



Griffith College

Exploring the suitability of utilising computer-based assessments in accounting and finance related modules at undergraduate level

By

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ABSTRACT

The purpose of this study is to explore the suitability of utilising computer-based assessments in accounting and finance related modules at undergraduate level. With the advances in technology ever increasing, there is a need to understand the suitability of introducing the developments in technology as part of the assessment process at third level education. One of the key driving forces of this study stems from the Professional Accountancy Bodies and their respective assessment strategy. Many professional bodies such as ACA, ACCA, and CPA are utilising technology by means of computer-based assessments; therefore, this study aims to determine the suitability of mirroring the professional accountancy bodies' assessment techniques in third-level education at undergraduate level.

This research builds on existing studies conducted to date, whilst introducing new elements and aspects in relation to the attitudes of learners at undergraduate level in private educational institutions, in terms of completing computer-based assessments. The aim is to determine the benefits, drawbacks, and challenges to introducing such assessment methods from the learners' perspective.

The research aims for this study, based on the primary research question, are as follows:

- To explore the attitudes of learners in relation to utilising computer-based assessments in comparison to hand-written assessments.
- To identify the benefits and drawbacks of utilising such a method of assessing learners.
- To investigate the potential challenges to introducing computer-based assessments at undergraduate level in accounting and finance related modules.

The research methodology undertaken as part of this research followed the interpretivist/constructivist approach using qualitative research techniques. The research conducted as part of this study included both primary and secondary methods of research. The secondary research was conducted by reviewing different literature, including online articles and publications, latest publications by other leading institutions and researchers in this area, newspaper publications and various reports on computer-based assessments. Primary research was gathered through surveys, a focus group and two in-depth interviews.

The findings from this study provide insights into learners' concerns in relation to utilising computer-based assessments, and aspects to consider improving the experience of all learners regarding computer-based assessments. Other findings include considerations for the importance of future employment skills, and the impact computer-based assessments have in relation to learner stress and/or anxiety, including deep interactive learning.

Finally, this research concludes with recommendations for future studies, including quantitative studies in relation to implementing computer-based assessments. This study provides recommendations to third-level institutions in respect to both handwritten and computer-based assessments. These include the importance of timely feedback, and reflections relating particularly to computer-based assessments such as the importance of implementing formative assessments enabling learners to prepare for summative assessments utilising computers, the concerns in relation to accessing relevant technology, amongst other findings discussed as part of this study.

Keywords: Education, Assessments, Computer-based assessments, Computer-aided assessments, Formative assessment, Summative assessment, Interactive learning, Deep learning, Sustainable assessments.

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GLOSSARY

ACA	Associate Chartered Accountants (see professional accountancy bodies).
ACCA	The Association of Chartered Certified Accountants (see professional accountancy bodies).
Assessment	An instrument utilised by educators to determine a judgement about learning, or the skills acquired as part of the learning process.
CBA	Computer-based assessments.
CIMA	Chartered Institute of Management Accountants (see professional accountancy bodies).
CPA	Certified Public Accountants (see professional accountancy bodies).
Discursive / Essay style questions	Questions that require learners to write an extended response to answer the question requirements.
E – Assessment	Assessment activities conducted using technology or digital platforms to carry out the assessment.
E-Learning	Instructional or educational information / training delivered via digital resources / devices with the intended use of supporting learning.
Formative Assessment	Relates to practice assessments provided by educators throughout the learning process to judge / gage the learners performance to date. Generally, no marks are awarded for formative assessments as they are deemed practice tests.
GC	Griffith College, including Dublin, Limerick, and Cork.
HE	Higher Education.
HEI	Higher Education Institutions.
HWA	Handwritten assessments.
Likert Style Question type	Provides the participant / research subject with an option to answer according to a scale, for example “strongly agree, agree, neutral, disagree, strongly disagree”.
Moodle	Moodle is the Virtual Learning Environment (VLE) used by Griffith college, and other learning institutions.
MCQ	Multiple Choice Question – A questioning style that provides learners with a list of options to select one or more answers from. Generally, there is no writing as part of a MCQ question.
OECD	The Organization for Economic Cooperation and Development.
Professional Accountancy Bodies	Refers to the accountancy bodies that provide post-graduate studies to students pursuing an accountancy degree, upon completion of their undergraduate degree, such as ACA, ACCA, CIMA, and CPA. These are the main professional accountancy bodies in Ireland.
QQI	Quality and Qualifications Ireland.
Rich Feedback	Feedback provided to the learner which goes beyond providing just the correct or model answer and general feedback. Rich feedback includes personalised feedback on the learners’ performance.
Summative Assessment	Assessments that result in the learner receiving a mark or grade for their performance in that assessment, for example – end of term examination or mid-term class test. Usually, formative assessments (see above) prepare learners for such summative assessments.

VLE	Virtual Learning Environment – software used by Colleges / Learning institutions to distribute course content or material to learners
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CHAPTER ONE – INTRODUCTION

1.1 Overview

As technology continues to evolve, Higher Education (HE) has been concerned about its advances and the expectation to implement such technology in teaching, learning and assessment practice. Sandwith (1993) outlined that technical competence and knowledge is essential in education. Later studies by Kirkwood and Price (2013) outline how technology should be used as a supportive tool in learning and assessment practices. More recently, studies by Voshaar *et al.*, (2023) have explored the use of technology through gamification in the learning process, outlining its positive impact on learners' performance. The Irish Student Survey Evaluation (ISSE, 2017) as part of their research outlined that learners appreciate effective teaching linked to the real work, including technology enhanced learning. Several studies have highlighted the importance of embracing technology as part of the learning and assessment process, focusing on a learning-centred and student-centred approach to teaching, which is explored as part of this study in the literature review in [chapter two](#). This study will focus on a number of key themes in relation to computer-based assessments (CBA), delving into the impact of CBA on student-centred learning, the perception of learners in relation to undergraduate studies and assessment techniques and its link to post graduate studies and employment, access to technology to engage with CBA, experiential learning; all with a view to assessing the suitability and impact of CBA at undergraduate level.

1.2 Research Purpose

The purpose of this research is to investigate the attitudes of students regarding the suitability of embracing technology as part of the assessment strategy in accounting and finance related modules, specifically focusing on the introduction of CBA at undergraduate level in private HE. This study explores the benefits, drawbacks, and challenges to assessment practices such as CBA. As part of this study, the researcher will conduct small-scale primary research on one stakeholder group, namely undergraduate students. Professional accountancy bodies, including professional accountancy firms, have implemented CBA as part of their assessment practice in recent years. Many accounting and finance graduates continue their studies with professional accountancy bodies as they undertake graduate programmes with professional accountancy organisations. Therefore, the researcher is keen to understand if implementing CBA at undergraduate level would assist learners with such future endeavours, determining if

students value a link between undergraduate education and future industry employment and studies. Greater information in relation to professional accountancy bodies and organisations can be found in [appendix one](#).

1.3 Significance of the Research

This research is particularly significant to the researcher, a lecturer in a private third level college, with an overall objective of introducing the use of such methods of assessments across the faculty and wider college. The researcher teaches accounting and finance related modules. As part of the emergency response to COVID-19, the researcher introduced CBA as both formative and summative assessments strategies at stage one of the business-related programmes. Whilst this method of assessment is currently being used at stage one only by the researcher, the end of term examination is conducted using the traditional ‘paper and pen’ methods, with many other modules utilising written-based interim assessments to the current day. As many professional accountancy bodies embrace technology as part of their assessment practice, the outcome of this research will aim to enhance learning through a more student-centred focus in relation to assessment approaches including CBA. Research clearly indicates that lecturers and learners are living in a fast-paced digital era. Therefore, the significance of this small-scale qualitative research enquiry is to identify the various aspects associated with CBA, investigate the attitudes of the learners in relation to using CBA, whilst informing learning, teaching, and assessment practice for educators.

1.4 Research Objectives

The overall research question for this study is to explore the suitability of utilising CBA in accounting and finance related modules at undergraduate level. The purpose of this is to determine if the use of such assessment strategies would enhance the learning experience for learners through the utilisation of modern technology as part of the assessment strategy, embracing advances in technology (such as access to mobile phones, laptops, etc.) that learners are exposed to, or frequently use, as part of their day to day lives.

The research question for this study is broken further into three aims as follows:

1. To explore the attitudes of learners in relation to utilising computer-based assessments in comparison to hand-written assessments (HWA).

2. To identify the benefits and drawbacks of utilising such a method of assessing learners.
3. To investigate the potential challenges to introducing computer-based assessments at undergraduate level in accounting and finance related modules

To obtain such aims supporting this research question, the objectives of this research will include exploring current research, building on research published to date, with the objective to provide new insights into the use of CBA utilising three elements of investigation as primary research, namely 1) surveys, 2) a focus group, and 3) interviews, all with learners at undergraduate level as they are the key stakeholder group for this study.

1.5 Structure of the Research

This dissertation is constructed of five chapters, each contributing to the different research objectives. This chapter outlines the purpose of this dissertation, setting the context for the research, outlining the research objectives and the significance of the study.

Chapter two entitled the literature review outlining the key themes underpinned to this research. This chapter also reviews the different users of CBA, clarifying the uses of such assessment strategies and examples of their uses.

Chapter three focuses on the researcher's approach to conducting the study, providing a rationale for such techniques of research. Limitations of the study coupled with any ethical considerations regarding the study are addressed in this chapter.

Chapter four portrays the findings from the primary research conducted, linking such findings back to the key themes and trends identified as part of the literature review.

The final chapter of this study discusses the key findings as part of this research and outlines recommendations for future variations of this study.

The following chapters will provide an insight into how the implementation of CBA can potentially enhance the learning process for learners, whilst considering the impact on the attitudes and perceptions of learners.

CHAPTER TWO – LITERATURE REVIEW

2.1 Introduction

The purpose of this chapter is to review the relevant literature relating to CBA and the use of such technology in the assessment process, exploring the current literature in relation to learners' attitudes to using such CBA, and its current impact on practice and policy. Assessment, whether formative or summative in nature, is seen as a vehicle for driving the learning process, encouraging a deep sense of learning in higher education (Ramsden, 1991).

The world of business is an active, ever-changing environment (Specht and Sandlin, 2006), which educators must embrace in terms of preparing learners for their future employment and studies. Many professional accountancy bodies in Ireland have implemented CBA, outlining their benefits such as flexibility, instant results, and convenience for the learner; reporting that students who take their examinations using computer-based methods are reporting higher levels of satisfaction (ACCA Global, 2023). Whilst research in relation to the Professional Accountancy Bodies will not form the primary focus of this literature review, [appendix one](#) provides greater details in relation to this.

This chapter will also focus on the level of learning as part of the learning and assessment process, reviewing the impact CBA has on deep or surface learning, active or passive learning, and finally reviewing learners access to such technologies to embrace CBA.

2.2 Background to Computer-Based Assessments

“Assessment of students is an essential component of educational programs and has a significant impact on student’s performance” (Aslam *et al.*, 2023, p.15).

As the name suggests, CBA entails learners completing their assessments, whether it be an in-class test or an end of year examination, using a computer on an online environment. CBA will not change the assessment strategy or type; more so, it is merely an updated modern method or mode of completing the assessment, bringing the method of the assessment strategy into the 21st century.

In different strands of HE, there are different types of CBA, forming part of formative self-tests to summative final examinations (Thelwall, 2000). Formative assessment, if used correctly, is an assessment methods utilised by students and lecturers as part of the instructional process,

providing both lecturers and learners with the information required to ensure the learners continue to grow in terms of education in that particular area of study (Heritage, 2007). Garrison and Ehringhaus (2007) outline that formative assessment could be considered as a 'practice' for the students in terms of preparing for a summative assessment, where students are not held accountable for the formative assessment; it is used as a learning aid throughout the learning process. Whereas summative assessments are utilised throughout the learning process to determine what a learner knows, usually in the format of a standardised test or end of term examination. Such summative assessments are used as part of the grading process for learners, used as a means to gauge the student's learning relative to content standards, known as module learning outcomes.

When considering the introduction of such alternative CBA, it is important to note that:

“An alternative online assessment is not a lesser form of assessment, but a different assessment to achieve the same aim” (The National Forum For The Enhancement Of Teaching And Learning in Higher Education, 2023, p.1).

