vital part of the scaffolding effect of formative assessments is feedback. Feedback provides the student with guidance and steers her in the right direction. Formative assessments without feedback serve the same purpose as a summative assessment in that the student receives a grade but has no guidance on how to correct the errors. Morgan, Dunn, O'Reilly, and Parry (2004), maintain that if a formative assessment is given at the end of the learning process students will most likely focus on the grade rather than the feedback, so it is essential that formative assessments run throughout the learning process if they are to form part of the learning process.

Summative assessments on the other hand occur at the end of a learning process. Typically much emphasis is placed on summative assessments because these count towards the final grading and form the mark that is reflected on the certification. It informs the student, the teacher and whoever is interested in the student's ability, as to the students' level of knowledge. The purpose of a summative assessment is to establish a grade and determine the student's level of knowledge and competence. The summative assessment is the culmination of all the learning that has taken place during a certain time period. Summative assessments generally do not include feedback as the purpose of a summative assessment is to measure learning at the end of a learning process. It serves as a means to measure the student's final ability. It is therefore a high stakes assessment and can cause enormous stress and anxiety amongst students (Ramsden, 2003, Knight & Yorke, 2003).

## **2.5. Modes of assessment in this study**

As previously explained, the computer assessments under consideration in this study are either automated or "manual". I will now describe each of these in more detail.

### **2.5.1. Manual method of assessment**

When conducting assessments in computer literacy, the traditional mode of assessment delivery has been paper based (manual testing). The nature of these assessments differs from many other assessments in that, whilst the questions are on paper, the tasks are completed on a computer. The tasks that the student completes on the computer constitute the “answer paper”. The teacher, or in the case of ICDL, the external test supervisor, is required to collect all data saved on disk. All manual assessments are administered by an external examiner who is appointed by the ICDL Foundation. Collecting the data on disk enables marking to be conducted off site.

The marking of these assessments are often long and tedious not to mention the cost of having an external examiner invigilate and mark the assessment. Technical problems could occur when the disk is faulty and data cannot be accessed from the disk. In such cases the student would be required to re-take the assessment at no charge. However there is a cost to the student in the form of effort and time. In an effort to provide a more reliable and convenient alternative, software companies have offered automated assessments, one of which is the focus in this study.

### **2.5.2. Automated Assessments**

There has been a growing interest in automated assessments especially in areas such as computer literacy and a number of software packages have been designed to meet the growing demands. There is however limited research on issues related to simulation (automated) versus real-time (manual) assessments.

Research by Dixie and Wesson (2001) considers the use of the ICDL Certification as a requirement for various academic programmes. The research addresses problems related to the certification matching the expected outcomes of university departments in which it would be implemented. Their concerns were related to the curriculum and that it should ensure the competency of graduates and be relevant to computerised tasks that students would perform in their future careers. The study does not consider the different prescribed modes



of assessment. Dixie and Wesson do however recommend that further research be conducted in “assessment mechanisms” (Dixie & Wesson 2001, p.9).

Studies by Bull (1999) outline issues concerned with automated assessments. Much of her research and findings explores the challenges associated with the use of technology in assessments. According to Bull (1999), the use of automated assessments is a “contentious” topic that requires further investigation. She states that the validity of the automated assessments can be brought into question. Pedagogy, she insists, must define automated assessments instead of technology defining the process of assessments (Bull, 1999, pp. 123-124). She contends that decisions regarding automated assessments are often made for pragmatic rather than educational reasons. She also expresses concern over the separation of the education process and the assessment process. The simulation assessments administered to students in this study are designed by the software company and approved by the ICDL Foundation. The International Hotel School and other institutions have no control in what is assessed or how the assessments are designed.

Research by Dowsing (1998) outlines some relevant concepts about the flexibility of technology in automated assessments. Dowsing provides an insight into how the technology itself can become the key focus and the role and purpose of assessments are overshadowed. Assessment software is often implemented due to economical constraints and high costs of using manual assessments. However this mode of assessment can compromise the assessment process, according to Dowsing (1998), in that the convenience of having assessment software can overshadow the purpose of assessment. Lazarinis (2006) draws out the silences related to simulated automated assessments. He maintains that when questions are not linked within the program they can create disorientation in assessments. Lazarinis suggests that discrete questions commonly used in automated assessment can atomize the learning process.

Lazarinis also raises the concern that in automated assessments, some questions are marked incorrect even if the answer provided is “partially correct”

(Lazarinis, 2006, p. 263). Automated assessments typically do not award method marks as the software can only mark “right” or “wrong answers”. The software is, as yet, generally not sophisticated enough to judge a student’s progress towards the desired answer.

In the automated assessment students often cannot see the results of their choice as would occur in a “live” scenario (Lazarinis, 2006, p. 263). In a “live” scenario for a computer literacy assessment for example, when a student selects a piece of text and increases the font size of this text, she is able to see the consequences of her actions on the screen immediately and determine whether to proceed or whether to rectify an error she can visibly identify that she has made. In the simulation assessment, students cannot see the results of the steps they have taken.

In automated assessments, students usually cannot make changes to their answers or revisit their answers once the answer is accepted (Lazarinis, 2006, p. 263). The software marks items as the student accepts her answers so the student may not change her answers. In a manual assessment, the assessor marks the end product so the student can redo questions as many times during the assessment process as she wishes, within the provided time.

The use of technology in assessment is seen as progressive and in keeping with the dynamic principles of the interpretive and constructive approaches of assessment. It is clear that automated assessments bring with them numerous advantages, particularly in respect to time and money. Furthermore, the use of automated assessment for measuring proficiency in a technical skill such as computer proficiency is likely to increase. However we must be cautious in how these automated assessments are designed and ensure that they cater for diverse approaches and encourage critical thinking as opposed to memorization of concepts.

## **Chapter Three: Research Methodology**

This chapter outlines the research approach used in this study and describes the steps followed to collect and interpret the data.

### **3. Key research question:**

What are the differences in students' responses to automated and manual assessment in terms of measuring student capability in a computer literacy programme?

#### **3.1. Research design and methodology**

A mixed mode research study was conducted using case study as the methodology, making use of two different methods to collect the data, observation and semi-structured interviews (Yin, 2003, p. 83). As this is a case study the findings cannot be broadly generalisable but may be of value in other contexts where automated or manual assessments are used. Soy (1997, p.1) states that, "Case studies emphasize detailed contextual analysis of a limited number of events or conditions and their relationships." In other words the contextual conditions are very important when considering the case and therefore the case is bounded by the context and might not be replicable in other contexts.

According to Yin (2003, p.1) "...case studies are the preferred strategy when "how" or "why" questions are being posed, when the investigator has little control over events, and when the focus is on a contemporary phenomenon within some real-life context." He defines case study research as "...an empirical inquiry that investigates a contemporary phenomenon within its real-life context, especially when the boundaries between phenomenon and context are not clearly evident." The context of this study relates well to a case study methodology in that the study focuses on a real life examination situation where many of the variables, such as the type of questions given, the student interpretation of examination questions and the multiple responses that students can produce, cannot be controlled. The sample comprised of eleven students taking both the manual and automated assessments of which only six were

interviewed. This study is therefore limited and unique in that the sample size is small and student interview data may not be replicable or generalisable. Punch (2005, p. 144) expands on case studies a little further by describing it as a strategy. He says "...the case study aims to understand the case in depth, and in its natural setting, recognizing its complexity and its context. It also has a holistic focus, aiming to preserve and understand the wholeness and unity of the case." In this case study, the focus was directed to the student experiences and their perceptions of the manual and automated assessments after they had taken these assessments. The study involved the students taking a manual and automated assessment in either Microsoft Word or Internet and Email.

According to Yin (2003, p. 83) in collecting data in case study research it is important to include multiple sources of data, a case study database and a chain of evidence. In this case study, observation and interviews were the two sources for collecting data. Common themes were extrapolated from the observations and the interviews.

## **3.2. Research process**

### **3.2.1. Data collection**

I collected my data from two sources in an effort to triangulate the findings. Babbie & Mouton (1998, p. 275) state "Triangulation is generally considered to be one of the best ways to enhance validity and reliability in qualitative research." The use of triangulation of observations of all eleven students who undertook both assessments, interviews with six students and a look at the scores for the assessments allowed for a fuller picture of the phenomena under study, the two forms of assessment.

I wanted to get information firstly about the assessments and how they were structured. As I am a test supervisor, I was able to observe the students taking their final assessments in different Modules. This formed the basis of my observation field notes. The main source of data however was semi-structured

interviews with students. After completing the manual and automated assessments, the students who agreed to participate, were interviewed.

I felt observations were important to allow me to see the experiences the students had in the two assessments so that I would be able to relate to students when in the interviews and could corroborate some of what they were saying through my own observations and experience.

For the observations during the assessments, I was able to watch the students taking their assessments and made some notes pertaining to the difficulties students were experiencing. I used a schedule of observation items (See Appendix A). However I found that this was too restrictive as I came across a variety of different items that were of interest which did not fit neatly into my schedule. I made notes during the assessments but was aware that students might feel aware of my presence if I watched individuals for too long, so I would walk around viewing different student screens. It is common practice for a test supervisor to walk around the room and observe the students. The students were comfortable with me watching for a few minutes when completing the tasks but then I needed to move on to avoid distracting the student. This made collecting specific information difficult especially related to documenting their difficulties with certain tasks. I therefore used extensive notes written up both during and after observing the assessments rather than sticking rigidly with the observation schedule I had devised.

The field notes of observations of students' assessments were extrapolated and tabulated into common themes using Microsoft Excel. These were then aligned to the themes from the interviews. There were some common themes that emerged out of my observations and the students' interviews. The issues that arose during the observation were used as a form of triangulation to support the data for the themes that emerged in the interviews. The main themes that emerged from these different data sources provided a better understanding of the assessment process.

I also wanted to compare the students' responses to the automated assessment and a manual assessment. However the International Hotel School does not use manual assessments for the ICDL Courses. Pitcher, Goldfinch and Beevers (2002, p.167) maintain,

“An important issue with any computer-based test is to discover how it compares with a conventional paper-based test in the perception of students.”

I have experience of the manual assessment formats from past use of this mode of assessment. Using the ICDL sample assessments and my observations of the automated assessments for two Modules, MS Word and Internet and Email, I was able to develop a similar standard manual assessment for these Modules. The manual assessment questions were kept similar to the automated assessment so that students were able to relate to both assessments and be able relay comparative responses. The automated assessments are drawn up from a set bank of assessment questions from the assessment software supplier. These questions do not change unless a new version of the assessments is released. The computer merely changes the order of the questions and generates different assessments. It was therefore not difficult to create a similar set of questions, demanding that students perform similar tasks. One must also consider that a direct comparison between the two assessments was not the focus in this study but rather as the key research question indicates, the focus was on students' responses to these two types of assessment.

In order to select the students for the assessments, I asked a few classes for volunteers. I explained that I was conducting research about the computer literacy programme and was interested to hear what they thought of the assessment. I explained that I required their permission to use their responses from the interviews in my research findings and that I would use pseudonyms instead of their real names. I described the process of the assessments and highlighted that their marks would be confidential. I made it clear that only the official automated assessment mark would be used as their final mark and the additional assessment was part of the research. I explained that at any time if

they felt uncomfortable and wished to withdraw from the study, they could do so without prejudice. Some students volunteered and signed the consent form (See Appendix B) but then on the day opted not to do the interview or the manual assessment. This was probably because on completing the required automated assessment they could go home for the day as opposed to sitting an additional exam and then undertaking an interview. In my brief to the students, I asked students to volunteer to take the additional manual assessment and told them that I would select who could be interviewed as I wanted a cross section of students with different levels of achievement and backgrounds. Six students were selected for the interviews.

A pre-scheduled assessment date was set for students to complete their ICDL assessment. In order to comply with the ICDL examination rules and conduct the research assessment, students were asked to take their ICDL assessment first so as not to infringe on the rules of the ICDL Certification or advantage the students in the official assessment. Immediately thereafter these students were asked to complete the manual assessment. Eleven students completed the automated assessment and the manual assessment. The assessments took forty-five minutes each. There were two sessions. The first group of five students completed the MS Word Module assessment in the early morning, whilst the second group of six students completed the Internet and Email Module assessment in the afternoon. Those students who completed the MS Word assessment were able to complete the automated assessment in the morning and then the manual assessment, developed for this study, thereafter. They did not seem too perturbed by having to do two assessments and all readily agreed. The second group completed their automated assessment on Internet and email in the afternoon. Once they had completed the automated assessment, they were asked to take the manual Internet and Email assessment that was developed for this study. These students however seemed tired at the end of the second assessment and did mention it was a little long especially as they completed both the automated and manual assessments in the afternoon. Nevertheless both assessments were completed in the required time.

A limiting factor could be that the students were fatigued in the second assessment especially those who had to sit the afternoon session. I wanted students to do the manual assessment immediately after the automated so that there was no extra time given to prepare for the manual assessment. I did not want to compromise the official ICDL assessment and for these ethical reasons, I selected to have the student do the research manual assessment immediately after the official ICDL assessment.

The results of both assessments were then compared using Microsoft Excel. The comparison highlighted some of the differences of the two assessments, particularly the differences in scores. As these scores were a small sample size any analysis of the test scores would be insufficient to make any valid conclusions and was therefore not considered as part of the data. The intention of this study is not to make a direct comparison between the assessments as the two assessments were not identical. The focus was on the observations and interviews in order to answer the research question and not on any quantitative analysis of marks.

Soon after these assessments were conducted, six students were interviewed. Two top scoring students, two average scoring students and two low scoring students were interviewed using semi-structured interview questions. The scores (See Appendix C) used for this interview selection were the automatically generated automated assessment scores as I had not marked the manual assessments at that stage. The selection of students across the mark spectrum was simply to ensure depth of perspectives obtained through the interviews. There was also cross section of different races and genders. The group was made up of two Black students, one Coloured student, two White students and one Indian student. There were two males and four females. It was a good representation of the class demographics.

I used semi-structured interviews which enabled me to get different perspectives from the different students. The aim in the design of the interview questions was to elicit as much free conversation as possible in order to acquire “rich and descriptive data” (Nieuwenhuis, 2007, p. 87). I developed a set of



questions (See Appendix D) as something to work from. Although these were structured questions, they were only used as starting points for conversation and from there new questions came to the fore and where necessary I was able to probe for explanations of issues of interest related to the assessments the students had undertaken. According to Cohen, Manion and Morrison (2007, p. 351), “less formal interviews” allow the interviewer to change the sequence of the questions, change the words and the interviewer is also able to elaborate and explain the questions or add to the questions. I allowed the students to speak freely about the topic. I thought that using interviews rather than questionnaires would allow me to gain a deeper understanding of the issues in the study and would provide a more natural way of communicating with the participants. Usually one is able to develop a rapport with participants and really get to know what they think (Kelly, 2006, p. 297).

I did not anticipate that some students would be nervous and required reassurance and coaxing for more information. As much as I tried to make these students feel comfortable, I acknowledge that it may have been a little intimidating being interviewed by the school principal. This is also a novel situation, where the principal actually wanted to hear how the students felt about their assessments and understandably some students may have been a bit guarded.

In some instances the students went off the subject. I found this difficult to handle as I did not want to offend the student and give him/her the impression that I was not prepared to listen to their issues. I eventually managed to steer the conversations back to the research topic. One student wanted to use the interviews as a platform to air her dissatisfaction about other subject assessments. Whilst these were challenges that I had to attend to, I found overall that the student interviews enabled me to get evidence of specific examples pertaining to the differences between the two types of assessments. It was also clear that the students enjoyed having a platform through which to share their perceptions of how they were assessed and what their concerns were.

In the interviews, I used open ended questions thinking that the participants would be forced to elaborate on their ideas and thoughts. In one interview the student was so confused and unsure that she kept saying “I don’t know”. In which case I rephrased questions and tried to motivate her to think about the questions I was posing without giving her any particular direction. This provided more meaningful data than just “Yes/No” or “I don’t know” responses (Cohen, Manion, & Morrison, 2007, p. 357). There was opportunity to clarify misunderstandings of questions and answers (Cohen, Manion, & Morrison, 2007, p. 352). I did also find that at times I had to gently interrupt the student to clarify the point she was making.

I recorded all interviews using a digital recorder and transcribed them in full and verbatim. According to Kelly (2006, p.298), it is advantageous to tape record the interview as it allows you to capture the full account without being distracted with note-taking. All the interviews were done behind closed doors so that we were not interrupted or distracted. I felt it important to do my own transcriptions so that I could immerse myself in the data. It was my intention to send the transcriptions back to the participants for checking and to ensure that I had been faithful to the process. However the students did not want to spend the time checking my transcriptions as they were getting ready to leave for their vacation, so none of the students read the transcriptions.

Most of the interviews took between fifteen to twenty minutes. In one particular interview I had not turned on the recorder and discovered only after the interview that it had not recorded the interview. The student seeing the horror on my face very kindly said she would go through the interview questions again and gave me a shorter version of what she had originally said so that I could have it on tape. Whilst I got the essence of what she originally said, I felt I may have missed some poignant nuances from her initial interview. That taught me a lesson about checking the equipment before starting an interview.

The units of analysis were derived from the responses to the questions and the observations of student responses I had noted during the assessments. Using Nvivo (a research analysis software application) I was able to categorise the

data into a range of common themes that came from the student responses and my observations. The most common themes formed the basis for the findings.

### **3.3. Ethical Considerations in the Research**

Some of the ethical issues I needed to consider pertained to consent. There are four sets of stakeholders who needed to be consulted with regards to consent to use their names or in the case of students to take part in the study and use the data for future publications.

Firstly I sought consent from the institution for which I work and where the study was undertaken. This consent was granted by the director of the International Hotel School with no conditions attached (See Appendix E).

The second consent was sought from the specific software company that developed the automated assessment considered in this study. From a publicity point of view, I was aware that such research undertakings could affect the company's public image. The company agreed to give consent to use their name in this research provided the software was not compared to any other software. This was never my intention as I believe that the automated software is fundamentally a good idea but that all assessment requires research and ongoing improvement. The intention was never to compare products. It is hoped that the findings of this study will provide some background into students' experiences and will encourage further development for the benefit of all students. However, after some deliberation, I have decided not use the name of the software company in this study. The findings of this study relate to the use of automated assessment for computer literacy generally and do not relate to aspects of this company's software in particular. It is hoped that the conclusions and recommendations arising from this study be taken into consideration more broadly than just the developers of one of the many automated assessments, all of which are quite similar. The almost identical nature of the automated assessment software approved by the ICDL Foundation means that the findings of this study could be taken into account by the software developers of any of these programs.

Consent was also sought from the ICDL Foundation in South Africa as the ICDL Foundation holds the copyrights to the ICDL name (See Appendix F). Consent was granted without any restrictions to the research. My belief in the success of the programme has prompted me to investigate the challenges that occur within it in an effort to raise awareness and ultimately to contribute to the further improvement of this internationally successful certification. I believe this study will provide rich and informative insight for the ICDL Programme which I hope will inform and enrich future assessment practices in other institutions.

Lastly, informed consent was sought from the students who took part in the study. The students were consenting to undertaking two assessments for a Module. One assessment was the official ICDL automated assessment for the Module which they would have ordinarily taken and the other was the corresponding manual assessment that I developed. They were informed that they would not be given the results for the manual assessment and that the automated assessment result was the official result.

Students also needed to agree to being interviewed if they were chosen. Students were informed that the interviews would take approximately twenty minutes and would be individually recorded interviews. All information would be confidential and student names would be kept anonymous. All recorded data would be stored in a locked facility. It was explained that for audit purposes the recorded data would be kept at the Centre for Higher Education Studies for a period of five years, after which it would be destroyed. Consent was received from all students who took part in the research. A copy of the informed consent letter is included as Appendix B.

## Chapter Four - Research Findings

### 4. Introduction

In this chapter common themes arising from the data are discussed. No statistical comparison of the results of the two types of assessment is possible as only eleven students completed both assessments<sup>3</sup>. The very small sample size prevents any kind of statistical analysis and certainly precludes any conclusions being reached in this way. It simply raises concerns which can be considered in more depth in the light of the observation and interview data. Out of the eleven students who completed both assessments only six students elected to be interviewed. As discussed in the previous chapter the findings arise from both observations and interviews.