In the emergence of technology in education, CBA has been limited to simplistic styles of questions (Whiting, 1985). However, in the late 1990s, advances in technology enabled the generation of free online assessments, with significant improvements for CBA materialising in recent years. Due to the advance in technology in today's digital age, tests are increasingly being delivered on computers, adapting the traditional paper-based tests (Lynch, 2022). Since the emergence of COVID 19, there has been a rapid transition from traditional styles of teaching and learning to a new model of online assessment and learning (Almansour and Alaudan, 2022). In their studies in relation to comparing CBA with HWA, researchers noted that:

“Both the teachers and the parents perceived online assessments as more convenient, fun, and interactive than traditional paper-based assessments. Furthermore, both the teachers and the parents associated online assessments with serious challenges” (Almansour and Alaudan, 2022, p.1).

Such findings will be reviewed further as part of the literature review, embedded as the main themes for this study.

2.3 Introduction of Technology in Learning

Technology has enhanced the digital learning process in HE by improving student engagement and success as part of the learning process (Ahmed and Parsons, 2013). Technology refers to the skills required on a technical level to conduct a particular task. Technical competence and knowledge is amongst some of the essential competences required in education (Sandwith, 1993). The use of such technology in the learning environment, not just in the classroom, but as part of the assessment approach is crucial to take into consideration in such a modern culture where technological advancements have become a vital part of everyone's life. The introduction of technology into all classroom learning environments, including teaching and assessment strategy, is a key resource that all educators must consider (Kirkwood and Price, 2013).

From the research conducted by Kirkwood and Price, it is clear that a number of educators focus on how to utilise the tech tools simply because they are available, instead of thinking about what they are teaching or assessing, the achievement of learning outcomes, or the enhancement of the learning experience for learners. Advances in technology should not dictate the learning environment, or simply be used as an escape from the traditional teaching and assessment methods, but utilised as a supportive tool in the learning and assessment process (Kirkwood and Price, 2013). In their work, Neiterman and Zaza (2019) flag the concerns with utilising technology in the classroom outlining that technology can be a mere distraction, a learning tool, or an unnecessary evil where technology has a negative impact on the learning process, which is important to consider as a formative assessment tool. However, whilst technology may distract learners, alternatively:

“Technology is a tool for engaging student learning. It also is a necessary tool for providing accessible education for some students with learning and physical disabilities” (Neiterman and Zaza, 2019, p.15).

The studies mentioned above makes it clear that there is a distinct trend or unifying theme regarding the usage of technology. Technology use has the potential to enhance the students' learning experiences, but as was mentioned above, educators must carefully consider how these tools will be utilised to ensure that they will support and improve rather than detract from student engagement in learning and assessment.

Whilst there appears to be an appetite amongst lecturers to adapt to this new era of technology enhanced learning in response to the surge in the uptake of digital technology in education, a concern arose amongst the lecturers outlining that supporting “tech driven” education required time to design and develop their own digital resources without any support or professional time to do so (Marcus-Quinn, 2020). The expectations on learners has increased significantly with an expectation to master the technical competencies of the subject matter coupled with mastering the technology to complete assessments (Churyk and Mantzke, 2005). Studies by The National Literacy Trust illustrated that the majority of educators supported the use of technology as part of the learning process; however, they cited a lack of training in the use of such technology as a major barrier to implementing such, with almost a quarter (23.3%) outlining they had received no training in using such technology (Picton, 2019).

2.4 Enhancing Student Learning

Research indicates that this modern era of education is aligned with the use of technology as many college learners, almost all, are familiar with technology and how to use it (Roemintoyo *et al.*, 2022). Education cannot remain unchanged in this technology-based education era, it requires the immediate implementation of an innovative, dynamic and constructive learning climate (Aidarbekova *et al.*, 2021). Designing teaching and assessment materials with the use of technology has the potential to enable the growth of students in a positive stimulating learning environment (Tukenova *et al.*, 2019).

Research conducted in the early 2000’s identified that such online CBA did not increase the anxiety levels of learners or hinder their performance levels (Cassady and Gridley, 2005). Further research on learners’ attitudes on such use of CBA has revealed both a positive and negative response to its use. However, to alleviate concerns that CBA would hinder learners’ performance, studies conducted in late 2000’s identified that CBA provided an accurate assessment of the learners’ abilities (Maguire *et al.*, 2010). Furthermore, the introduction of CBA at professional accountancy level sparked a concern in relation to the prestigious nature regarding the accreditation of the degree. As part of their studies, Bunker and Flesher (2013) conducted research on the transition from the traditional pen-and-paper style examination to the modern CBA on the CPA examinations. As part of their study on such CPA examinations,

they noted that such a transition to CBA did not have a negative impact on the prestigious perception of the CPA certification.

Research indicated, focusing on a student centred learning approach, putting the student at the heart of the learning and assessment process, the introduction of CBA as part of the formative assessment process is essential, prior to implementing CBA as a summative assessment technique (Deutsch *et al.*, 2012). Learners should be afforded the opportunity to prepare the CBA as practice tools in preparation for their summative assessment. Many professional accountancy bodies provide the opportunity for learners to complete mock examinations to familiarise themselves with such assessment software in advance of the final module examinations.

Focusing on students' perceptions, studies conducted in 2008 identified that:

“seventy-four percent of students agreed/strongly agreed that they prefer to be assessed on-line rather than by traditional methods” (Marriott and Lau, 2008, p.83).

Focusing on enhancing student learning, the concept of deep learning plays an integral role in terms of impacting the students learning. Deep learning is described as an emotional engagement with the course or module content or material, generating an interest in determining causes and solutions, and harvesting a thirst for knowledge and understanding over and beyond the minimum requirement (Biggs and Tang, 2011). In comparison to deep learning, learners who adopt a surface learning approach are primarily focused on trying to pass the examination, usually utilising a rote learning approach, without generating any deep interest in the subject matter, or trying to gain a deep understanding or interest in the module content; the primary focus is to pass the test (Dolmans *et al.*, 2016). It is important to note, as indicated in many research papers, that learners have the ability to employ either mode of learning, deep or surface learning, as such learning styles are not associated with any individual personality traits or characteristics, but rather dependant on the context of what is being taught or examined (Cowman, 1998; Entwistle, 1991).

Building on this, in their study, Marton and Saljo (1976) evaluated the learners' ability to recall an understanding of a particular article. As part of this exercise, the study revealed that learners who executed a deep learning generated an understanding of the underlying meaning of the article, with the intention to understand the essence of the article; in comparison to learners who engaged a surface approach to learning, who concentrated on

memorising phrases and terminology used throughout the article without seeking an understanding or meaning of the article (Marton and Säljö, 1976; Kember *et al.*, 1997). Deep learning is often associated with generating an environment to facilitate critical thinking, which is a key characteristic of an excellent educational process. Therefore, it is important to assess whether the introduction of CBA, as formative or summative assessment techniques, would engage learners in a deep sense of learning, or would it encourage surface learning which may hinder the learner as they progress in the professional accountancy profession.

Research examined the introduction of gamification (utilising the mobile phone) as part of the learning process, to identify the learners' success in an undergraduate accounting module at stage one of the programme. Gamification includes quizzes as well as communicative elements helping learners structure their college daily schedule. The introduction of such technology identified that learners who engaged with this learning strategy performed significantly higher than learners who did not engage with the gamification learning strategy (Voshaar *et al.*, 2023). Further studies in the area of gamification outlined that students who utilised the online gamification tool 'Kahoot!' obtained higher marks than those that did not (Ortiz-Martínez *et al.*, 2022). It is evident from these studies that the utilisation of such gamification methods, for example the introduction of quizzes as assessment techniques, either formative or summative, would greatly assist learners in terms of deeper learning and gaining higher grades. Gamification tools can be easily translated to assessment methods in the realm of accounting and finance, for example, utilising quiz platforms as assessment techniques as part of a college's online virtual learning environment.

Whilst there are many factors that influence the learners in terms of determining a deep or surface learning approach, one factor outlined in studies by many researchers is the assessment modes (Entwistle and Ramsden, 2015; Snelgrove and Slater, 2003; Yonker, 2011). Such CBA, implementing multiple-choice questions are usually generated based on either factual information or the application of information, thereby having an impact on the levels of cognitive processing (Yonker, 2011). However, whilst assessment modes which encourage deep learning in contrast to surface learning should be rewarded; as noted in research, assessment modes will not, itself, develop a deep learner (Tian, 2007).

Vygotsky's Sociocultural Theory places greater importance on social interactions within the learning process, as knowledge is co-constructed between two or more people, in comparison

to Piaget's Theory of Cognitive Development which focuses on individuals constructing knowledge on their own. Social Cognitivism, is defined by Kolb and Kolb (2009) as:

“Focusing on experiential learning, emphasizing that learners learn by continually following a recursive sequence of experiencing, reflecting, thinking and acting” (p. 1).

CBA in a formative assessment environment lend themselves to a more cognitivism style of learning, enabling learners to continually develop knowledge, skills, and expertise on their own, continually repeating computer-based formative assessments, receiving instant feedback as part of the process. The nature of CBA do not encourage interactions between two or more people, and therefore lean towards the new modern approaches of Piaget's cognitivism.

Considerations are required in relation to the impact of CBA on learners' ability to interact and engage with the learning and assessment practice. As outlined in research, active learning and assessment environments encompasses engagement that encourages critical thinking and problem solving skills, incorporating activities to support such a learning style (Kilgo *et al.*, 2015; Kitchens *et al.*, 2018). In contrast to active learning, passive learning promotes an environment where the lecturer is the 'sage on the stage', as a singular individual in the learning environment who may share information or provide instruction in a traditional classroom setting. In such a passive learning environment, the lecturer teaches and assesses the learners in a passive manner, where learners may passively absorb the information and seldomly engage with the course content and/or material (Huggins and Stamatel, 2015).

Early research in this area outlines the employment of assessment strategies depicting question-and-answer methods and devising content scenarios with accompanying answers (which can be portrayed in formative and summative assessments in accounting and finance modules) and all support an active learning approach to learning and assessment (Pedersen, 2010; Zepke and Leach, 2010). Employing a more engaged practical form of learning and assessment reinforces the pedagogical concepts, where learners perform to a higher standard in terms of information recall through an active learning method, rather than a passive learning method (Zepke and Leach, 2010; Douglas, 2012).

Research has also shown that educators, in the ever-increasing technological era of education, whilst trying to respond to the needs of Generation NeXt (Gen X) learners in the classroom,

are facing challenges in terms of creating and delivering engaging classes and assessment strategies and techniques, whilst meeting the assessment requirements (McDonald *et al.*, 2020).

As part of their findings, The Hunt Report (2011) encouraged educators in HE environments to stimulate active engagement in the classroom, discouraging passive student engagement, enabling the learner to generate lifelong critical thinking skills, creating a learning stimulus to encourage deep and meaningful learning (DES, 2011). Therefore, it is imperative to determine whether the introduction of CBA can aid this overarching goal of encouraging active learning in third level educational settings.

Studies in active learning in accounting, and the impact on student engagement, outlines those learners exposed to an active learning environment resulted in deeper learning. As part of this research, incorporating a case study style approach, a range of online materials, including the use of technological advances such as apps, self-test quizzes and video tutorials, promoted a supportive learning classroom environment enabling learners to increase their interest and engagement with the course content. Conclusions of this research illustrated that such active learning strategies, including CBA as a formative assessment technique, enabled the creation of a positive, high quality teaching environment for learners, encouraging an active and deeper sense of learning. Furthermore, as part of this case study, learners outlined their overall appreciation for such CBA by way of online quizzes, noting their usefulness in terms of testing their own knowledge and progress (King, 2020).

Assessment feedback plays a significant role in terms of enhancing pedagogy, with research indicating that:

“All assessment activity in universities should aim to produce effective feedback for students. Indeed, feedback is arguably the most important aspect of the assessment process” (Bloxham and Boyd, 2007, p.103).

Rich feedback plays an integral role in enhancing student learning. Advances in such technology aids the learner in terms of timely feedback regarding their performance in the related assessment. According to current studies, the use of CBA in courses connected to accounting minimizes the digital divide in the learning process, with most students typically supportive of the use and advantages of such assessment methods. In this study, many

participants stated they preferred working online in contrast to using pen and paper assessment methods because they appreciated getting immediate and helpful feedback (Helfaya, 2019a). A key finding of this study notes:

“Information technology (IT), therefore, can provide an innovative type of assessment and feedback that students’ desire in an effective manner” (Helfaya, 2019a, p.1).