#### 4.1. Flexibility and Authenticity

In chapter two, I explained the need for flexibility and authenticity for good assessment practices (refer to Chapter Two, Section 2.2.3 and Section 2.5.2). Piaget's Theory that two people could arrive at the same outcomes through different processes (Underhill 2006) supports the notion that any automated assessment should allow for different approaches to the target solution. This follows on with the idea that simulation assessments should allow for a variety of different pathways to answering questions in the computer literacy assessments provided such pathways are available in the authentic world of computer use (as referred to Chapter Two, Section 2.2.3 and Section 2.3). To allow this freedom, automated assessment must then provide students with an environment that is realistic and authentic for fair assessment to take place.

Assessment should be authentic, in that it promotes the practice of directly assessing students on credible intellectual tasks...authentic assessment tasks help students to focus on

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<sup>3</sup> A descriptive comparison of the two sets of assessment scores is provided in Appendix C for background purposes only and no conclusions are reached in this study on the basis of the comparison of these marks

demonstrating their ability to discern critical knowledge and to act effectively in situations that make sense in their future professional contexts (Luckett and Sayigh, 2004, p. 123).

Assessment should provide students with opportunities to show competence and provide a flexible assessment environment with as many choices as possible to answer questions (Dowsing, 1998, p. 4). Assessment must meet the intended outcomes, be reliable and measure students' performance accurately. In the data it was quite evident that students felt they were restricted from doing certain things that they would normally be able to do in the application. The following quote from Bheki illustrates this point:

“Well you can use some of them [shortcut options] but there's some of them that is like for example if you right click on the mouse it gives you the main menu so normally what happens is that you right click it gives you the menu and then it becomes so much simpler, ... it's simpler when you working with Word than when you with the actual assessment [automated].”

One of the issues that were highlighted during the observations was that some of the students found the technical computer language used in the assessments difficult to comprehend. Such things as “input” and “output” seemed to prevent students from understanding certain questions and completing certain tasks. As mentioned in section 1.1 the inequality in access to and use of computer based technology impacts on the students' level of computer literacy and understanding of computer concepts (Hawkins and Paris, 1997) (as referred to in Chapter One, Section 1.1).

The issue of authenticity within assessments was a key theme arising in the data. In reviewing assessment practices, researchers such as Heywood (2000); Boud and Falchikov (2007) and Race (2005), have emphasized the importance of authentic assessment in the learning and development of student abilities. So what do we mean when we talk about an assessment being authentic? In designing assessments we must ask, what we hope to gain in the end. Do we

want to assess concepts and skills that students are expected to perform when they are eventually employed? Do our assessments allow students to demonstrate these abilities at an acceptable standard?

The increasing call for graduates with more relevant industry related knowledge has resulted in a change in the educational goals in higher education (as referred to in Chapter Two, Section 1.5). More emphasis has been placed on equipping graduates with the skills and knowledge that are required in professional practice. This change has resulted in a greater emphasis on assessing students in authentic real life contexts (Ashcroft & Palacio, 1996, Gipps, 1996, Lockett & Sutherland, 2000). This focus on student application of knowledge has influenced the way assessments are used. There is now a greater call for assessments that are authentic and that allow for different ways of expressing knowledge. Ultimately, assessments must encompass and relate to real life situations for students to demonstrate the application of knowledge, skills and ideas (Schwartz & Webb, 2002).

Gipps (1994, p.155) maintains the following about authentic assessment,

The aim with authentic assessment is first to decide what the actual performances are that we want students to be good at, then to design assessments to reflect those performances. Assessment here is seen as a part of students' regular work activity rather than a special one-off prepared for activity.

One of the primary reasons for using authentic assessment is its "construct validity", that is the authentic assessment's ability to measure what it is meant to measure (Gipps, 1994, Erwin, 1995). In the case of a computer literacy course, the expected outcomes are clearly defined and the skills being developed are of a highly practical nature so one would expect that the assessments would measure these outcomes, that is one would expect high construct validity.

Assessment tasks that are authentic require more than just a standard response. Authentic assessments often require the student to problem solve

and think about solutions to the problem as is the requirement in the work place rather than simply to rely on recall of steps to be taken. So an authentic assessment is said to be a replication of the real life situation whereby the assessment task mirrors real life practices that are expected in the workplace. Researchers maintain that authentic assessments place an emphasis on the value of realistic tasks and the context (Havnes & McDowell, 2008). As a result of this, authentic assessments are considered to be more valid in assessing student competency in comparison to traditional assessments (Gulikers, Bastiaens & Kirschner, 2008)

Another reason for using authentic assessment is the impact it has on student learning. Students tend to use deeper approaches in preparing for authentic assessments because they recognize the importance of the application of ideas for their future careers (Schwartz & Webb, 2002; Brown, Bull, & Pendlebury, 1997). According to James, McInnes and Devlin (2002), students value assessments that are applicable to real life situations and that are related to the work they will later perform in work situations. They are more committed to study for assessments that involve authentic tasks as opposed to superficial and irrelevant tasks. Students are more interested in authentic assessment because the task is relevant and students are able to relate to it (Gibbs & Simpson, 2004). Authentic assessments require the student to perform the whole competency which incorporates knowledge, skills and attitudes which give meaning to the task (Gipps, 1994; Boud, 1995).

According to Brown (2004, p.83) assessments should not only measure recall but allow the students to show what they have learned and that they can perform these tasks in real life situations. She maintains that it is better to include tasks that are authentic than to include tasks that are easy to assess. Brown argues that it is more meaningful to assess a student's ability to perform a task than to describe it. This issue of authenticity in assessment was a key finding of this study and arose as a major theme in both the observations and interviews.



Authenticity in the case of the assessments observed in this study can be related to the extent to which the tasks the students undertook during the assessment align to those which would be expected of them in the workplace. The following extract from Missy's<sup>4</sup> interview describes a student's perspective of an authentic assessment:

“You do need to learn how to do it like the exercise [manual assessment] we did, you need to know how to do it manually as opposed to just clicking a button and having a choice given to you because then it makes you, it does make you confident and it makes you knowledgeable about whatever you are doing.”

In a number of the interviews, the interviewees talked about the ease of the automated assessment and the fact that they had to answer questions related to discrete tasks which required one click as opposed to actually undertaking the task as they would need to do when working in the authentic environment of various software programs such as MS Word, MS Excel etc. In my observations and discussions with the interviewees, I noted that the automated assessments merely asked students to identify the buttons or menu items they would use as opposed to actually being required to complete a task. Missy explains:

“The first assessment [automated assessment] you just had to click... it's kind of like playing the lotto, you had to click and make sure it's the right one ... [its] just technical, like technology is very easy... you just click and it's fine ...”

It was clear from the observations and from the interviews that even if students didn't know a particular method of completing the task, they would simply guess what the option was. Allow me to elaborate further here with a simple example. One of the learning outcomes of the MS Word Module is that students must be

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<sup>4</sup> For the ethical reasons discussed in chapter three, all student names have been replaced by pseudonyms.

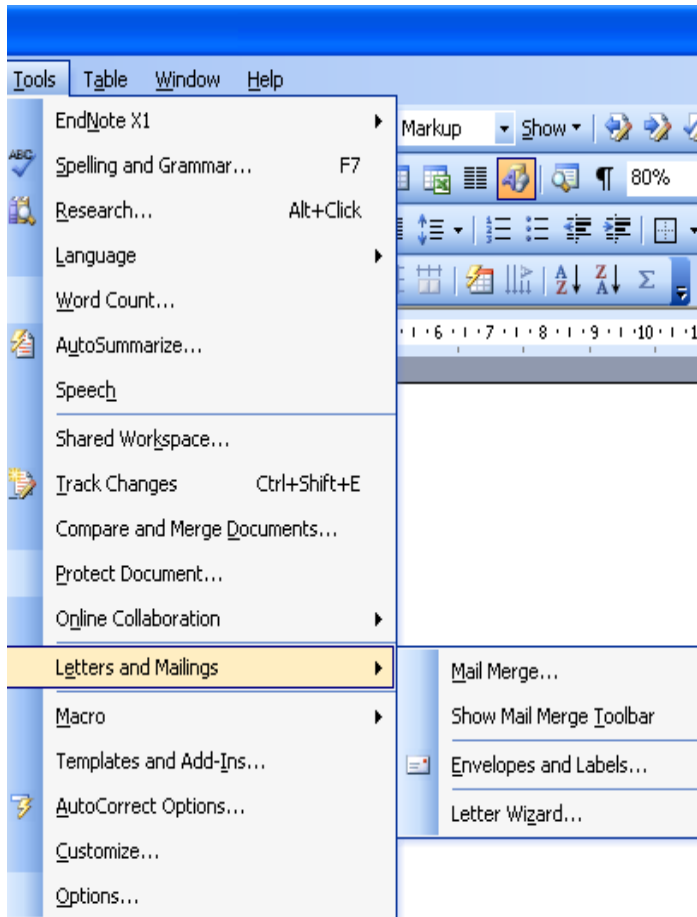
able to save a file. If you consider an authentic situation, there may be different contexts when saving a file which will require different actions. For example, the very first time you save a file, you could click on the “Save” button on the toolbar or you could click on the “File” menu bar and choose “Save” or “Save As” or you could hold the “CTRL” key on the keyboard while pressing the “S” key on the keyboard. All three of these methods result in MS Word producing a “Save As” dialog box (window). At this point the user must know that the system requires a file name to be typed in a specific box (file name box) and that you must also choose an appropriate folder where you want to save the document within a particular drive such as C drive or D drive. If you wanted to change the format of the document so that it can be read by another software program, then you also need to know how to change the file type within the save menu. Having completed those tasks, you would be required to click the save button in the dialog box to complete the saving procedure. Any changes made to the document thereafter, would need to be updated in the existing saved document. This would be done by clicking the “Save” button on the toolbar or using the “Save” menu option or by pressing the “CTRL” and “S” buttons on the keyboard.

In the automated assessment, where the task of saving a file is being assessed, students complete only one step of this procedure. The automated assessment software loads a prepared document for the student and the assessment question requests the student to “Save a file using the appropriate menu option”. In this case, the simulation software prevents the student from using alternate methods of completing the task. The student who is unfamiliar with the menus can browse and find the “Save” or “Save as” menu option. On clicking this menu option the software confirms that the user has selected “Save” or “Save As” by asking the user to confirm her selection. The student then clicks on the “OK” button and the software proceeds to the next question. So in testing, the discrete task of clicking on the “Save” menu, the assumption is that the student is able to perform the full procedure of saving a document. In the manual assessment, the student can select any of the alternative methods of saving a document and needs to complete the entire process and actually save the document onto a disk. Bheki explains his experience of another question which illustrates this point.

“The difference with the second assessment was that they asked for a whole lot more than in the first assessment cos the first assessment it’s a question and then you just click and then you on [the next question] with the second assessment the question need you to do things like with the mail merging you have to look for things and you merge it together and [look] for the picture one, you had to look for the picture put it in there look for indentations and it seemed longer because you had to do more.”

Other examples of discrete assessment tasks are evident throughout the data. Students were articulate in explaining that the automated assessment does not assess their ability to complete a task but merely expects them to identify menus, buttons or answer multiple choice questions related to how one would complete that task if one had to do so. In the following extract from the interview with Missy, she explains her experience of answering a mail merge question for the Microsoft Word assessment. It must be noted that in an authentic environment in order to complete a mail merge task, the user will have to follow a series of menu options. At this point I must emphasize the complexity of the mail merge feature. Figure 1 shows an example of the mail merge menu students will encounter in the automated assessment. Figure 2 shows the menu option that is displayed once the “Mail Merge” menu option is selected and allows the student to complete the mail merge task.

**Figure 1: Screen shot of the menu options students would encounter in the automated assessment**



**Figure 2: Screenshot of menu options not available to students**

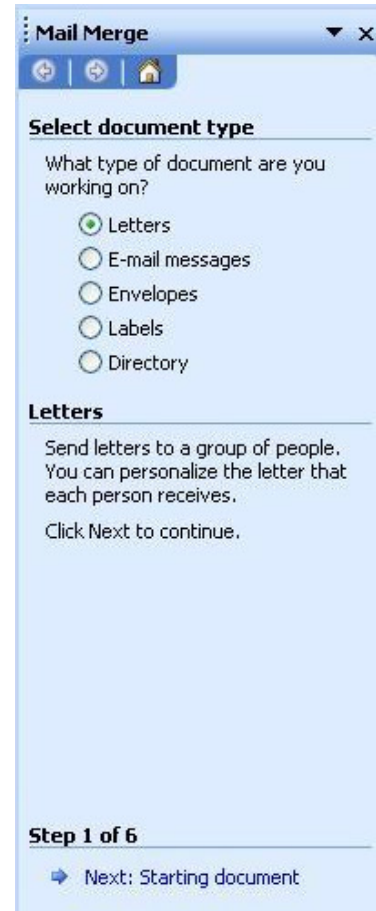


Figure 2 illustrates the menu option that is omitted in the assessment. Once the student correctly selects the Mail Merge menu in Figure 1, the software marks her competent in mail merge. You will note that Figure 2, a screenshot from the actual program, indicates that there are six steps to be undertaken to complete the mail merge task. The merge feature allows the user to take a standard document and, through a series of steps, merge a list of people's details into the document to produce a personalized document for each person. In essence the user is able to integrate two separate documents, thereby creating a third merged document. In real life situations, this feature is used to send out mail shot letters to existing clients and requires the user to follow quite a detailed process. Missy discusses the difference between the two assessments regarding the task of undertaking a mail merge.

“I think ok the first assessment [automated assessment] it was just click for mail merge so you could pretty much guess [which is the mail merge option] ... [In the] second assessment [manual assessment] you actually had to find mail merge, you had to find the data source and I don't actually understand all that so it was difficult for me to understand to apply it or to put onto the computer.” (Missy)

If one considers the example, Missy says that in the automated assessment she was not required to actually work through a mail merge question from beginning to end. All she was required to do was select a menu item and based on what she selected, the system would score her for this section.

This particular example illustrates how the automated assessment at times did not assess students' ability to perform the task as they would need to do in a real life situation. It merely allows the student to choose the appropriate menu option. As Missy explains she doesn't really understand the mail merge and found it difficult to complete the manual assessment as she had to perform all parts of the task as she would be required to do in a work situation. According to Baron and Bochee (1995 cited in Gravett and Geyser 2004), authentic assessments include multifaceted tasks and do not focus on bits of tasks but rather the student is required to perform real-life tasks within specific contexts.

It is also vitally important that if students are to be employed, they must know how to do the job practically. When students can relate the assessment tasks to the workplace, as is readily possible in a subject such as computer literacy, there is more meaning and understanding for designing a task in the assessment. The following interview comment from Brian, illustrates how the automated assessment does not meet this requirement of relevancy to the authentic situations.

“If you[re] going to get a mark you might as well get a mark that used to make sure that you know what's going on instead of an easier exam and just passing but not knowing the entire program as yet.”  
(Brian)

In my observation of students taking the assessment, I was able to view first hand, some of the issues that students later brought up in the interviews. Whilst the examples may have been different, the same themes seem to appear throughout my observation of the assessment process. In further discussions with the interviewees, it became apparent that students struggle with the automated assessment restrictions in the use of the software being assessed. One of the themes that arose from the observations was the issue of flexibility of the assessment simulation software. Harvey and Mogy (1999, p.14) maintain that using technology to support assessments requires flexibility of assessment design and implementation of an assessment plan. Students were observed trying different methods to achieve the desired outcomes and only certain options were available. They were observed clicking on particular menus or using particular key combinations which would achieve the desired result in an authentic situation but which were not “active” in the simulation software of the assessment. In order to control tasks and the working environment the software retards the student’s use of the application.

Much of the debate on what constitutes good assessment revolves around issues of fairness. According to Brown, Bull and Pendlebury (1997, p. 251), “Fairness implies equality of opportunity and treatment.” Authentic assessment is about offering students a variety of options to demonstrate their abilities and therefore good authentic assessments include fairness in allowing the student to perform to the best of their ability without being hindered. In the real world they would not have these particular restrictions when working with the software applications. Gipps (1994, p.168) argues that the “fairness aspect of authenticity” implies that all parties experience fairness in the assessment process and not just the test developer. The data suggests that the automated assessment falls short of being fair and authentic. For example Amy in her interview describes the automated MS Word assessment as difficult because it restricted her from using certain shortcut options that she had learnt:

“It was a bit difficult because I didn’t have many options to choose from. Like finding things I had to do....Like being able to edit

words, like changing the superscript of a word, we didn't have much options to like look through to try and find it in the menu."  
(Amy)

In the above example, if Amy was using Microsoft Word in the workplace she would be able to work through the menus, find the superscript option and complete the task. If she knew a shortcut option then she would be able to use it. As a result of the restrictions in the simulated software of the automated assessment, she had no idea if the option she chose was the correct menu because the assessment asks the student to select the menu option in which superscript can be found without allowing the user to see the menu option. The student must memorize where the option is. If the student hasn't memorized where the menu items are then the chances of choosing the correct option are slim. In the authentic environment, you don't have to remember every menu. You can click and browse through the menus until you find the required item.

During my observations of a Microsoft Windows assessment, a student attempting to change the language settings was unable to access the menu using the right click option. There were a number of other instances where this facility was not available, although the "right click" is used extensively to open menus in a real world setting.

Another student, Melanie described her experience of answering the question on "saving a file" in the automated assessment. She maintained that she wasn't able to look further beyond the save option.

"...It doesn't give you another option so that you can see if you made a correct choice. It gives you that first one [menu option] and at the end of it you don't really know." (Melanie)

Melanie did not know whether she had performed the task correctly as the response of the simulated system was different to what happens in saving a document in an authentic situation. In my observation of the question on "Save a file" the student had to know where the menu was. However the software doesn't allow the user to get to the point of saving the file and giving it a proper

name. There is no assessment of other technical issues related to saving a file such as that she can't use certain symbols in her filename or that she understands how to choose the correct drive and folder as well as what file format to save the document in. These are aspects of saving that are imperative for students to know. The automated system does not test this ability, while the manual process requires it. Students don't get to complete the task and the automated system does not provide feedback allowing the student to check that she has made the correct choices (as referred to in Chapter Two, Section 2.5.2). In the authentic environment, the software application shows you the filename on the title bar to confirm you have saved the document and every time you update the document it provides an indication on the bottom of the screen that it is saving. These visual cues are absent from the simulated environment of the automated assessment, leaving the user in the dark.

In some questions students are asked to select the correct shortcut icon on the screen. The system does not confirm what item the student has selected as would occur in the real software environment. For example in the authentic software environment, when you click on the bold button, not only does the text in the document become bold but also the button on the toolbar changes colour (See Figure 3 and 4 below). In a real setting, users would be able to use these visual cues to confirm a completed task.

**Figure 3 : Inactive toolbar button Bold Button Off**



**Figure 4 : Active toolbar button Bold button on and text is bold.**



In another example, I observed in the assessment sessions that students had great difficulty in one question where they have to adjust the row heights of a cell in Microsoft Excel 2003. This process usually requires the user to move the mouse pointer until it changes to a double arrow indicating the mouse is in the correct position for the user to complete the task (See Figure 5).



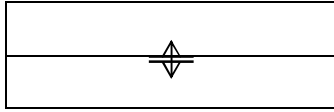


Figure 5: Row Adjustment arrow for height adjustment in MS Excel 2003

The user must then perform the click and drag motion to adjust the cell height. This is absent in the automated assessment. I observed students struggling to find the right position over the line, sometimes spending a good two to three minutes on a task that takes less than minute to do. This feature does not appear in the automated assessment resulting in students guessing where they can click and drag the line to make the adjustment. Time is wasted and confusion reigns as student become frustrated with the assessment task and they are left with no idea whether they were successful in that task or not.

In the automated assessment these functions are disabled as the software uses simulation of the actual application software being assessed. In the real software environment, when the user hovers the mouse over any button a message box appears alongside the button indicating what button you are pointing to. The simulation software does not perform this action which may lead students to point the mouse inaccurately, and inadvertently choose the incorrect button. When considering these examples one has to pose the question of whether the automated assessment allows for consistency. Would the same student the next time, click in the same area to generate the same response and does the automated assessment actually interpret the responses correctly? As described in section 2.5.2 Lazarinis makes this criticism.