A key functionality of CBA is the automatic nature of enabling immediate feedback to the learner (Marriott and Lau, 2008). Research identified that if technology enables the learner to return to reengage with course materials on an on-going basis in their own time, then technology empowers formative assessment as part of the learning process (Passey, 2017).

Researchers conducted a case study analysis on the perception of learners undertaking online quizzes using electronic devices, analysing their overall performance. This study was conducted on a sample of 208 learners enrolled on an accounting module at the Universitat Autònoma de Barcelona. Findings from this study indicate a positive relationship between completing computer-based quizzes and obtaining high examination scores (Di Meo and Martí-Ballester, 2020). Further research in the area of CBA identified that the use of technology as part of the learning process, including assessment, is appreciated by learners (Helfaya, 2019b), with the learners’ performance improving in accounting related modules when conducting assessments online (Aisbitt and Sangster, 2005).

Therefore, it is evident from such research that CBA encourage an active learning environment, promoting a deeper understanding of subject matter amongst the learners.

2.5 Linkage to Industry Practice

With the aim of enhancing the student learning process, evolving with the rapid changes in technology, the Professional Accountancy Bodies transitioned their assessment process to CBA, details of which are provided in [appendix one](#). As many undergraduate learners progress to professional accountancy studies, this has a direct implication on the policies and practices at undergraduate learning and assessments. Studies have outlined that many students expect learning institutions, at a faculty level, to provide provisions to prepare learners for the professional accountancy examinations, outlining the more skills and educated the faculty lecturers were in relation to CBA, the better informed learners would be in this regard (Peterson, Kramer and Reider, 2002). Indeed, it is evident from the literature that learners

expect to be best prepared for such professional accountancy examination, meaning the introduction of such assessments techniques at undergraduate level would provide the opportunity for learners to gain experience and knowledge in such areas.

Furthermore, many professional accountancy organisations conduct their in-house learning via online platforms (Deloitte, 2022). Studies conducted in recent years outlined that:

“University curriculum develops students’ soft skills,....., and supports the relationship between soft skills and student preparedness for employment” (Teng *et al.*, 2019, p.1).

Industry experts in their report *Preparing Youth for the Workforce of Tomorrow* noted that:

“New entrants to the workforce will require very strong social, employability, and work-readiness skills that reflect the behavioural, attitudinal, and character traits highly valued in the workplace and in society” (Yoder *et al.*, 2020, p.8).

Building on this, many future employers expect a link between higher education and practice (Lisá *et al.*, 2019). Studies also note that the educational process must be aligned with the workforce requirements, as this plays an integral role in terms of preparing learners for future employment (Finley, 2021). Focusing on this, students have indicated an expectation that college education must be ‘laser-focused’ in terms of preparing learners for future employment (Gora, 2022).

Further research places emphasis on authentic assessments and its relationship to student learning and future employment. Studies have outlined that:

“Authentic assessment aims to replicate the tasks and performance standards typically found in the world of work and has been found to have a positive impact on student learning, autonomy, motivation, self-regulation and metacognition; abilities highly related to employability” (Villarroel *et al.*, 2018, p.1).

It is evident that learners, and future employers, expect third level educational providers to ensure they are preparing learners for future employment, which can be achieved by introducing such authentic assessments which mirror the professional workforce.

2.6 Learners' Technical Proficiency and Competence

One of the key concerns in relation to introducing CBA at undergraduate level is ensuring students are proficient and competent in relation to using such technology. Literature defends this statement by stating:

“Since online lessons are delivered via technology-enhanced devices, therefore it is crucial for students to be ready and competent in dealing with the computer and the internet” (Chung *et al.*, 2020, p.304).

Literature indicates that the introduction of early practical experience such as the use of CBA for formative assessments would increase the skills and expertise required by the user groups to complete such CBA at third level education (Deutsch *et al.*, 2012). Therefore, it is required that students are exposed to formative / practice assessment in advance of end of term summative assessments, to ensure learners have the skills and experience to complete CBA.

In recent studies examining the 21st century skills of learners, research indicates that learners possess digital literacy skills such as access to the necessary technical knowledge, skills, and expertise; ability to access and produce digital information; noting that learner's digital literacy skills are linked to all skills in all fields of education (Koçak and Göksu, 2020). Recent studies have indicated that:

“Students' readiness was high in computer and internet self-efficacy” (Chung *et al.*, 2020, p.302).

Whilst research would indicate the readiness of learners in terms of computer literacy and proficiency, a case study in Jordanian University focusing on their emergency online teaching response to COVID 19 identified that:

“After experimenting with the online learning model, students expressed a moderate level of satisfaction with the new trend. However, our findings stressed the importance of providing a state-of-the-art technical infrastructure of powerful Internet connections and digital e-learning tools for an ideal online learning environment” (Al-Salman and Haider, 2021, p.9).

From this, whilst students are happy to engage with a modernised teaching and assessment strategy, using CBA as part of the process; students stress the importance of providing high

quality infrastructure to facilitate this assessment strategy, along with ample formative/practice tools or aids as part of the process. Access to such technology is explored later as part of this literature review.

2.7 Access to Technology

As noted in the previous paragraphs, it is imperative that students have access to high-quality technological infrastructure to successfully partake in CBA. Advances in technology has influenced the educational sector today, with an increased expectation on schools and educators to enhance the learning environment with the use of technology; however, challenges to its use and access have been identified. One of the key concerns to such advance use of technology is the access to technology by the educator and learners, followed closely by educators' attitudes to using such technologies (Winter *et al.*, 2021).

As education shifted online in response to COVID-19, sparking an increased interest in research in this area of access to technology, one major concern noted was the assumption that all learners would have access to appropriate technology and home support to implement such an online teaching strategy (Winter *et al.*, 2021). Research indicated an increased loss in learning for learners in a disadvantaged position in terms of limited or no access to computers, the internet or other necessary technologies to implement online learning and assessment (Willis, 2020). Studies in the UK with regards to online education and assessment in primary and post-primary education indicated that student learning was negatively impacted for learners as:

“They don't all have their own devices, space in the home, good broadband and some need your physical presence to keep them motivated” (Winter *et al.*, 2021, p.6).

Again, such considerations should be reviewed in terms of implementing CBA, as these factors will impact the successful implementation of the transition in assessment technique.

Whilst the primary focus on access to technology relates to elements such as laptops or computers, one of the key drivers for success in terms of utilising CBA is access to sufficient broadband internet. Research in this area was significantly heightened in response to COVID-19, where many learning institutions were forced to cancel face-to-face learning and transition to an online learning environment. Recent studies have raised concerns in relation to learners' remote access to online digital learning resources, including access to high quality broadband

connectivity. Access to such high-quality broadband connectivity is paramount to the success of CBA. As part of their studies in relation to high-quality broadband connectivity in Ireland, Cullinan *et al.*, (2021) identified that:

“One-in-six students come from areas with poor broadband coverage” (p. 1).

Furthermore, such studies have outlined that learners from such poor broadband coverage are more likely to be socioeconomically disadvantaged. Researchers have also indicated the urgent necessity of local government to intervene in terms of providing greater equity of access to high-speed broadband, to enable the provision of online learning in the future, if so required (Mac Domhnaill *et al.*, 2021).

Indeed, it is evident from the research, that whilst learners may be tech savvy and accepting of utilising such assessment techniques, there continues to be a digital divide amongst learners regarding access to such technologies required to implement CBA, which must be considered by the HE Institutions.

2.8 Summary

Indeed, the literature to date indicates a strong acceptance by learners with regard to utilising such CBA; however, such acceptances may be challenged by other factors such as ease of access to such technology, resources and supports in terms of preparing for CBA, which the researcher aims to investigate as part of this study.

A large proportion of the literature to date is reflective of educational settings in primary and post-primary classrooms, with some reference to lecturers’ perceptions and attitudes at public third level institutions. There is a limited amount of research conducted in relation to third level education in the Irish economy, with a specific emphasis on private education focusing on the learners as the key stakeholder; a notable gap in the research in this area. Therefore, this study will explore the attitudes of learners in response to utilising such CBA, delving into their attitudes, advantages, challenges, and limitations of using CBA at undergraduate level in Ireland, with a particular focus on a private third level educational provider. To do this, the researcher will focus on the following key emerging themes arising from the literature review:

- Literature indicates a positive connotation between CBA and the student attitudes – the researcher aims to explore this further to determine are there any concerns in relation to executing CBA amongst private third level learners.
- Literature details student readiness and preparedness in relation to completing CBA – this study will focus on such themes to ascertain if this is applicable to undergraduate learners in private higher-level education.
- Literature explores the impact of CBA in relation to deep interactive learning – this research will consider such concepts in relation to learners who have recently been exposed to this method of assessment in private education.
- Studies conducted to date indicate the expectation of students in relation to being prepared regarding future employment – this research will explore this further to decipher if such expectations resonate with learners in private education.
- Finally, literature has noted concerns amongst students in relation to access to suitable technology to complete CBA – this study will build on this literature to determine if such issues are still prevalent amongst learners in private education.

Conducting this small-scale research study, building on the research to date, will make an important contribution to studies in this area, specifically contributing to third level institutions and the academic community, with a primary focus on learners studying in private third level education.

CHAPTER THREE – METHODOLOGY

3.1 Introduction

This chapter outlines the research methodologies employed by the researcher, detailing the research objectives, philosophy, approach, and strategy, describing the methods used to collect the data as a result of the findings and conclusions identified as part of the literature review in [chapter two](#) above. This chapter also analyses the techniques used by the researcher in terms of analysing the primary data which is collected in response to investigating the research objectives. Furthermore, this chapter also considers the ethical concerns as part of the research methodologies.

Creswell, one of the more notable researchers in the area of educational research methodology has described research as a process or steps utilised by a researcher to gather and analyse information in relation to the research topics, with an end result on gaining a deeper understanding on the topic or research hypothesis (Creswell, 1994). As noted by research, there are many methods or vehicles which a researcher can utilise in order to gain information on the research objectives; encouraging researchers to utilise different approaches as this will yield a greater return in terms of knowledge and data (Blaxter *et al.*, 2008). Focusing on the advice influenced by research, primary research was conducted using research instruments such as surveys, interviews, and a focus group. Such methods of primary research were utilised based on an interpretivist/constructivist philosophy.

3.2 Research Philosophy

As part of this study, the researcher utilised a qualitative interpretivist approach to conducting research, utilising a range of qualitative research techniques to explore the research hypothesis. The study was exploratory in nature, focusing on an investigation regarding implementing CBA as part of the assessment strategy in accounting and finance modules at undergraduate level.

Research has indicated that some of the main features of qualitative research include research instruments such as questionnaires, observations, reflective journals, focus groups, and surveys, to name a few. Such research should be conducted in an open-ended manner, enabling the researcher to gather valuable and meaningful information or data in relation to the research hypothesis (Creswell, 1994).

Further research by Hammersley, another prominent researcher in the area of educational research, contributed significantly to the paradigms in regard to research, investigating and exploring the interpretivist and positivist paradigms (Hammersley, 2012). The positivist methodology to research is linked to relationships, attempting to identify causes which may impact certain outcomes (Scotland, 2012). Further studies have indicated that positivism focuses on pure data and facts, without any influence or bias from human involvement, intervention or interpretation (Alharahsheh and Pius, 2020). Research conducted following a positivist approach relies on quantitative data, which researchers believe to be more scientific and trustworthy, avoiding the involvement of any human behaviour or emotions, providing objective information and findings (Johnson, 2014).

In contrast to this, the interpretivist paradigm, focuses on adopting a research methodology where the research phenomenon can have a number of explanations, building knowledge and theory through observations and interpretations of social constructions (Al-Riyami, 2015). Research outlines that an interpretivist researcher should employ skills to enable the researcher to gain an understanding of the different ways of viewing and experiencing the world, taking into account the different cultures and contexts, without bias or undue influences when studying individuals and their respective interpretations (Pham, 2018). This research method enables the researcher to deeply understand the social context of the research phenomenon, which is a major advantage; however, research has indicated that this interpretivist methodology to conducting research results in findings of a subjective rather than objective nature (Mack, 2010). The constructivism research paradigm is a product of mutual understanding made by people in social ways, seeing knowledge as co-constructed by the researcher and research participants, with the researcher inherently involved in the research journey. The constructivist approach is used to understand 'why something might be happening', or 'how people might be thinking' (Magoon, 1977).

As studies evolve, research is becoming more complex and diverse. The two key, and most popular, methods for conducting research are qualitative and quantitative methods; qualitative methodology grounded on the interpretivist paradigm to research, and quantitative methodology grounded on the positivist paradigm to research (Tuli, 2010).

3.3 Research Approach and Strategy

The three research aims of this study are:

1. To explore the attitudes of learners in relation to utilising CBA in comparison to HWA.
2. To identify the benefits and drawbacks of utilising such a method of assessing learners.
3. To investigate the potential challenges to introducing CBA at undergraduate level in accounting and finance related modules.

To achieve these aims, the researcher utilised the following objectives:

1. Conducted secondary research of current literature regarding CBA to develop themes and strands of enquiry for primary research.
2. Executed surveys (via questionnaires) with undergraduate learners to determine their attitudes and preferences (including benefits, limitations, and challenges) regarding CBA.
3. Analysing and building on the responses from the surveys, conducted a focus group with learners to gain greater insights and understandings from such findings.
4. Finally, conducted two in-depth interviews with learners to gain deep personal insights to their perceptions of using CBA.

Following a review of the research methodologies and considering the purpose of the research is to explore the learners' attitudes to CBA, gathering in-depth insights to the benefits, challenges, and limitations of using CBA based on the beliefs and experiences, developing an understanding of how the learners feel, think, and understand CBA; the interpretivist/constructivist approach is most suitable for this research study. This research method is the optimum approach to provide the best possible findings and conclusions of the research objectives, enabling the discovery of deep and meaningful findings, supporting the research objectives of this study.

Mason (2002) describes the interpretivism approach to research as an approach that is:

“Closer associated with the qualitative method where data is collected in order to develop explanations, arguments and generalisations based on people's knowledge, view, understanding and experiences of the social reality being explored” (p. 7).

The qualitative interpretivist/constructivist analysis is best suited for this study as it acknowledges that knowledge is socially created by two or more individuals, enabling the creation of thoughts and ideas based on experiences, utilising research instruments such as interviews or focus groups, where the participants engage in a mutually constructed conversation which promotes discussion.

Whilst the interpretivist/constructivist approach has been utilised as part of this study, it is important to acknowledge the criticisms associated with such methods of research. Researchers have indicated that the qualitative approach to data collection can be time consuming in comparison to a quantitative approach, resulting in smaller sample sizes being used. Therefore, this will limit the ability of the researcher to extrapolate the findings and conclusions to a wider population with the same degree of certainty as research findings obtained utilising a quantitative approach (Ochieng, 2009). Furthermore, studies have outlined that due to the nature of qualitative research being associated with data that is characterised by personal feelings, beliefs and experiences, some researchers believe it is not reliable consistent information in comparison to findings and results arising from quantitative studies (Cohen *et al.*, 2007).

However, taking the above into consideration, the researcher concluded that the benefits of this research approach outweighed the drawbacks, and therefore has utilised the qualitative interpretivist approach to research as part of this study.

3.4 Research Design and Methods

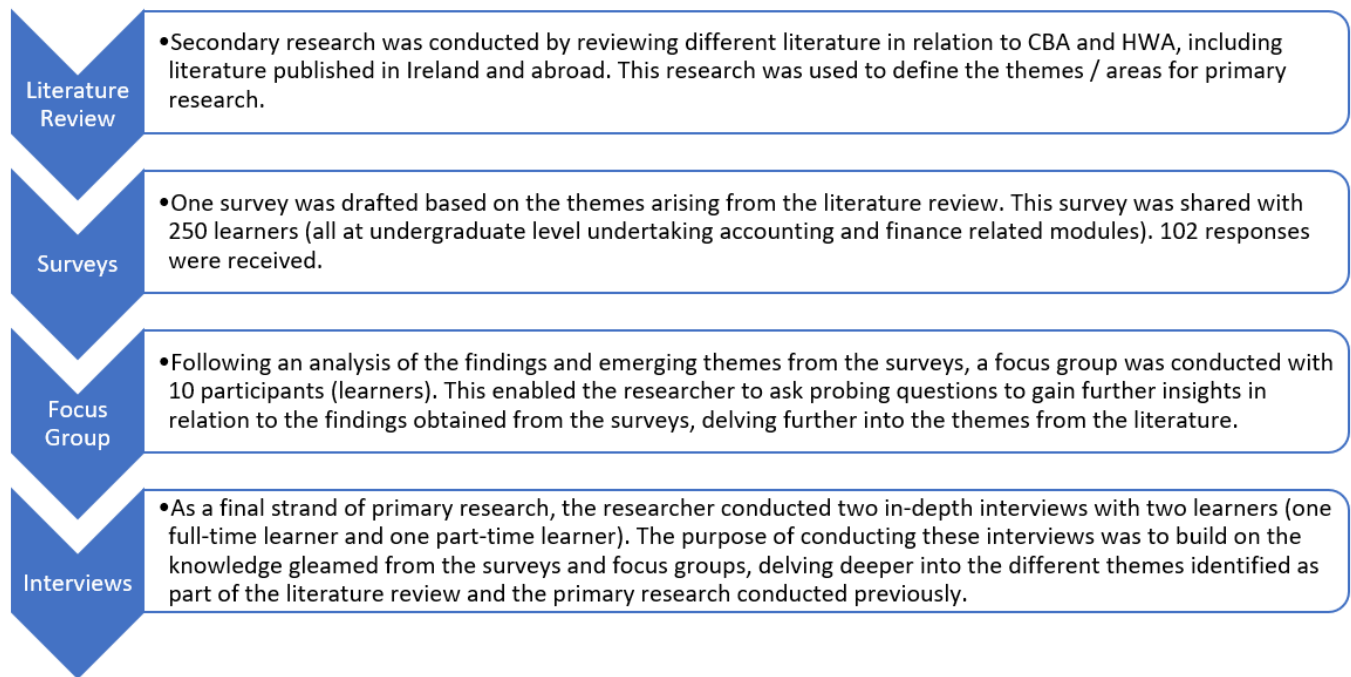
The research conducted as part of this study included both primary and secondary methods of research. The secondary research was conducted by reviewing appropriate relevant literature, including online articles and publications, latest publications by other leading institutions and researchers in this area, deep and surface learning, active and passive learning, and challenges in respect to the use of technology in education. Such secondary research was obtained using an institutional library database, searching key words like computer-based examinations, computer-based assessments, tests, assessments, undergraduate, higher education, accounting and finance, access to technology, and online assessments.

In line with a qualitative approach to conducting research, the researcher executed the research by completing surveys, a focus group, and interviews. This primary research was conducted based on experiences and studies within the researcher's own HE learning institution; namely, Griffith College Dublin, predominantly aimed at computational based modules, such as accounting and finance related modules, at undergraduate level in the Faculty of Business, on both the BA (Hons) in Business and the BA (Hons) in Accounting and Finance programmes.

3.5 Data Collection Methods

As outlined above, this study was conducted using the interpretivist/constructivism qualitative research methodology. There were three main streams of data collection methods utilised as part of this study; surveys, a focus group, and individual interviews. The research process commenced with designing surveys based on the research question and aims. Following this, the researcher conducted in-depth interviews and a focus group, designing questions based on the initial findings and results arising from the surveys conducted with the learners. The use of this qualitative research approach applied throughout this study enabled the researcher to design or modify questions over the course of the research when conducting interviews (Gubrium and Holstein, 2012). Utilising such research instruments enabled the researcher to gain deep insights and understandings into the research aims, encouraging discussion amongst the participants, and gaining an insight into the learners' perspectives and interpretations of the use of such CBA. The use of a focus group enabled the researcher to delve deeper into the emerging themes arising from the surveys, along with obtaining a more deep and personal understanding in the interviews. Figure 3.1 details a schematic portraying the research executed by the researcher.

Figure 3.1



The primary data collection research instruments utilised as part of this study have been described further below:

3.5.1 Surveys

The use of surveys in HE is a common experience for lecturers and learners in education, all of whom are familiar with surveys as a tool in terms of data collection. According to research, surveys are one of the most commonly used tools in terms of data collection used by researchers when conducting studies in HE, with research indicating that high volumes of researchers utilise this method of data collection (Stage and Manning, 2016). Research also indicates that many faculties and students conducting research in the educational third level college setting frequently utilise surveys due to their efficient and effective nature in terms of data collection. Furthermore, many Colleges and Universities utilise surveys in regard to their ongoing research efforts at an institutional level (Kuh *et al.*, 2015). Babbie (2012, cited in Metwally, 2012) outlines surveys as a useful data collection tool in explaining, describing, and assessing the attitudes, characteristics, and opinions of a large population, identifying the key benefits such as efficiency and reliability. Advances in technology has supported the extensive use of internet-based surveys, enabling knowledge creation in research (Ward and Pond, 2015).

The researcher completed one survey as part of the primary research. Broad themes arising from the literature review, coupled with linking this information to the research aims, were used to design this survey questions, details of the questions can be found in [appendix two](#). The survey, which took 10-12 minutes to complete, was shared with 250 learners at undergraduate level (out of a pool of approx. 400 learners), learners completing accounting and finance related modules at both stage one, two, and three of the programmes. The researcher received 102 responses from this survey across all stages of the programmes, representing a 41% success rate in terms of responses.

3.5.2 Focus Groups

Focus groups have been defined by researchers as a group interview or a collective conversation amongst participants (Dimitriadis and Kamberelis, 2014). The use of focus groups as a method of collecting primary qualitative data enables the collection of a broad range of opinions, usually in a face-to-face setting, allowing the researcher to study the group interactions (Hinkes, 2021). The use of focus groups in academic research has increased significantly, emphasising the importance of collecting reliable data and information on what the participants think, gaining an understanding into why they think the way they do, facilitating interactions amongst the group participants, allowing them to freely express their views and compare them to their peers or colleagues (Stage and Manning, 2016).

The researcher utilised this method of research as part of this study as it enabled the collection of richer feedback through the interactions in the focus group, collecting data on impressions and attitudes of the participants. The focus group was conducted after the surveys, enabling the researcher to analyse the findings of the survey, generating open-ended probing questions based on the findings of the survey. The focus group was conducted with ten learners.

There was one focus group conducted as part of this study, which took place in person. This focus group was recorded by the researcher via zoom, with permission from the participants, to enable the researcher to participate in the focus group freely and actively, without any distractions in terms of taking notes, etc. which may have deflected from the dynamic of the focus group. Furthermore, the researcher was able to focus on the conversation between the participants, reading body language and identifying cues which induced additional questions as part of the study.

The general themes arising from the literature review as part of the secondary research, coupled with the findings and analysis arising from the surveys conducted above, were utilised by the researcher to broadly guide the focus group questions. Whilst the focus group utilised a semi-structured approach to asking questions, these broad themes and findings were used to guide the focus group, encouraging in-depth discussions regarding the research aims and objectives, whilst trying to ensure the participants did not stray from the topics being studied. Therefore, the focus group was broadly guided around the questions found in [appendix three](#). The focus group lasted roughly forty-five minutes.

3.5.3 Interviews

Research has indicated that interviews enable the researcher to obtain deeper, thematic descriptions of complex experiences by interviewing participants in relation to their own evaluation of experiences and perceptions (Bender *et al.*, 2021). Kvale and Brinkmann (2009) have described an interview as an interactive conversation between the researcher and participants, both of whom have shared interests. Ethnographic interviewing, known as the traditional method of conducting interviews, entails the researcher gaining an insight into the perceptions that relate to human experiences (Charmaz, 2006). Research details that there are three kinds of interviewing techniques that can be used as qualitative research; namely, 1) semi-structured interviews, 2) standard open-ended interviews, and 3) informal interviews conducted in a conversational manner (Patton, 1990).

As part of this study, the researcher conducted two in-depth semi-structured interviews. These interviews were conducted with learners who are undertaking accounting and finance related studies at Griffith College, one participant studying full-time and one participant studying part-time. The purpose of conducting these interviews was to build on the knowledge gleaned from the surveys and the focus group, delving deeper into the different themes identified as part of the literature review and the primary research conducted. The questions for the interviews were constructed based on the findings from the previous primary research, surveys, and focus group, linking it back to the themes identified in the literature review.

The questions designed for the interviews which were broadly used to direct the interview process can be found in [appendix four](#).