## **4.2. Validity**

Another key theme which seems to arise throughout the interviews with the students was the issue of validity. Erwin (1995) defines validity as the credibility of the assessment. Validity relates to fitness for purpose and determines the worth of assessment in measuring and making judgments about students' abilities, knowledge and understanding of the specified outcomes. When considering an assessment, we want to know that the assessment is measuring the stated content of the program and that what students experienced in the teaching and learning process is really what is assessed. Brown (2004) affirms

that an assessment is valid if it aims to assess what was planned in the learning objectives.

Students in this study expressed a clear view that the automated assessment is not really assessing their ability.

“Cos if you going to get a mark you might as well get a mark that used to make sure that you know what’s going on instead of an easier exam and just passing but not knowing the entire program as yet.” (Brian)

“It doesn’t really test our ability.” (Adrian)

“No, it’s not reaching the full potential. It’s just skimming through what you should know and it’s not going in depth of what Word is actually about.” (Bheki)

In Adrian’s interview it was evident she enjoyed the ease of use of the automated assessment and was quite happy that the automated assessment did not expect her to go through all the steps required to accomplish the finished product. The following extract from her interview illustrates the fact that students at times may enjoy an easy assessment, in spite of awareness that it does not test their ability.

“...in the automated one it might go “File” and you click on one with an extra arrow on it but it just gives you that option. Like you don’t have to go further...Yes.... It gives you the answer. It kinda says “Ok, you’re correct”.”

Whilst the automated assessment does not provide feedback, in this comment Adrian assumes that the automated assessment accepts her choice as correct because the software does not take her any further in the task and does not provide a negative response or ask for an alternative method. It simply takes

her to the next question. This lack of response from the software is understood to suggest that all is ok and the task is completed correctly.

Adrian is content that the assessment allows her to pass and get a good mark without having to complete the whole task. However she does indicate problems with the validity of the assessment. Adrian indicates that the assessment is invalid because it makes the assumption that the student is competent in performing the task successfully regardless of the fact that the student hasn't actually performed the whole task. In other words it is not assessing what it was designed to assess (as discussed in Chapter Two, in sections 2.3 and 2.5.2). The learning objectives of the course and the assessment tasks are not aligned so that we can say with a certain level of confidence that the student is competent in performing tasks and meets the learning objectives (Morgan, Dunn, O'Reilly, & Parry, 2004). Almost all the interviewees felt that the assessment was not assessing what they had learnt and further did not measure their level of competence accurately. According to Brian, what they have learnt is not what is being assessed. Some concepts have been excluded from the automated assessment. He says,

“... we learn it and we don't actually use it in the assessment so might as well use what you learn and then that way when you doing your own assignments you know how to use it.” (Brian)

Melanie explains her experience,

[With reference to the automated assessment]...”because some of the questions because they're tricky to answer. Maybe if you'd ask me manually, if you'd ask me like the proper question I probably could have given you an answer.” (Melanie)

In this case, it is clear that Melanie feels she could do better had she been given the manual option. These examples illustrate how the automated system seems to have problems of validity in that it does not assess the student's true abilities because it has restrictions. This clearly creates a problem in assessing all students' ability to perform tasks.

### **4.3. Reliability**

Another theme which has appeared in the data is reliability. Gipps (1994, p.67) maintains that for assessments to be reliable they must consistently measure the ability it is designed to assess. She states, "The underlying reliability question is: would an assessment produce the same or similar score on two occasions?" Reliability therefore is about achieving the same results at different times. It is about consistency of the assessment and that the same standard of assessment is applied to all students.

When we consider standardization, Gipps (1994) maintains that assessments must be administered and marked in the same way for all students. This means that the assessment is conducted under controlled circumstances. The automated assessment includes standardized simulated "application" type questions and a considerable number of multiple choice type questions. Multiple choice questions are a form of standardized type questions where the assessment tests recall type questions (as referred to in Chapter Two, Section 2.1.2). Ramsden (2003, p 185) states, "Tests of simple recall are usually highly reliable." This is one of the major benefits of using automated testing software as it consistently marks in the same manner and there is complete objectivity in the marking. The automated assessment is technically structured to maintain control of the software environment. This means that students cannot manipulate the system to gain assistance while taking the assessment. Students may not operate any other software or functions whilst doing the assessment and in this way the software maintains control of the functionality of the environment. So this makes the automated assessment highly reliable.

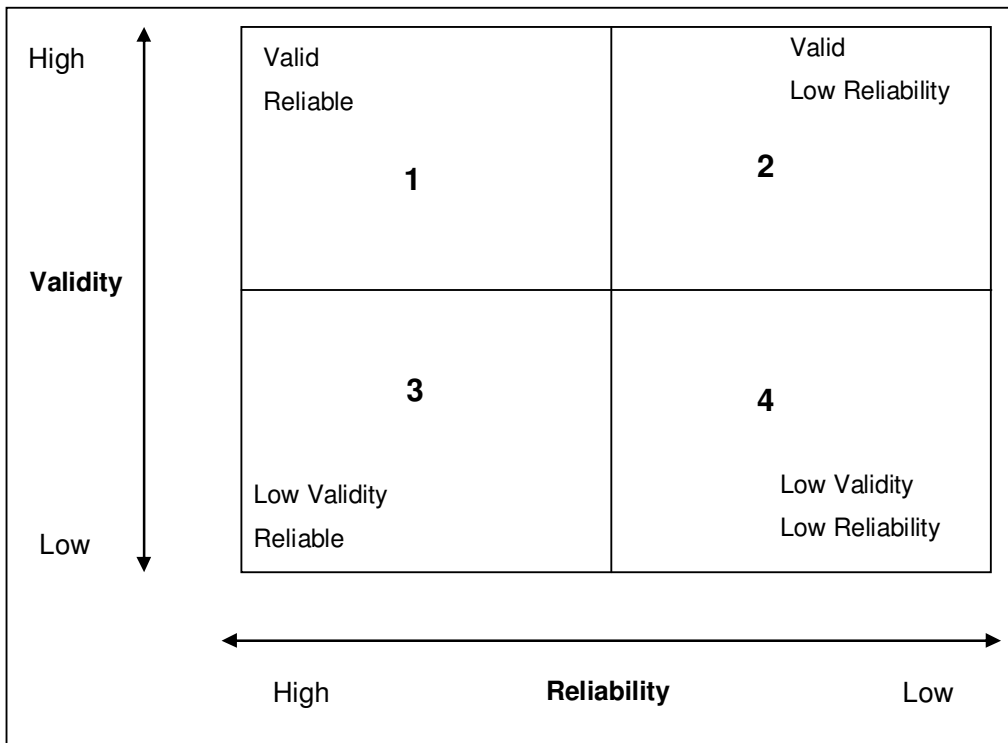
Reliability may well be easier to achieve in assessing computer literacy than for many other subjects in higher education because of the technical skills type of knowledge which is required. However there is the potential for manual assessments to be less reliable than automated ones. There is less control of the environment and so it can be unclear how students achieved the responses they give. There is also scope for some lack of reliability in the marking in that assessors may provide partial marks for some aspects or not. There is also the

issue that automated assessments are not vulnerable to human error in the same way that manual assessments are. Missy's explanation of her concerns illustrates this issue:

“...[In the second assessment] you have to make sure you know it [apply the features] so that the person who's going to get the assessment will be able to mark you correctly.”

Whilst the automated assessment attempts to provide real life scenarios, the quest for reliability and consistency can result in it falling short in validity and authenticity. This tension between the need for reliability and validity has been debated by educational researchers. Schwartz and Webb (2002) maintain that while a highly controlled assessment task will generate more consistent and reliable measurement, the greater the control in the assessment task the less real it becomes and weakens the level of validity of the assessment. Brown and Knight (1994) maintain that reliability requires standardization of the assessment situation thereby controlling the assessment process. Validity on the other hand requires assessments to reflect the authentic situation to ensure the assessment tests as close to the real world as possible and assesses what it was intended to assess.

Luckett and Sutherland (2000, p.106) recommend a move from assessment as a measurement tool, to more “interpretative or judicial models”. They suggest that if validity is the focus, then students should be given authentic tasks that apply to the real world. Brown (2004, p.83) maintains that if we want graduates to be effective in the work-place, assessments must take a “practice-orientated” format. Luckett and Sutherland offer a validity-reliability matrix suggesting that there are four combinations of validity and reliability.



( Lockett and Sutherland 2000, p.108)

**Figure 6: Reliability and Validity Matrix**

In reference to Figure 6, Lockett and Sutherland maintain that multiple choice type questions fit into category 3 (low validity but high on reliability). The aim would be to use assessment practices that match category 1 –both highly valid and highly reliable. In order to achieve this they suggest the use of varied types of assessments as a form of triangulation. A “cross section” of the students’ abilities is achieved through a variety of assessment interventions increasing the validity and reliability of the assessment practices. In the ICDL, there is only one summative assessment at the end of each Module. The recommended triangulation is not in place. While the International Hotel School chooses to include various formative assessments to help students reflect on their learning, these do not contribute to the final marks. The different format of these formative assessments does not therefore contribute to balancing out any shortcomings of the final summative assessment.

#### **4.4. Feedback**

In the interview with Adrian, the issue of consistency of marking was raised. Adrian felt apprehensive in the automated assessment when answering questions that required her to select items on the screen. She went on to explain that after one particular assessment, she asked to see why she did not pass. On viewing the assessment reports, which provide feedback on the concepts not the actual questions, she was able to see what concepts were problematic. However she thought she had answered those questions correctly. She was thus still unclear as to why she had failed.

Adrian reported that she then sat with the lecturer and together they went through the process of answering the particular question which she had remembered from the assessment. The lecturer and Adrian worked through the question in the real software environment (Microsoft PowerPoint) and the lecturer verified that Adrian had actually followed the correct procedure to complete the task.

Neither student nor lecturer could verify where the errors had occurred. The issue of concern is the lack of detail in the feedback from the assessment software when the student is interacting with it. In a real situation, the student would be able to see whether she has completed the task correctly. If she performed the task incorrectly, the software would display this, allowing her to make further corrections. In the automated assessment there is no such feedback. In this case not only is the student restricted from making corrections or changing her answers but she also may not see the outcome of her actions as would usually be the case in a real situation (as referred to in Chapter Two, Section 2.2.3).