All interview and focus group participants were contacted via email to set up the interview and focus group time, sharing details of the participants information sheet and consent form. In adherence with confidentiality, all participants were advised that all information shared as part of the research process would remain strictly confidential, with the participants remaining anonymous in the study, with no identifiable information being shared in the research findings. The participants would be referred to, as required, as interviewee 1, and interviewee 2. When conducting the interviews, the researcher recorded the interviews via zoom, enabling the researcher to fully concentrate on the interview process, in line with best practice as indicated by research, outlining that recording will prevent the researcher from getting stressed focusing on note taking in regards to the various items detailed by the participants (Johnson, 2010). At the start of the interview, and as part of the participant information sheet, all interview participants were advised that the recordings would be deleted following the examination boards or within two years after the interview date, whichever is sooner. The interviews lasted approximately forty-five minutes each.

3.6 Data Analysis

As noted, as part of the limitations of this study, the qualitative methods of the research have returned a vast amount of information, gathering a large volume of valuable data. Analysing such large volume of information would be considered beyond the scope of this study; therefore, the researcher decided to focus on some key emerging themes identified as part of the research, which are detailed as part of the analysis in [chapter four](#). As part of the data analysis process, the researcher manually transcribed the focus group and interviews, which enabled the researcher to code the data into broad themes in response to the research objectives. Coding is considered as the process of sorting and organising the data, which has been transcribed by the researcher, into categories from which themes can be identified for analysis (Durberry, 2018).

Following this, the researcher began the theme identification stage generating links between the literature review and the primary research. The interpretation of the information gleaned in the research is a crucial stage of the study.

3.7 Reliability and Validity of Information

Studies to date have indicated the importance of information validity and reliability of such data as an integral aspect of research that underpins the credibility and integrity of the study (Griffin *et al.*, 2022). Further research has indicated the importance of maintaining an audit trail of the research, detailing the source of the information, the creditworthiness of the research, and the accuracy of such information (Saunders *et al.*, 2020). Therefore, keeping in line with best practice in relation to research, the researcher has kept an audit trail of all research completed and analysis conducted as part of the study, with a focus on ensuring the highest standard of validity and reliability possible. This approach was employed throughout all chapters of this study.

3.8 Limitations

The main limitations related to time sensitivities in terms of conducting the research, coupled with the rapidness of the ever-evolving nature of CBA, and the increasing technological advances in the educational sector; meaning it was challenging within the timeframe to research all aspects of the hypothesis necessary to gain an in-depth understanding of the study and its impact on education. Furthermore, the research methodology was qualitative in nature; therefore, future iterations of this study may wish to conduct quantitative research to measure or validate the success of utilising such methods of assessments. Finally, the research was conducted in the researcher's learning institution, Griffith College. As this is a first attempt of this study, further opportunities for research may wish to entail other learning institutions across Ireland.

3.9 Ethical Considerations

Ethical consideration plays a vital part in the research process. Many researchers to date, such as Bell and Denscombe, have outlined the integral role or importance of obtaining ethical approval before conducting research as part of the study (Denscombe, 2008; Bell, 2010a). Ethical research entails receiving informed consent from the participants in advance of using the research instrument, coupled with reaching an agreement in regard to the use of this data, outlining how the findings as a result of this research will be reported and distributed (Bell, 2010b). Other researchers have outlined the importance of ethical approval by outlining that opting out of obtaining such approvals is not an option for the researchers (Farrimond, 2012).

The first step of the ethical approval process was to obtain approval at an Institutional level, gaining approval from the Research Ethics Board at Griffith College to complete research in the area of CBA, focusing on the particular areas identified in the research objectives. Please see [appendix five](#) for documentation in relation to such ethical approval.

The second step in the ethical process was ensuring to put provisions in place to gain informed consent from the participants in this study, learners at undergraduate level. The researcher drafted ethical consent forms to share with participants in advance of conducting the primary research. Please see [appendix six](#) for such documentation. Research dictates that best practice is to ensure to provide detailed information to all participants about the nature of the research, including the purpose, risks, and benefits of the study. Participants have the right to know they are being researched and have the right to withdraw from the study at any time, without providing a rationale for withdrawing (Seale *et al.*, 2004). In line with best practice, and ensuring the participants understood the research required as part of this study, an information sheet was shared with all participants, clearly outlining the purpose of the study. Please see this information sheet in [appendix seven](#).

Confidentiality plays an integral part of the research process, ensuring to protect the participants identity and their contributions to the study. In response to this, the researcher has implemented naming conventions to protect the identity of the participants.

The nature of qualitative research, in comparison to quantitative research, is particularly exposed in terms of its findings being biased in relation to the researcher's opinions (Thirsk and Clark, 2017). To dilute potential bias, the researcher ensured all survey respondents would remain anonymous throughout the process, and participant selection was random for the focus group and interviews based on a pool of volunteers. Finally, all emerging themes from the primary research are detailed in the appendices to this study, ensuring full representation of the findings are disclosed, further diluting researcher bias.

Implementing the above measures has ensured best practice in relation to ethical considerations has been adhered to throughout the research process. Furthermore, as the researcher is conducting primary research on learners within the researcher's learning institution, it was important to minimise bias and influence, remaining subjective throughout

the process, with an aim to present a true and fair analysis of the findings from the primary research.

3.10 Conclusion

This chapter outlined the research methodology implemented by the researcher as part of this study, providing a rationale for the use of such research methodologies; an interpretivist/constructivist approach, supported by various academics and researchers in academia. Finally, this chapter provided an in-depth analysis in relation to the ethical process as part of the study, detailing the limitations of the study, whilst highlighting potential future studies in this area arising from the primary research.

CHAPTER FOUR – FINDINGS, ANALYSIS AND DISCUSSION

4.1 Introduction

Chapter four details the findings, including the analysis and discussion of the findings, arising from the primary research on the research hypothesis, based on the research objective as outlined in the previous chapter, linking the primary research back to the literature reviewed as part of the secondary research phase of the study. The findings from the primary research have been pooled into themes which respond to the research questions, linked back to the literature review; moreover, supporting the gaps identified as part of the study to date.

The findings and analysis have been presented in a concurrent manner, providing a logical sequence, facilitating an in-depth analysis of the findings as part of this chapter. The findings and subsequent analysis will be linked back to the three research questions/aims.

To establish this, this chapter is divided into four different segments. The first part will detail the profile of the participants as part of the primary research for this study. As the key stakeholder focus of this study was learners in higher level education, it is important to closely understand the different characteristics of the participants, and their responses and opinions as they are being observed and analysed as part of this chapter. Following this, the next three segments will detail the findings and analysis of the three primary research instruments; namely, surveys, a focus group, and interviews; focusing on each of the research objectives. Each of these instruments were utilised by the researcher to identify emerging themes and findings to address the three research questions.

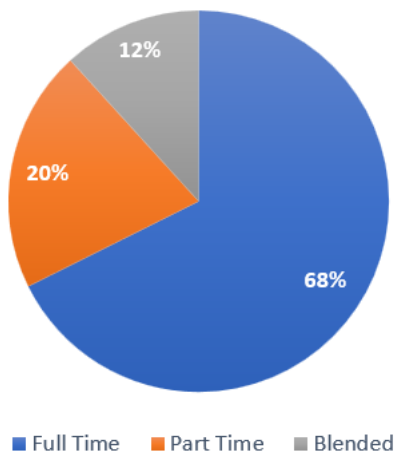
4.2 Profile of the Research Participants

As this study focuses on learners in HE, particularly focusing on private education, the different research instruments engaged learners from accounting and finance related modules in Griffith College on the BA (Hons) in Accounting and Finance and the BA (Hons) in Business. It should be noted that all participants have experience of both computer-based and handwritten assessments.

4.2.1 Survey Participants

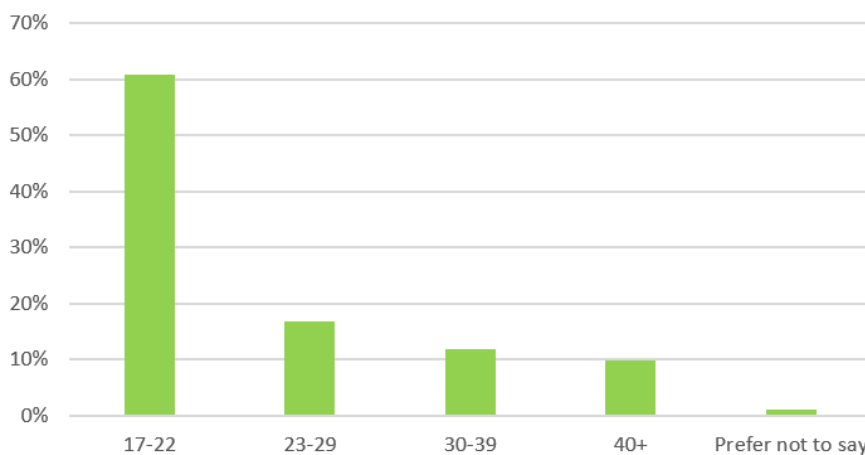
The participants engaging in the surveys [102 participants] were selected across all three study modes in Griffith College: namely, full-time students, part-time students, and blended (online) learners. Figure 4.1 details the breakdown of the study mode for the survey participants.

Figure 4.1



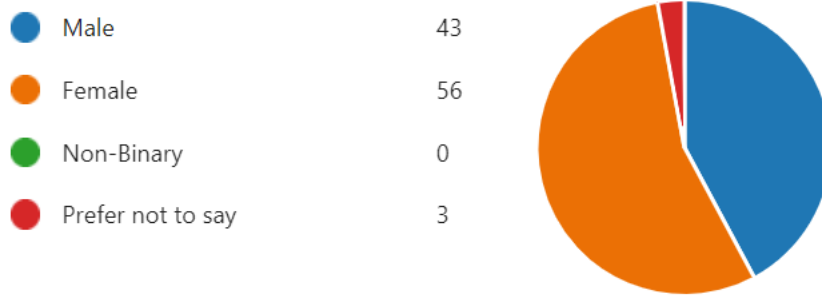
As part of the survey, learners were prompted to provide details in relation to their age profile, determining if learners are direct entry into third level education (i.e., direct entry from secondary level education), or if they are an experienced mature learner returning to education. The vast age gap portrays that opinions of both younger students and experienced students are being considered as part of this study. Figure 4.2 details the age profile of the survey participants.

Figure 4.2



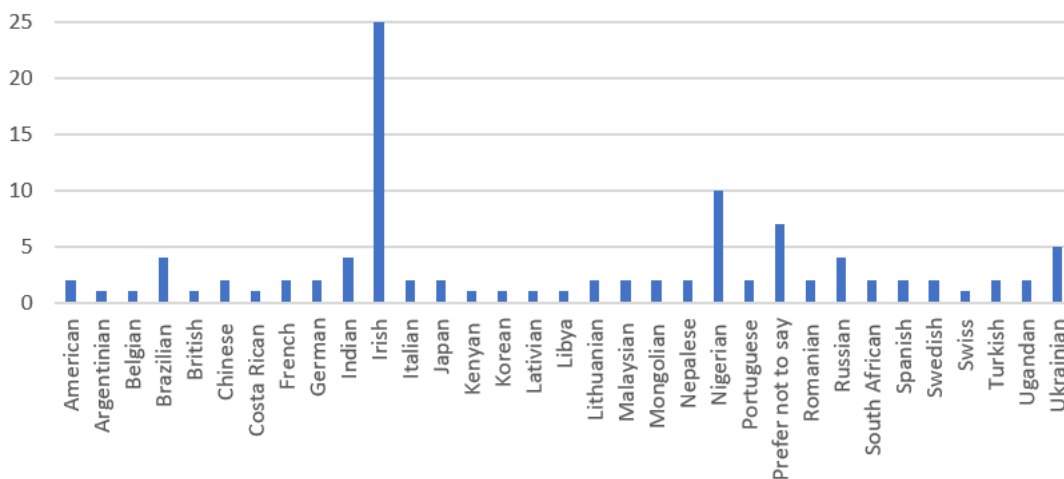
Participants provided information in relation to their gender. Figure 4.3 details the breakdown of participants based on gender.

Figure 4.3



As a private third level institution, many of the learners tend to be from different nationalities across the globe. Therefore, this research ensured to capture different nationalities as part of its study. Figure 4.4 details the various learner nationalities included as part of this study.

Figure 4.4



4.2.2 Focus Group Participants

The second stream of primary research entailed conducting a focus group with ten participants [full-time students]. The age profile and nationality profile of the participants in this focus group are detailed in figure 4.5 and figure 4.6 respectively.