#### **4.5. Surface and Deep approaches to assessment**

Research into learning approaches and assessment methods has revealed that students are inclined to adopt a particular approach to learning for assessments depending on the nature of the assessment. A number of researchers (for

example Prosser and Trigwell, 1999, Yoshino, 2001) maintain that task design that focuses on students' understanding rather than students' reproduction of knowledge promotes deep learning approaches which in turn promotes better learning and more competent graduates.

A learning approach refers to the methods or manner in which a student may prepare for an assessment (Ramsden, 2003). One strategy would be where students may choose to memorise the information so as to reproduce the same knowledge in the assessment. This is referred to as a surface approach to learning (Morgan, Dunn, O'Reilly, & Parry, 2004). Another strategy could be that students choose to engage more fully with learning material. Learning of concepts in this engaged manner may entail problem solving and applying critical thinking skills, analysis and creativity. The intention is to really understand the content rather than to remember it. This approach is referred to as a deep approach to learning (Morgan, Dunn, O'Reilly, & Parry, 2004). In a research project, Ramsden (2003) found that students can bring different intentions to the learning process with different results. Ramsden established that students who intended to understand whole texts, performed better in comparison to students who did not intend to understand the whole text. The latter focused on discrete parts of texts because their expectation was that memorization of information would allow them to answer the exams questions later. They did not engage in the material but focused on the discrete facts that they thought they were expected to know. It was found that students' perception of the test requirements led them to adopt a particular approach to learning. When students perceived that the assessment task required memorization and recall, they adopted the same method of learning. When students perceived that the assessment task required deeper understanding, they adopted strategies to understand the content and engaged with the content on a deeper level. The implication is that the format of assessment can affect the students' approach to learning.

Much of the writings on surface and deep approaches, developed from the perceptions/conceptions/approach model, seem to support the ideas put forward by the originating authors (Ramsden, 2003, Brown & Knight 1994,



Brown, Bull & Pendlebury, 1997). There is however contradictory debate as to whether students can be influenced into adopting deep approaches or know how to make changes to their approaches to learning. According to Haggis (2003) some of these findings have been refuted in other research studies. Research in China has revealed that whilst the Chinese adopt a rote learning approach, which according to the model defines a surface approach, evidence shows that these Chinese students seem to engage with the material at a deep level despite adopting a surface approach to learning. Haggis thus suggests that some of our classification of learning approaches reflects cultural norms of learning rather than significant differences in meaningful engagement.

Haggis also maintains that some research has shown that students don't always engage in deep approaches when provided with so-called engaging environments. It is not the context that influences the approaches to learning but the student's perception of the environment and the student's own personal views. These critiques of the surface/deep approaches to learning theory are useful in reminding us that teaching and learning is complex and context dependent and no simple theory can fully account for it. However the distinction between deep and surface approaches to learning is useful in accounting for some of the data which arose in this study.

In the research data, it was evident that students perceived the automated assessment as encouraging surface approaches to learning and the manual assessment as demanding a deeper engagement with the concepts being assessed. Students reported that the automated assessment was "easier" as they simply had to identify menu options and buttons that related to the task, rather than actually undertake the task. All the interviewees reported that the manual assessment was much more difficult in comparison to the automated assessment and yet the assessments tested exactly the same concepts. The manual assessment was seen to demand a deeper and more applied approach to learning. Missy's response to the manual assessment illustrates this:

“[For the] second one [manual assessment] you have to think about what you’re doing and then actually apply it so it can be right.” (Missy)

The following extract outlines Bheki’s learning approach to the automated assessment and his experience of the manual assessment.

“Because with the first assessment [automated assessment] I can just skim through my notes and then I’ll know it and then I’ll pass but the second one you had to know more in depth of Microsoft to actually make it for the second assessment [manual assessment].” (Bheki)

It is clear that Bheki used a surface approach to learning in preparation for the automated assessment and that his prior experiences of the automated assessment motivated his decision to use a surface approach. Boud (1995) maintains that the assessment tasks often motivate students to take either a surface approach or a deep approach. A phenomenon echoed in much of the literature (for example, Ramsden 2003, and Biggs 1999a cited in Morgan, Dunn, O’Reilly, & Parry, 2004).

It is also evident that this strategy did not assist Bheki with the manual assessment. The manual assessment was designed to resemble authentic tasks that students would be required to fulfil in their future careers. Like Bheki, six other students out of eleven in this study did not perform as well in the manual assessment (see Appendix C). It could be argued that these students may have adopted the same learning strategy and used a surface learning approach to prepare for the assessment tasks and expected to answer questions rather than apply their knowledge to a real set of contexts. According to Ramsden (2003) students are more inclined to do the least possible amount of work when the assessment tasks require surface learning. The following extracts from the interviewees illustrate this. When asked which method of assessment they prefer, they indicate that they prefer the “easier” automated

assessment although they also acknowledge that the assessment does not provide an accurate assessment of their capabilities.

“I would like the computerized system, it is much easier, but it makes you lazy.” (Amy)

“[In the manual assessment] you are actually working physically with the computer so you in the system a lot more. ‘Cos with the manual system you can work it and then you remember it.”  
(Melanie)

#### **4.6. Discrete tasks**

Literature on assessment has emphasised that assessment defines the curriculum and influences the way students learn (Ramsden, 2003, Gibbs and Simpson 2003). In the previous section on surface and deep approaches, I discussed the importance of students adopting engaged approaches to learning. If we want students to engage in problem solving and deep meaningful approaches that are applicable in their future, the assessment must be designed to elicit responses that are relevant (learning outcomes applicable in authentic context), interrelated (outcomes related to other outcomes) and integrated (assessment of a holistic body of knowledge). According to Ramsden (2003), students must be able to understand the whole learning task by connecting and arranging concepts to form the whole concept. Students do not gain meaning of concepts by engaging in isolated concepts. They must be able to create the links as well to gain a better understanding of the whole concept. As mentioned before in section 2.5.2, Lazarinis (2006) maintains that discrete tasks used in automated assessments can disorientate students and atomise the learning process. In the automated assessment in this study, tasks are unrelated. Each new question requires student re-orientation to understand the new scenario. In the manual assessment, each task builds on the previous one, or at the least, relates to the same document.

When skills and knowledge are compartmentalised into units the meaning and often the purpose of that task are lost resulting in a weaker and superficial

assessment (Gipps, 1994). This practice results not only in a lack of understanding but prevents the transference of knowledge to beyond the learning environment and retards the student's application of concepts in the real world. As mentioned earlier in section 2.2.1, Allais (2003, 2007) critiques the outcomes based education approach of the National Qualification Framework (NQF) for the compartmentalisation of content into unit standards. As Allais (2003, p. 318) puts this:

“Focusing on measurable outputs can have the effect of suppressing learning; one often does not see that the model isn't working, until one steps out of the paradigm. ... However, a technology of standards has been adopted which incline towards reductionism.”

Allais further draws out the problem of using industry stakeholders to define the assessment content and process leaving the academic institutions with little leverage in the education of students. Allais (2003) maintains that the NQF has been structured without reference to educational practice, creating a system that is rigid and inflexible and removed from educational practice.

In the case of the ICDL assessments, lecturers have no involvement in the design process nor are they allowed to view or be present when students take the assessment. I was present in the examination venue in order to observe students for this study. As Principal and one of the approved ICDL test supervisors, I am allowed to be present in the examination venue. However the lecturers are not permitted entry and the supervisor may not be a lecturer on the ICDL Course. This process may increase the integrity of the assessment process but decreases lecturer involvement in the assessment process and makes for a stark divide between teaching and learning on the one hand and assessment on the other. This results in a disjointed and isolated educational practice that has no link to what was done in the classroom. Lecturers don't know what the ultimate goal is but are expected to support students in their learning for the assessment. This takes us back to the point that assessments should be reflective of the curriculum and be part of the learning process not just tacked on to the end of a learning process.

According to Knight and Yorke (2003), the use of convergent (see Section 2.3) assessments encourages learning of discrete concepts and students who adopt this approach are not able to perform as well as those who have been exposed to “open-ended” or divergent tasks. With reference to the work place, they maintain that,

Problems “in the wild” are often open-ended, and solutions have to be reached relatively quickly with incomplete information to hand. The reaching of solutions may involve the integration of understandings from a range of contexts, not all of them grounded in academic study (Knight and Yorke, 2003, p. 38).

According to Ehmann (2005) in a constructive learning environment assessment tasks should be aligned to the prescribed learning objectives and outcomes. Any model of assessment which assesses tasks discretely does not support these principles of assessment.

In this research study, students reported experiencing less difficulty in the automated assessment than in the manual assessment because they could concentrate on discrete concepts and were not expected to relate concepts or build on concepts. According to Bheki the automated assessment was easier because it didn't have links between questions and he didn't have to keep up with the related topics.

“...it's just that it is different between the first [automated assessment] and the second one [manual assessment] was that with the first one you get asked a question relating to that topic and then you move onto another topic and another topic and even if you do come back to the first topic you just forgot, that you did it again. So it becomes easier whereas with the second one [manual assessment] there were second questions linked to the first one and the third linked to the second one.” (Bheki)

Later when asked if he felt the automated assessment was testing his ability, he mentioned that he did not feel it was testing his full ability (as referred to in Chapter Two, Section 2.1.2).

“It’s just skimming through what you should know and it’s not going in depth of what the MS Word is actually about.” (Bheki)

Adrian said she enjoyed the manual assessment because she was able to understand more and relate better to the questions that were linked. The manual assessment seemed to be more meaningful for the students than the automated assessment which focused on assessing tasks in isolation. Adrian also mentioned that the automated assessment was not testing her understanding of the concepts but rather her recall of it.

“...You understand a lot more from it [manual assessment] like while you busy in the exam things actually, you put more together than when you were doing it on the automated [assessment] your eyes [are] just catching words...I wouldn’t know how to do a distribution list but I know what it is.” (Adrian)

Melanie felt that the manual assessment made her apply her knowledge whilst the automated assessment gave her items to choose from in a discrete way. This highlights how assessment of discrete concepts can lead students to the perception that there is no relationship between the concepts.