Figure 4.5

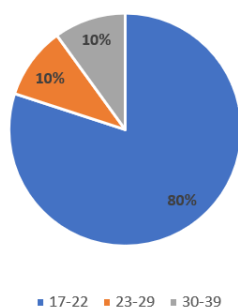
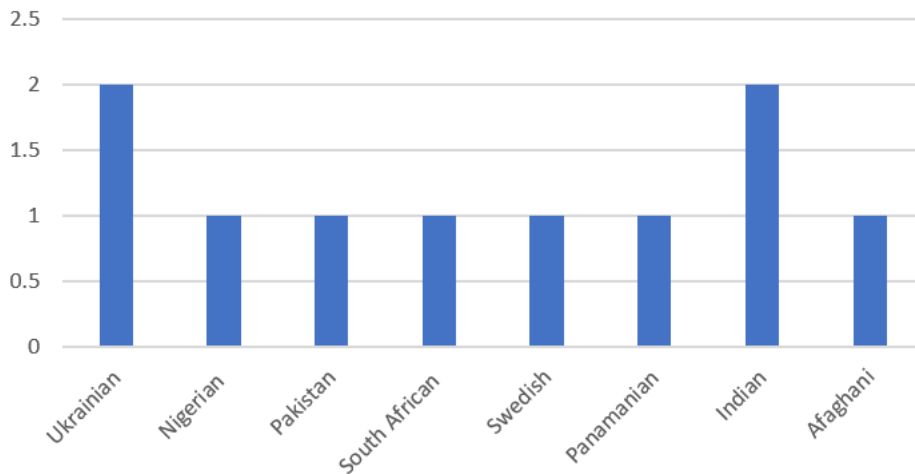


Figure 4.6



4.2.3 Interview Participants

As part of this study, two in-depth semi-structured interviewed were conducted. Table 4.2.3.1 details the profile of the two interviewees:

Table 4.2.3.1

Participant No.	Study Mode	Age Profile	Nationality
Interviewee 1	Part Time Student	30 – 39 [mature learner]	Irish
Interviewee 2	Full Time Student	17 – 22	Nigerian

4.3 Research Background

The three streams of research instruments were conducted as follows:

- **Surveys:** The surveys were circulated with students in the middle of the teaching term (week six of thirteen), sharing the link to the survey via email to all participants. Learners completed these surveys in their own time, requiring up to 10 to 12 minutes to complete each survey.
- **Focus Group:** The focus group was conducted after the final examinations had been completed, enabling learners to experience both interim assessments and end of term examinations. The focus group was conducted face-to-face on Griffith College Dublin

campus and took place in July 2023. The duration of the focus group was roughly forty-five minutes.

- Interviews: The two in-depth interviews took place in July 2023; one of which was conducted online via zoom, and one of which was conducted in person on Griffith College Dublin campus. The duration of the interviews were roughly forty-five minutes.

All three strands of enquiry were utilised to address all three research aims. The focus group and semi-structures interviews involved probing the participants to gain deeper understandings to the responses from the surveys, and to gain greater insights as part of this study. The data from the primary research was coded using different emerging themes, which can be found in [appendices eight to ten](#). As part of this chapter, the researcher has utilised direct quotes from the research instruments to demonstrate these themes and to strengthen the validity of the study. The themes identified as part of the coding process provided the main headings for the findings which are discussed below.

4.4 Findings and Discussions

4.4.1 Research Aim One: Findings and Discussions

To explore the attitudes of learners in relation to utilising CBA in comparison to HWA.

4.4.1.1 Learners' Attitudes to Computer-Based Assessments

When exploring the attitudes of learners in relation to completing CBA in comparison to HWA, findings arising from the survey outlining that 75% of learners preferred to complete CBA with 25% of learners preferring to complete HWA. Exploring this further, participants when probed in the focus group outlined that CBA are preferred due to their technical functionalities such as typing ability is quicker than handwriting, spelling and grammar tools assist with errors, and CBA enable faster feedback from lecturers. Such statistics are not surprising as researchers, such as Churyk and Mantzke (2005) have outlined that there is an increased expectation from the student body to include technology as part of the teaching and assessment strategy within the learning process.

An interesting observation from the findings from the interviews, which was unexpected as it was not discovered as part of the secondary literature review, was in relation to the credibility

of the assessment process. One interviewee raised concerns, which reflected across the student body, in relation to the credibility of HWA, noting:

“That some students are concerned they have not received the correct result/grade. CBA enables learners to receive their feedback and exam script back, meaning students can be sure they have received the correct grade”.

Whilst this finding raises distressing concerns in relation to students’ perspectives regarding the credibility of assessments; a positive discovery relates to the reassurances students receive in relation to completing CBA, ensuring they are receiving the correct results or grades, thus strengthening the argument for utilising such assessment techniques.

4.4.1.2 Future Employment Skills

A key emerging theme in relation to learners’ attitudes towards utilising such CBA evolved around their concerns for future employment in the field of accounting and finance. Primary research indicated that learners cherished the skills required for succeeding in the workforce and therefore expected such skills to be instilled in the learning process at undergraduate level. One survey respondent noted that CBA:

“Encourages the use of computers and technology as part of the assessment process, encouraging learners to improve their typing skills – all of which are required for future employment”.

Furthermore, another survey respondent noted that:

“I believe nowadays there is no handwriting working required in the real world, companies use systems for all tasks, the college has to prepare the students for the workplace, and I see many people struggling with technology at work because all their exams were handwritten and now, they are required to do it on Excel or use different systems to perform their work”.

Supporting this, all respondents in the focus group and interviews placed an important emphasis on the ability to easily transition from third level education to the workplace, ensuring that such skills were taught at undergraduate level. Respondents noted that:

“Students should be prepared for that lifestyle in work / future workforce”.

Delving into this further in the focus group and interviews, participants also noted that undergraduate level studies should prepare learners for future studies at the professional accountancy level. Participants in the focus group outlined that:

“Students prefer to embrace the use of CBA now in their undergraduate studies as professional accountancy bodies complete all assessments using CBA”.

Interviewee one also noted that:

“Undergraduate studies should mirror the assessment process at professional accountancy level, students should learn it now and be prepared for the future”.

This primary research has highlighted the positive association between CBA and the benefit to future employment and post graduate professional accountancy studies, including its purpose in the modern technological lifestyle and society to which learners are accustomed to. Such findings correspond with what was revealed from the literature review. Studies conducted by Peterson, Kramer and Reider (2002), Teng *et al.*, (2019) and Gora (2022) concur with the findings from the primary research, highlighting the importance of learners’ attitudes to being prepared for future endeavours, identifying a strong link between education and industry practice.

4.4.1.3 Skills and Experience

The primary research as part of this study, conducted by way of survey, has confirmed the findings as part of the secondary research, that learners feel they have the skills and expertise to use technology as part of the learning process, outlining that:

“Students are more into gadgets and technology, so it is more likely that students would prefer CBA”.

Future analysis of the primary research, conducted in the focus group and interviews identified that most students have access to technology in their day-to-day live, depending on the use of technology for a vast majority of their day-to-day tasks. Interviewee two stated that:

“They have completed CBA prior to their studies in Griffith College, giving them the skills and experiences to do CBA. Many Nigerian students complete their secondary level examinations using CBA, and this should be continued in to third level education”.

The commentary from the student cohort aptly expresses their feelings that they feel students have the required skills and expertise to do CBA. These findings are not surprising as they correspond with previous studies conducted by Kocak and Goksu (2020) and Chung *et al.*, (2020).

However, in contradiction to this, interviewee one [mature learner] outlined that:

“Mature students prefer HWA as they do not have the experience and skills to complete CBA. There is also a concern around typing skills and the lack of such skills.”

This latter finding is unexpected as there was very little revealed in the literature about mature learners concerns in relation to literacy skills. Such concerns must be considered by educators in advance of employing CBA as an assessment strategy. Additionally, some participants in the focus group noted their concerns in relation to ‘confidence’ regarding completing CBA; this is discussed further in relation to research aim two: findings and discussions.

4.4.2 Research Aim Two: Findings and Discussions

To identify the benefits and drawbacks of utilising such a method of assessing learners.

4.4.2.1 Deep Interactive Learning

In an educational era of tech savvy learners, the primary research conducted by the surveys has revealed that learners believe that the use of CBA as formative and summative assessment strategies encourages an increased level of interactions within the module, whilst developing a sense of deeper learning of the module content. Some learners noted that:

“CBA facilitate interactive learning instead of having to read textbooks”.

Other learners noted as part of the surveys that the use of CBA as formative assessments in terms of preparing for summative assessments are:

“More engaging to learn and keeps me, personally, more attentive to what I'm doing”.

Furthermore, the use of CBA:

“Enables learners to track their learning”.

Learners also remarked that the use of CBA as formative assessments has impacted their learning by:

“Allowing immediate feedback which makes learning more interactive and encourages a greater sense of understanding of the subject”.

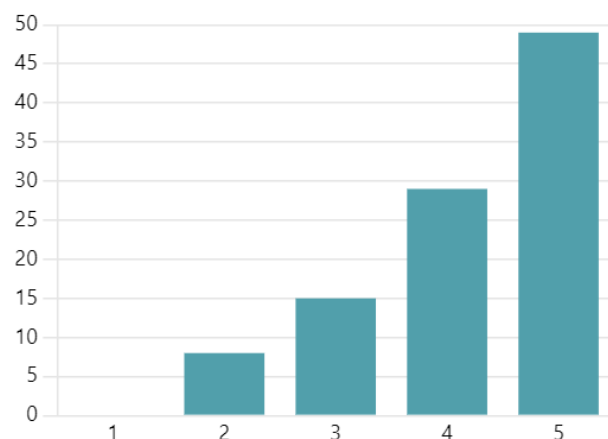
Further primary research by way of a focus group indicated that learners, when probed with further questions, outlined that formative assessments must be used in the same technique as the summative assessment. They noted that:

“Technology does not make learning fun or boring, but makes it more engaging; however, learners need to engage with the learning”.

Building on this, as part of the survey findings, respondents indicated an average of 4.18 out of 5 in terms of CBA making modules more engaging and interactive. Figure 4.7 demonstrates the learners’ responses on a Likert scale in relation to this question, with 1 being strongly disagree and 5 being strongly agree. 49% of learners indicated they strongly agree with this statement, whereas no-one strongly disagreed with this statement in relation to CBA creating an interactive and engaging environment.

Figure 4.7

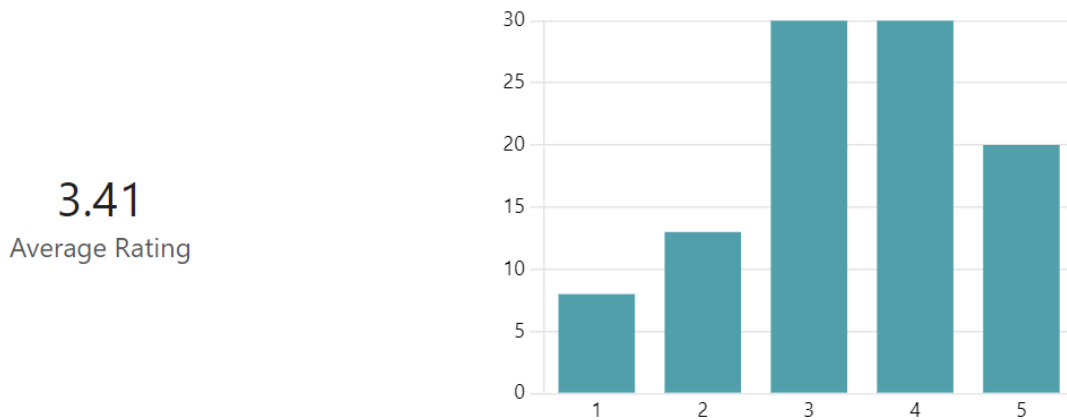
4.18
Average Rating



However, the survey responses in relation to CBA encouraging a deeper sense of learning did not generate a similar response, with only 20% of student strongly agreeing with this, whereas 8% of student strongly disagreed with this. Figure 4.8 portrays these findings on a Likert scale

with 1 being strongly disagree and 5 being strongly agree, in relation to CBA generating a deeper sense of learning.

Figure 4.8



The focus group revealed that generating a deep sense of learning is based on the learners' attitudes and characteristics, noting:

"If you want to do well, you will engage in deep learning".

Furthermore, interviewee two outlined that the use of CBA encouraged:

"Rote learning especially MCQ, unless there is a requirement to provide an analysis of the course content".