“With the automated [assessment] and doing the practical you just choosing something. You’re not having to actually physically apply it. Whereas in manual [assessment] you [are] applying it.” (Melanie)

Through this analysis, we can see how discrete assessment of items was perceived to impact on students’ learning and their inability to perform tasks in different contexts. They find it more difficult when they had to apply their knowledge in the manual assessment. Whilst they may be familiar with what a particular theoretical concept is and what it does, they may not actually be able to perform the tasks to achieve a successful outcome.

This is a huge concern considering that once these students have received their certification, they will be considered competent in this computer literacy programme. This could give a false impression of the students' abilities and even cast doubt on the validity of the certification and assessment practices. This has implications for all stakeholders but most importantly the student who when employed may not be able to perform the tasks that her certification represents. Hager (1993, p.1) maintains, "...if a narrow, mechanistic view of competence is taken, the clear answer seems to be that competency standards have no place in the higher education system." It may well be argued that computer literacy, at the level of use of these mainstream programs, is in fact not part of the higher education system but a necessary pre-cursor within it. However, I have argued that computer literacy is a vital aspect of today's world and that our unequal sector requires that higher education takes responsibility for ensuring that this is included in the curriculum. Furthermore, I have argued that even in a practical skill such as computer literacy, it is necessary to move beyond an atomistic understanding of the competences and consider computer literacy processes more holistically.

#### **4.7. Multiple choice questions**

Aside from selecting menu items or keys to push in the automated assessment, there were also some multiple choice questions (MCQs). The students raised a number of issues in this regard in the interviews. The use of MCQs will therefore now be discussed in more detail.

Much has been written regarding the advantages and disadvantages of using multiple choice questions in assessing student abilities (Rowntree, 1977, Brown & Knight 1994, Morgan, Dunn, O'Reilly, & Parry, 2004). Paper - based multiple choice questions are regarded as easier to administer and to mark, thereby saving time. The use of computerised multiple choice questions has added benefits in that the computer marks the students' responses and there is no need for human intervention. This also makes for a highly reliable assessment as the marking is objective and there is no marker bias as is often experienced

with traditional types of assessment. It is possible also to cover a wide range of concepts in a short time when multiple choice questions are used.

Over the years the extensive use of MCQs in various contexts has highlighted some disadvantages. Some researchers (Brown, Bull & Pendlebury, 1997, Harper, 2003, Scharf & Baldwin, 2007, Bull & McKenna, 2000) maintain that good quality MCQs can be difficult to formulate and the poor design and structure of the question and the distracters often allow students to guess the answer. Rowntree (1987) also warns against the sole use of multiple choice type questions, maintaining that this will lead students to use surface approaches to learning as students scan through learning material and study factual concepts in isolation rather than learning the subject to gain meaning and understanding.

There has also been debate among researchers such as Scharf and Baldwin (2007) and Harper (2003) that multiple choice questions are limited in the levels of knowledge they can assess. According to Harper (2003) MCQ's are able to assess all competencies defined in Bloom's Taxonomy (Bloom 1994). Other researchers (Brown, Bull & Pendlebury, 1997, Chalmers & McAusland, 2002, Tarrant & Ware, 2008) maintain that the design of these assessments can be difficult and time consuming to set. In poorly designed MCQ assessments only discrete factual concepts are assessed, with a focus on lower level skills and abilities. This level of questioning is often perceived by students as easier to study for because they need to remember certain bits of information rather than engage in a broader or more applied understanding encouraging the student to adopt surface approaches to learning.

In this study, many of the automated assessment questions were multiple choice type questions. The multiple choice questions were used to ask questions relating to what the student would practically do to perform a task. In the interviews the students indicated that this was easier than demonstrating the ability to perform a task in a specific context as in the case of the manual assessment. Here are some quotes from the students:



“...they give you options like multiple choice, I think those were the best questions because when you rule out your answers you left with about two and then it becomes simpler ...” (Bheki)

“... when it’s multiple choice it’s fine because it’s only four options or whatever...” (Melanie)

“...the first one was easier because we had options to choose from... When they ask you questions like the multiple choice questions” (Amy)

“The second assessment (manual) was harder.... takes up a lot of time and you have to keep on remembering and thinking and actually having to apply it.” (Missy)

In one particular instance students were asked in a MCQ to identify the correct tabs setting in a document. Many students were able to select the correct answer. However when they were asked in the manual assessment to actually set tabs in a document not one of the students were able to perform the task. This evidence illustrates that whilst students may be able to identify steps in performing a task, and thereby correctly answer an MCQ, these discrete bits of information do not necessarily indicate the student’s ability to perform a task successfully.

MCQ assessments also do not allow for more than one correct answer. In the computer literacy programme, as in real life, students are exposed to alternate ways of achieving the same ends. From this perspective we can say that MCQ is not entirely appropriate for assessing application type questions where more than one routine can be followed to complete the task successfully. If we restrict the student to one method, we are not providing the student with a fair chance to demonstrate her levels of computer literacy in a “real world” environment.



## Chapter Five: Conclusions and Recommendations

This study has considered both automated and manual assessments of computer literacy. The study has acknowledged that automated assessment brings with it a level of reliability which cannot be matched by manual assessments. Furthermore when the international and mass assessment context of the ICDL Programme is taken into account, the efficiencies brought about with automated assessments are huge. Managing the kinds of human error that can occur and impact on the integrity of the programme is made very difficult with manual assessments, especially when one considers the many institutions across many countries offering the ICDL.

However this study has raised questions about the extent to which the current automated assessment validly measures student capabilities. As this is a summative assessment, this evidence also impacts on other stakeholders such as the institution and future employers possibly leading to false expectations about students' capabilities. As this is a high stakes assessment, students were generally content that they are found competent even though they expressed, in this study data, an awareness of the limitations of their skills and some concerns about their abilities for their future careers.

The issue of authenticity arose as the prime concern in this study. It can be seen through the data that the perceived lack of authenticity can impact not only on the validity of the assessments but also on the ways in which students prepare for the assessment. The students indicated that the automated assessment did not test their actual abilities to perform tasks but rather tested their ability to memorise menus and icons. The students indicated that the manual assessment was authentic with the result that when they did not know how to complete a particular process, this would be evident through the assessment.

The automated assessment was found to be restrictive and inflexible and not cater sufficiently for the different approaches to answering questions available

in an authentic setting. The manual assessment was found to allow students to experiment during the assessment with different ways of achieving the same ends. The automated software was also not found to provide the kind of feedback to students that they would receive from using the actual program being assessed, whereas the manual assessment provided the visual cues students could call on to self-assess in the same way that they would do in the work environment.

### **5.1. Interactive learning initiatives**

In the interests of students' constructive learning, the need for a more interactive ICDL learning curriculum is paramount. It is clear that students do not receive enough practical engagement through the learning process and therefore are not able to perform the required manual tasks. This is an indictment on the International Hotel School as students should be engaging more with real computer literacy tasks to prepare students for the work place. Alternative assessments might be considered such as peer assessments, self assessments, project work and other engaging initiatives to stimulate and motivate students. The ICDL Foundation should consider making this a requirement of all institutions as this would be in the best interests of the ultimate clients, the students.

### **5.2. ICDL Assessment Transparency**

Another important issue is the lack of transparency in terms of the summative assessment goals. The policy that the teacher should not be involved in the assessment process goes against academic practices and contributes to a disjointed curriculum. It is the job of the teacher to assess and guide the student in the construction of knowledge. A teacher who is uninformed about the goals and nature of the assessment can not assist in the construction of this knowledge.

Given the worldwide nature of this programme and the need for integrity across the assessment process, it is clear why current assessment regulations are in

place. Furthermore, the role automated assessments play in ensuring that there can be no manipulation of the assessment process should not be underestimated.

With the above issues in mind I propose a number of alternatives to the current practices for the ICDL Foundation, the automated assessment software developers and the International Hotel School.

A bank of automated assessment questions should be devised in consultation with an academic forum from different academic institutions. The teacher should have access to the bank of questions and be allowed to make up different assessment sets that could be used in the classroom as formative assessments. Teacher involvement in defining the assessment questions and selection of the assessment questions would allow a certain level of autonomy and help improve teaching practices. Academics need to work with software developers to generate a more cohesive assessment plan with practical and engaging assessment tasks that form the bulk of the summative assessment.

The summative assessment should take the same format as the formative assessments. However it would count for the final grade. This will allow teachers and students, from the beginning of the learning process, to see examples of the types of questions that could be asked in the summative assessment. This will enable them to work towards achieving a “visible” goal. Teachers are also aware of what goals the students must achieve in the summative assessment. In this way we maintain the integrity of the certification and provide the necessary support to the students.

Another recommendation would be to include project work as a requirement for the ICDL Certification. This project work could be in the form of a portfolio of evidence that is developed progressively over a period of time and is assessed by the teacher. A weighted mark from this portfolio could then contribute to the final mark. A summative external assessment together with the weighted portfolio mark would provide the students with multiple opportunities to prove

their competence and receive feedback from the teacher and less emphasis would be placed on a single summative assessment.

Various recommendations arise from this study regarding the automated assessment software development. In essence the automated software must assess authentic real-life tasks and not discrete concepts. The assessment must be able to assess students' ability to perform tasks and therefore it is required to assess a whole process of steps that lead to the end task and not just a portion of the task. The assessment should not only be able to assess the outcome but the process that led to the outcome. As the certification is an indication of technical skill, it must ensure these abilities are assessed. Automated assessments should be more interactive and include more authentic and challenging tasks with a flexibility to adjust and manipulate documents.

The software must be designed to provide an authentic working environment or must be able to work with the authentic software environment to enable the student to have the flexibility to select how to perform various technical tasks.

The software should provide a more detailed report on the errors the student has made during the assessment. This will allow students to go back and review their mistakes with the intention to improve on the first attempt.

### **5.3. Conclusion**

Technology today offers many opportunities for new and exciting educational assessment practices. However the design of assessment tasks and assessment focus must take on a more creative, interactive, innovative and challenging direction.

This study considered the assessment of computer literacy in an internationally recognised qualification. In particular the study considered the use of automated assessment using a simulated environment as opposed to a manual assessment using an authentic software environment. The data, in the form of observations and interviews, raised several concerns regarding the automated

assessment particularly regarding authenticity and validity. The great benefits in terms of efficiency and reliability of such automated assessments should however not be overlooked. The recommendations are thus geared towards strengthening the form of the automated assessments as well as improving on the way in which they are used in the ICDL Curriculum.

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## Appendix A – Observation Schedule

Observation Item	Yes/No	No. of students
1. Student asked for clarification of questions.		
Comment:		
2. Student did know how to match the items.		
Comment:		
3. Student confused about the instruction.		
Comment:		
4. Student trying a method that system did not allow.		
Comment:		
5. Example of questions testing recall – memory of menus.		
Comment		
6. Example of questions testing understanding and application of skill.		
Comment:		

## **Appendix B – Student Consent**

17 November 2008

### **RE: MASTERS RESEARCH PROJECT – STUDENT CONSENT**

Dear Student

I am currently undertaking a master's research project in fulfillment of a Master's Degree in Education (Higher Education) at the University Of KwaZulu-Natal. My research topic is entitled "A Comparison of Students' Responses to Automated and Manual Computer Literacy Assessments."

The research will entail 20 students taking two assessments of 45 minutes each. The first assessment will be the automated assessment which is your official examination and the marks attained in this examination will be the final mark. The second assessment will be for research purposes only and these marks will not be given to you.

Once you have completed the assessments, you may be selected for an interview. Should you be selected (only 6 students will be selected according to marks, ie 2 highest, 2 middle and 2 lowest scores), you will be asked a few questions about your assessment experience.

Should you agree to be interviewed, I will require about twenty minutes of your time where I will ask you a few simple questions. I will need to tape record our interview so that I can work with the information later. Your responses will then be put on paper and for purposes of accuracy I will require you to read through the typed recordings and provide me with feedback should you think that it is not accurate. Your responses will be confidential and your names will not be used in the research. All data will be locked away and not be accessible to anyone but me. For audit purposes, the recorded data will be kept at the Centre for Higher Education Studies for a period of five years, after which it will be destroyed. (Documents will be shredded and CDs will be incinerated.)

Participation is voluntary and you are free to withdraw from the study at any stage and for any reason. Your refusal to participate will be respected and will not disadvantage you in any way.

Should you wish to verify any information, my research supervisor is Dr Sioux McKenna at the Centre for Higher Education Studies at the University of KwaZulu-Natal. She maybe contacted via email: [mckenna@ukzn.ac.za](mailto:mckenna@ukzn.ac.za)

If you agree to these conditions and are willing to participate in this study, kindly complete the declaration below. A copy of this document will be made available for your records.

Thank you for your time and contribution to this exciting project.

Kind Regards

Chantal Pillay

Student Number ; 901363730

Cell: 082 7729948

Email: [chantal\\_pillay@mweb.co.za](mailto:chantal_pillay@mweb.co.za)

I _____ (Full name of participant) hereby confirm that I understand the contents of this document and the nature of the research study and I consent to participating in this study.  I understand I am at liberty to withdraw from the study should I so wish.  Signature of Participant _____ Date: _____
--



## Appendix C – Background to Scores

A comparison of the scores achieved for both assessments showed that students' marks decreased for the manual assessment. In one case the student's mark dropped by 26%. Table 1 illustrates the difference between the scores. In seven of the eleven students, the manual test scores was less than for the automated assessment and in three instances (indicated in shaded rows), the manual score would have resulted in the students' failure. The pass mark for each Module is 75%. These sets of scores generally show a difference between the manual and automated assessment. The very small sample size means that no statistical conclusions or correlations can be arrived at. The tentative concerns raised by these figures should be considered in the light of the qualitative data discussed within this dissertation.

	<b>Automated</b>	<b>Manual</b>	<b>Difference</b>	<b>Subject</b>
Student 1	80	80	0	MS Word
Student 2	94	69	-25	MS Word
Student 3	91	83	-8	MS Word
Student 4	94	86	-8	MS Word
Student 5	69	67	-2	MS Word
Student 6	77	83	6	Internet & Email
Student 7	91	92	1	Internet & Email
Student 8	83	67	-16	Internet & Email
Student 9	86	81	-5	Internet & Email
Student 10	77	83	6	Internet & Email
Student 11	86	60	-26	Internet & Email

## Appendix D - Interview Questions

These were just used as a guide for the interview process.

1. Describe your experience of the first assessment?
2. Tell me about your experience of the second assessment?
3. What did you find most difficult in the first assessment? Why was it difficult?
4. What did you find most difficult in the second assessment? Why was it difficult?
5. What type of questions did you prefer in the first assessment? Why?
6. What type of questions did you prefer in the second assessment? Why?
7. Do you think the results reflect what you know about computers?
8. How did the first assessment compare with the second assessment?
9. How would you prefer to be tested for this subject? What method of assessment would you prefer? Describe the method?

## Appendix E - Consent from the Institution

2 Ellington Gardens  
35 Rif Road  
Manor Gardens  
Durban  
4001  
Date

Attention: Mr King  
The International Hotel School  
124 Jan Hofmeyr Road  
Westville  
3630

### **RE: MASTERS RESEARCH PROJECT**

Dear Mr King

As you are aware, I am currently undertaking a master's research project in fulfillment of a Master's Degree in Education (Higher Education) at the University Of KwaZulu-Natal. My research topic is entitled "A Comparison of Students' Responses to Automated and Manual Computer Literacy Assessments."

In the study, students' automated assessment results will be compared with a similar manual assessment. I will also interview students about their perceptions on manual and automated assessments. During the assessment process I will observe students taking the assessment and make field notes about the process.

I believe this research study will benefit our institution in understanding the computer literacy assessment process, from the students' perspective and provide us with an opportunity to assess our educational practices. The research may also bring to the fore new ideas to working with automated assessments.

As I would like interview some of the students, I hereby request permission to conduct this study at your institution in Durban.

I would prefer to describe the institutions name. ie The International Hotel School. I hereby request your permission to use the trade name in this research but am willing to keep the name of the institution anonymous should you so wish.

Should you wish to verify any information, my research supervisor is Dr Sioux McKenna at the Centre for Higher Education Studies at the University of KwaZulu-Natal. She maybe contacted via email: [mckenna@ukzn.ac.za](mailto:mckenna@ukzn.ac.za)

I am very excited about this project and trust that you would consider a positive response to my request.

Thank you for your time and contribution to this exciting project.

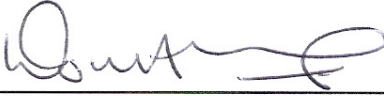
Yours sincerely

Chantal Pillay

Student Number: 901363730

Cell: 082 7729948

Email: [chantal\\_pillay@mweb.co.za](mailto:chantal_pillay@mweb.co.za)

I <u>D. H. King</u> (Full name)
hereby confirm that I understand the contents of this document and the nature of the research study and I give consent for this study to be conducted at our institution.
I understand the institution is at liberty to withdraw from the study should we so wish.
<b>Signature on behalf of (Institution Name)</b> <b>Date:</b> <u>28 July 2018</u>


## Appendix F- Consent from the ICDL Foundation

2 Ellington Gardens  
35 Rif Road  
Manor Gardens  
Durban  
4001  
06 June 2008

Attention: Jenny van Niekerk

### **ICDL South Africa**

PO Box 36087  
GLOSDERRY  
CAPE TOWN, 7702

### **RE: MASTERS RESEARCH PROJECT**

Dear Mrs van Niekerk

I am currently undertaking a master's research project in fulfilment of a Master's Degree in Education (Higher Education) at the University Of KwaZulu-Natal. My research topic is entitled "A Comparison of Students' Responses to Automated and Manual Computer Literacy Assessments."

In the study, students' automated assessment results will be compared with a similar manual assessment. I will also interview students about their perceptions on manual and automated assessments. During the assessment process I will observe students taking the assessment and make field notes about the process. I am an ICDL test supervisor at the International Hotel School and I am aware of the rules of ICDL assessment. Please be assured all data collected will be password protected and stored securely in order to protect the data integrity as well as the identity of the participants.

I believe this research study will benefit our institution and your organisation to understand the assessment process from the students' perspective and provide us with an opportunity to assess our educational practices. The research may also bring to the fore new ideas to working with automated assessments.

I would prefer to describe your organisation by the trade name. ie (ICDL). I hereby request your permission to use the trade name in this research but am willing to keep the name of the organisation anonymous should you so wish.

Should you wish to verify any information, my research supervisor is Dr Sioux McKenna at the Centre for Higher Education Studies at the University of KwaZulu-Natal. She maybe contacted via email: [mckenna@ukzn.ac.za](mailto:mckenna@ukzn.ac.za)

I am very excited about this project and trust that you would consider a positive response to my request. Thank you for your time and contribution to this exciting project.

Yours sincerely

Chantal Pillay  
Student Number: 901363730  
Fax No: 0866443962  
Cell: 082 7729948  
Email: [chantal\\_pillay@mweb.co.za](mailto:chantal_pillay@mweb.co.za)

Please complete the form below and return via fax or email:

I ANTHONY HARPER (Full name) hereby confirm that I understand the contents of this document and the nature of the research study and I **give/do not give consent** to use the trade name ICDL in the research project.

Comments/Restrictions: \_\_\_\_\_

I understand our organisation is at liberty to withdraw from the study at any time should we so wish.

Signature on behalf of (ICDL SA) \_\_\_\_\_ Date: 13/07/2009.

[Signature]

## Appendix G – Ethical Clearance



RESEARCH OFFICE (GOVAN MBEKI CENTRE)  
WESTVILLE CAMPUS  
TELEPHONE NO.: 031 – 2603587  
EMAIL : [ximbap@ukzn.ac.za](mailto:ximbap@ukzn.ac.za)

28 NOVEMBER 2008

MS. CMB PILLAY (901373630)  
ADULT AND HIGHER EDUCATION

Dear Ms. Pillay

ETHICAL CLEARANCE APPROVAL NUMBER: HSS/0768/08M

I wish to confirm that ethical clearance has been approved for the following project:

*"A comparison of automated and manual computer literacy assessments in measuring capability"*

PLEASE NOTE: Research data should be securely stored in the school/department for a period of 5 years

Yours faithfully

  
.....  
MS. PHUMELELE XIMBA

cc. Supervisor (Dr. S McKenna)  
cc. Mr. D Buchler