It is not surprising to see such findings as part of the primary research, as the literature reviewed as part of this study indicates that the introducing of technology, whether by gamification as noted by Voshaar *et al.*, (2023) and Ortiz-Martines *et al.*, (2022), enhances the learning experience for learners, encouraging a deeper interactive sense of learning. Other researchers have also noted that assessment strategies also play an integral part of encouraging a deeper sense of learning, such as Entwistle and Ramsden (2015), Snelgrove and Slater (2003), and Yonker (2011).

Reviewing the above statistics, the focus group participants noted that:

"Some learners can get distracted easily when completing formative CBA in class".

Whilst research to date, both primary and secondary, would indicate that the majority of learners would encourage the use of technology, some researchers have noted their concerns in relation to introducing technology due to its availability, and its potential to distract learners in the learning process. Researchers such as Kirkwood and Price (2013) emphasise the importance of introducing the technology to enhance the learning process, and not only due to its availability; whereas studies conducted by Neiterman and Zaza (2019) flag their concerns in relation to the use of such technology being a mere distraction and an unnecessary evil, having a negative impact on the learning process.

Whilst the findings as part of this research appear to be positive in relation to using CBA, some findings indicate their concerns, particularly around the above noted distractions by previous studies, where learners have noted that:

“The brightness of the screen can be distracting in comparison to paper assessments”.

“Access to a laptop or computer when studying can distract learners i.e., go to other websites – social media, etc”.

However, when considering such distractions in relation to using technology, the end users must consider the benefits which may outweigh the distractions, such as noted by interviewee two:

“Access to the technology on the phone in terms of practice online CBA tests / formative assessment, enables the user to access the resources from anywhere; outlining they completed such studies on the bus to work, school, etc. Accessibility and ease of use meant interaction with the modules content was increased”.

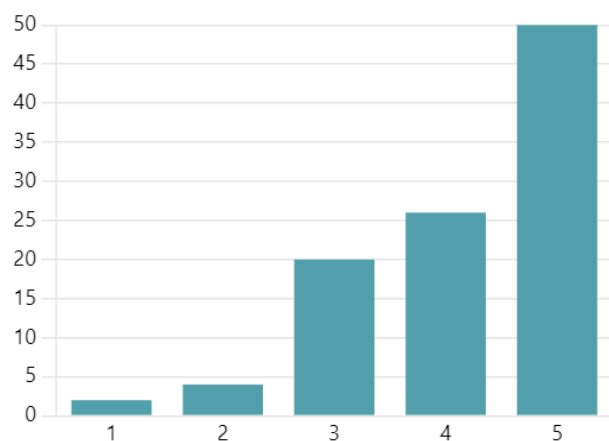
Again, this key insight should be considered by educational institutions should they wish to implement CBA, ensuring that such distractions or negative associations are tackled to reasonably address the learners’ concerns. This research implies that educators need to embrace these findings in order to determine strategies to try and negate any distractions for students in the learning process.

4.4.2.2 Formative Assessments

What was uncovered regarding formative assessments in relation to CBA was that on average, 4.16 out of 5 agreed that formative assessments in the form of CBA are helpful in terms of completing studies and preparing for assessments such as class tests and examinations. Figure 4.9 details the breakdown of responses in relation to the helpfulness of CBA in relation to formative assessments on a Likert scale with 1 being strongly disagree and 5 being strongly agree.

Figure 4.9

4.16
Average Rating



From this diagram, 49% strongly agree that the use of CBA is helpful in terms of formative assessments in comparison to 2% who strongly disagree with this. Further responses in the primary research indicate that it is:

“Easier for the students to prepare for the tests as there are samples online”.

Furthermore, learners remarked that formative assessments utilised via CBA generates a positive learning experience as:

“It is great to see questions turn green when they are correct on a computer”.

The focus group respondents noted that formative assessment as part of the learning process, in the same manner as the summative assessment is key in terms for preparing for such assessments, outlining that:

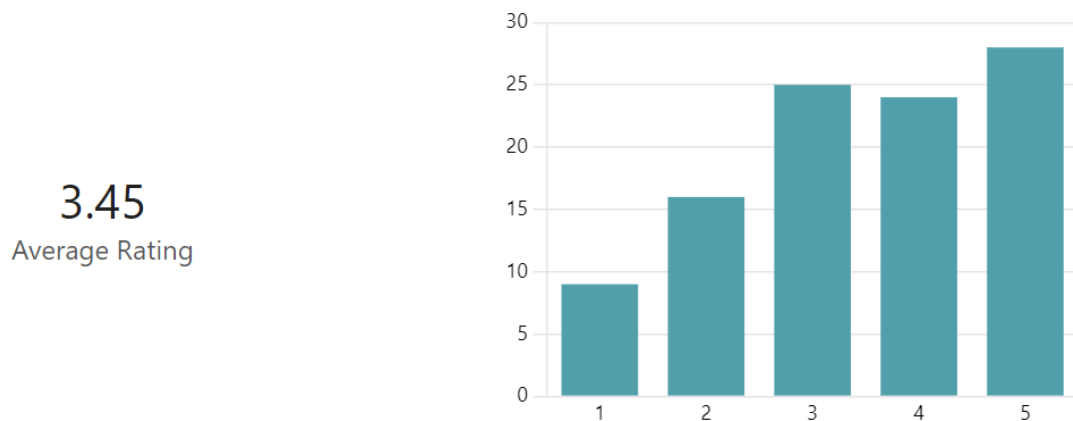
“If the final examinations were to be completed using CBA, learners would expect the module content to be taught using CBA tools and techniques in the class”.

These findings are all consistent with past studies which assert the importance of formative assessments as part of the learning process. Studies by researchers such as King (2020), and earlier studies by Deutsch *et al.*, (2012), all support the primary research findings of this study; outlining that students appreciate formative assessments as CBA, enabling them to build confidence in advance of the final summative assessment. However, what is interesting to note is learners’ positive association with the practice test questions in formative assessments turning green when learners get a correct answer, placing an emphasis on empowering learners in the learning process, enabling learners to interact with the assessments and develop positive connections with such. This would imply that educators should embrace CBA as a method of formative assessment, as traditional pen-and-paper or textbooks would not enable such positive reinforcements for learners.

4.4.2.3 Stress and Anxiety

The primary research revealed insights into the impact of stress and anxiety with the introduction of CBA. When participants were surveyed in relation to determine if CBA, in comparison to HWA, alleviated any study/exam fear or stresses, an average rating of 3.45 out of 5 was received, with 27% of participating strongly agreeing with this statement and 9% of learners strongly disagreeing with this statement. Figure 4.10 portrays the results of the impact CBA has in relation to assess fears and stresses on a Likert scale with 1 being strongly disagree and 5 being strongly agree.

Figure 4.10



On further analysis of the primary research data from the surveys, some learners noted that:

“CBA makes assessments and exams less stressful”, and “being able to practice CBA’s online [formative assessment] before the class test reduces pressure”.

“It is important to practice the assessment technique before sitting the actual assessments”.

These findings indicate that what is desirable from learners is more practice in formative assessments in advance of the summative assessments as this will have a direct impact on the level of stress or anxiety from learners.

Further analysis of the primary research by way of a focus group indicated that some learners noted that CBA increased the level of stress associated with assessments due to:

“Lack of battery charge on laptop, access to technology issues, access to broadband, fear if students make a mistake and hit the wrong button to close laptop”.

Alternatively, interviewee two noted CBA decreased the level of stress associated with assessments as:

“There is less manual writing in the process, typing is so much easier and easier to review answers”.

Typing skills arose as both a concern and a positive for learners in relation to completing CBA. Some learners noted that:

“CBA are less stressful as students do not have to worry about handwriting”.

However, this is not evident for all learners partaking in CBA, as some survey responses noted that:

“CBA increased stress as not all students are proficient in typing skills or computer literate”.

The overall findings in relation to stress and anxiety do not fully align with the literature. Research by Cassady and Gridley (2005) outlined that CBA did not increase the level of anxiety for learners, or hinder their performance; however, such studies did not consider the aspect of access to suitable technology as part of the assessment process and its impact on stress and anxiety, which has been unveiled as part of this primary research.

Whilst such studies indicate that CBA has not hindered the performance of learners, primary research has revealed that learners enjoy studying in traditional methods, making physical notes on pen-and-paper, encouraging their ‘muscle memory’ when learning. The use of CBA may impact the traditional methods of learning, especially as primary research has indicated learners require the teaching and formative assessments to mirror the summative assessment strategy.

These findings imply that the use of CBA depends on the computer literacy of learners; therefore, educators need to consider the computer literacy abilities of learners in advance of implementing CBA, with possible consideration of including practical courses to improve such skills and ensuring to teach learners using the assessment software in the classroom.

4.4.2.4 CBA Functionalities

Other benefits identified as part of the primary research related to the functionalities of the CBA in comparison to the HWA. For examples, the learners noted as part of the survey that:

“CBA can assist with spelling and grammar – removing any mistakes, and also highlights any errors which can be amended, whereas HWA does not facilitate this”.

“The use of CBA enables each learner to have their own individual timer, meaning they can manage their time more effectively”.

“CBA are easier to navigate, and learners can flag a question to return to it, it is easier to jump between questions”.

The above sentiments in relation to the features of CBA were echoed in the focus group and interviews as well. To date, there are few studies completed in terms of the functionalities of CBA, especially the use of MCQs as the assessment technique. Therefore, such findings are reasonably new in terms of studies in this research phenomenon. It is evident learners enjoy such functionalities when completing assessments, which may bring ease to the learner as part of the assessment process.

Further commentary in the survey identified that the use of CBA:

“Enables the learner to increase the screen and therefore increases the text making it easier to read”.

However, other respondents in the survey contradicted this statement outlining that:

“Reading a question on a screen for CBA are not necessarily helpful for students with learning difficulties”.

Therefore, it is evident that further research is required in this area to determine if it is possible for educators to consider the different learning needs and requirements of learners before implement CBA as an assessment strategy.

Whilst the above functionalities of CBA have demonstrated a strong sense of advantages or benefits associated with CBA, respondents revealed some negative association with CBA, outlining some disadvantages such as the lack of paper to complete workings as part of their answers, CBA does not facilitate this, whereas HWA would enable students to:

“Makes notes on their exam papers [question paper]; rough notes throughout the exam; outlining it would be easier to follow their calculations in a HWA”.

However, in contradiction to this, interviewee two outlined, given their experience with CBA at secondary school level:

“That if they could make notes on the online CBA, highlight the questions, and have a note taking function built in as part of the CBA, then student would be happy to complete the CBA with no paper for rough work, as long as they are taught using these functions”.

Therefore, an overarching theme in terms of CBA functionality is ensuring learners have experience of using such software. These findings correspond with Garrison and Ehringhaus (2007) who outline that formative assessments would work as a practice in advance of the summative assessments. Deutsch *et al.*, (2012) further strengthen such primary findings outlining that formative [practice] assessments would increase skills and expertise required by the user group to complete such CBA.

Furthermore, the focus group participants noted that it was essentially important:

“For the lecturer to carefully explain the CBA process, outlining the different functions of CBA and the process that CBA will work”.

This lack of support or guidance when using CBA as an assessment method was not expected as literature did not allude to this as part of the secondary research. However, this may be linked to the studies by Marcus-Quinn (2020) who outlined the concerns amongst lecturers in relation to a lack of resources to design and develop digital resources. Further studies by Picton (2019) outlined that almost a quarter of lecturers did not receive appropriate training to use such technology. Therefore, such literature may have a direct link or impact on the primary findings noted above.

This poses a problem as this method of assessment is slowly being employed across third level education given its popularity amongst users; therefore, this is a key gap that needs to be filled, meaning these are positive findings which must be considered by the educational body.

A key emerging theme from both strands of research, both primary and secondary, is in relation to assessment feedback. Studies to date, conducted by researchers such as Marriot and Lau (2008), have outlined that such advances in technology enables the timely feedback of their assessments, including the automation of feedback in formative assessments. More recent studies conducted by Helfaya (2019) outline that learners appreciate getting timely and immediate feedback.

In general, the primary research identified similar findings to the secondary research, outlining that learners appreciate the ability to receive feedback in a timely manner, enabling them to build on this feedback. Respondents also noted that:

“Learners receive their CBA back so students can see what they got right and wrong and build on this feedback. HWA does not easily facilitate this”.

Whilst the literature has not indicated that learning institutions physically provide the CBA back to learners as feedback, this aspect of feedback provided deep and meaningful feedback to the learner, which they appreciated.

Building on this, other responses noted that:

“CBA enabled quicker feedback in comparison to HWA. Lecturers were able to correct CBA a lot faster”.

Many studies have attested the importance of feedback; therefore, in line with the literature in this area, it is not surprising to see that learners appreciate timely feedback. These findings imply that timely feedback, whether as part of CBA or HWA, should be mandatory practice in any assessment process.

4.4.3 Research Aim Three: Findings and Discussions

To investigate the potential challenges to introducing CBA at undergraduate level in accounting and finance related modules.

4.4.3.1 Access to technology

A key emerging theme arising from the primary research conducted via the surveys, supported by the various findings as part of the literature review, is learners’ concerns in relation to access to technology and access to suitable technological resources in the classroom and examination centre. Some of the resounding concerns from the learners indicated that:

“Not all students have access to laptops / tablets to complete the CBA”.

“There are not enough charging points in the classroom – learners are expected to have a fully charged battery”.

Such findings are consistent with the secondary research conducted as part of this study. Researchers such as Winter *et al.*, (2021) raised concerns regarding access to technology especially after many learning institutions transferred to online learning and assessment following the COVID 19 pandemic. Other researchers such as Willis (2020) echoed the concerns in relation to access to technology, outlining the negative impact it would have on learners who do not have access to suitable technology to complete such assessments.

Probing this further, primary research from the focus group revealed that a high percentage of participants (9/10 participants) outlined that:

“It is expected that students should have a laptop, this generation of learners are tech savvy and should have some access to technology – laptop or tablet”.

Unsurprisingly, interviewee one and two both outlined that:

“All students (most likely) should have some sort of technology (laptop/iPad)”, and

“Most students have a laptop to complete any sort of assignment, CBA or otherwise”.

Whilst the primary research indicated a concern in relation to access to technology for a small percentage of learners, further research conducted by the focus group identified that most respondents outlined that:

“It is ok to have a requirement to have a laptop for college, but if the college required a certain laptop or certain software to be bought, respondents noted that should be provided by the college”.

This finding transitions into another key finding from the survey were learners also indicated a concern in relation to the cost associated with CBA in comparison to the traditional HWA, noting:

“There is a high cost associated with access to technology”.

This theme was explored further as part of the other research instruments utilised as part of this study. Due to the unstructured nature of the focus group, when discussing this key finding from the surveys, one participant outlined that:

“Students in private education who received student bursaries or scholarships may not be able to buy such technology like a laptop or related accounting software”.

Furthermore, interviewees noted that:

“Students would be angry / frustrated if they had to spend further monies [in addition to tuition fees] on buying certain laptops/software”.

On the one hand, the findings in relation to access to technology and the associated costs of such technology is not surprising as we know already from previous studies that there are

access issues for students, especially students from a socioeconomically disadvantaged background as outlined by Cullinan *et al.*, (2021). It was therefore surprising to gain insights in relation to students in private education on receipt of student bursaries or scholarships, as this was not mentioned in the literature.

The implication here calls for education providers to consider the entire student cohort before implementing CBA, developing, and incorporating strategies to ensure no student is disadvantaged as part of the assessment process.

4.4.3.2 Access to Suitable Broadband

As identified in the secondary research, access to suitable broadband to complete assessments online appears to be another emerging theme as part of this research. Respondents to the survey have outlined:

“Not all students have access to strong internet or sometimes the web browser would freeze”.

Unsurprisingly, this concern was echoed throughout many responses by the learners in all strands of the primary research. Researchers such as Cullinan *et al.*, (2021) and Mac Domhnaill *et al.*, (2021) have discussed this concern which is highlighted in the literature review of this study. Their findings indicate the troubles associated to accessing such high-speed broadband, outlining that one-in-six learners have access to poor broadband coverage and are more likely to be socioeconomically disadvantaged.

Other responses to the survey mirror the concern in relation to access to strong internet to suitably complete the CBA, outlining that:

“When completing CBA, some learners would be kicked out of the technological software due to internet issues”.

This implies there is an immediate need to address the concern in relation to accessing suitable technology, including broadband, by many educational providers. Whilst the literature indicates an immediate intervention required by the Government, educational providers must consider such concerns before implementing CBA.

4.5 Conclusion

This chapter presented the findings, analysis, and discussion of the main themes arising from the primary research of this study, creating connections between the key findings from both the primary research on the key stakeholder group – the learner, and the literature reviewed as part of this study. The findings are representative of the research questions, contributing to the attitudes of learners in relation to CBA, including benefits, drawbacks, and challenges to their use.

In the next chapter, the implications of the research findings will be summarised, providing recommendations and future considerations arising from this study.

CHAPTER FIVE – CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

At the final stages of this study, this chapter presents a summary of the final conclusions, including recommendations for future iterations for further studies. The secondary research revealed a number of key themes as part of past studies in the area of CBA, focusing on the use of such assessment methods in academia, gaining a greater understanding on the impact of CBA in relation to deep and surface learning, active and passive learning, and access to required technology. The primary research was conducted with a view of supporting the research conducted by past researchers in this area, focusing on CBA in accounting and finance related modules at a third level learning institution, with a particular focus on a private learning institution.

The conclusions, including any related recommendations and areas that may initiate future studies in this area, have been detailed per research aim highlighted below.

5.2: Research Aim One: Conclusions and Recommendations

The first research aim focused on the attitudes of learners in relation to completing CBA in comparison to HWA. The primary research revealed that 75% of learners preferred CBA in comparison to HWA, noting CBA functionalities, ease of use, less handwriting, and quicker typing skills as some of the key drivers for this result. Findings in relation to the 25% of learners who prefer HWA noted that they have IT literacy skills issues (with regards to typing) and they are 'creatures of habit' who prefer the traditional HWA, as this is the assessment method they are familiar with. The conclusion here is that the majority of learners appear to be satisfied in relation to completing CBA; however, a practical recommendation would be to liaise further with the 25% of learners who prefer HWA, developing the required practices within education to assist such learners who shy away from CBA.

As part of the research, an unsurprising finding arose in relation to creating a link between students' learning practices and future employment and studies. As per the literature, learners expected third level education to prepare learners for their future endeavours, which is mirrored in the primary research findings in this study. The recommendation here would be to encourage academic providers to work with professional accountancy bodies and organisations regarding designing authentic assessment strategies which will generate the

required skills within learners which can easily be transferred to future employment and studies.

5.3: Research Aim Two: Conclusions and Recommendations

The second research aim was to ascertain the benefits and limitations of utilising CBA. Interestingly, the primary research provided evidence that the use of CBA supports a deeper interactive learning environment, enhancing the learning experience for learners. It also emerged that learners enjoyed the 'ease of access' to CBA as formative assessments, as it enabled learners to study whilst on the move, i.e., going to college, work, etc. However, respondents also noted that using technology in the learning process can be perceived as distracting, which is also noted in the literature review. A recommendation would be to encourage greater use of CBA as formative assessments as it enables learners to access resources on the move; however, in the absence of controls to prevent distractions for the learners, educators must consider how to combat such issues in relation to this.

As expected, in line with the discussions in the literature review, respondents outlined the importance and appreciation of formative assessment as part of the learning process; a key conclusion arising from the study. It prompts the recommendation to make such formative assessments, CBA or otherwise, a mandatory practice as part of the learning process for students.

In relation to stress and anxiety associated with undertaking CBA, the primary research provides evidence of both positive and negative results in this regard. Learners noted both increases and decreases in their stress and anxiety levels in relation to introducing CBA as part of their studies. Some respondents noted that CBA reduced anxiety as everything was in one place, a reduction in the level of handwriting that was required for HWA, and the use of formative assessments as the same technique as the summative assessment assisted with the reduction in stress. However, some respondents noted increasing level of stress arising from the same concerns noted in relation to access to suitable technology. Such stresses were also increased due to the lack of understanding of the CBA process. It is evident from this conclusion that a practical recommendation is to ensure learners are well prepared for CBA, providing clear instructions to them in advance of the assessment date. Furthermore, it is evident that learners have established a clear link between the importance of formative

assessments and the impact of stress arising from CBA. Therefore, a logical recommendation is to ensure that learning institutions implement formative assessments in the same technique as the summative assessment.

Finally, a key finding stems from the use of CBA, more so the different functionalities of such CBA, outlining their many benefits. Surprisingly, there was not much literature in relation to the various functionalities of CBA, such as individual timers, flagging questions, assistance with spelling and grammar, and the ease of moving between questions. This knowledge provides useful information as part of this study, which all educators should consider as part of their assessment practice. Furthermore, participants enjoyed the ability to increase the screen size to provide a larger and easier text to read. Arising from this key finding, a logical recommendation would be for educators to consider such benefits when designing their assessment practices. Furthermore, educational providers should consider this contribution to academia when designing assessment policy at an institutional level.

5.4: Research Aim Three: Conclusions and Recommendations

The final research aim focused on identifying challenges in relation to introducing CBA as an assessment technique. Interestingly, the key findings from the primary research mirrored the concerns raised as part of the literature review. The main conclusions noted that learners were concerned in relation to access to suitable technology to complete such CBA, i.e., having a suitable laptop/tablet to complete the assessment, access to suitable technological resources on the college campus (such as charging points for laptops/tables), including suitable broadband to support the use of CBA. Whilst such findings are similar to the literature regardless of learners registered in public or private education, one surprising revelation was raised in relation to students in receipt of scholarships or bursaries in private education, something that was not revealed in the literature review. This insight demonstrates the need for educators to consider all learners when adapting their assessment practices, ensuring to design assessment techniques that are equitable to all learners.

5.5: Recommendations for future studies

This study, small-scale qualitative in nature, was conducted in a relatively short period of time. As portrayed throughout the study, technology continues to grow at a rapid speed. Therefore,

this study would benefit from a longitudinal study, including considerations for quantitative research in relation to the research question.

Furthermore, there are a number of key themes identified as part of the primary research which were not explored due to the time constraints. Studying these further would help establish a greater understanding of the research phenomenon.

The researcher believes that there is a strong requirement for continuous research in relation to CBA, and the use of technology in the learning and assessment process, to enable a greater understanding of how policy and practice needs to evolve to reflect the demands of academia. In doing so, will enable educators to design authentic assessment strategies which best reflect the needs and demands of learners.

5.6: Contribution to the Study

This research has generated significant insights and findings to the already existing information available in relation to CBA, arising from the collection of qualitative data in relation to the research aims. Some of the key contributions noted by the researcher are:

- This study builds on current literature and research regarding the use of CBA as an assessment mode, enhancing such studies with a focus on private third level education.
- This research has explored the attitudes of learners in third level private education in terms of completing CBA in comparison to HWA and has provided new findings into the changing needs and requirements of learners in relation to education, particularly assessments, including a focus on the adaption of the teaching and assessment methods to achieve such learners' needs and requirements.
- This author has provided recommendations which can be implemented in educational settings by incorporating changes to their current assessment practice and policies, supported by a number of potential areas for further research.

Finally, one of the key contributions arising from this study stems from the research methodologies utilised by the researcher, noting that it has proven effective in terms of generating links between academia and the industry, and creating a sense of inclusion from the learners in terms of shaping educational practice for their future learning. Learners were

passionate to partake in this study, willing to share their attitudes and perceptions in relation to CBA, with an end goal of enhancing the learning experience for learners through the implementation of authentic assessment approaches.

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LIST OF APPENDICES

Appendix 1: Professional Accountancy Bodies

As outlined in the introduction to this study, a key driver for this research is driven from the professional accountancy bodies (ACA, ACCA, CPA, CIMA) who utilise such CBA as their assessment strategy. Upon completion of their undergraduate studies, many accounting and finance students pursue further studies with the professional accountancy bodies to obtain qualified accountancy credentials.

There are four professional accounting organisations in Ireland; namely, the Institute of Certified Public Accountants (CPA), the Association of Chartered Certified Accountants (ACCA), the Institute of Chartered Accountants (ACA), and Chartered Institute of Management Accountants (CIMA); all of which utilise CBA as an examination technique.

The professional accountancy body ACCA are currently using CBA to examine end of term studies. At present, these CBA comprise of five styles of questions: 1) multiple choice, 2) multiple response, 3) multiple response matching, 4) number entry, and 5) discursive/essay style questions. In terms of questioning style, some questions include background case study information which is required to support learners in determining their answers. [Appendix eleven](#) demonstrates the various styles of question examined by the ACCA exam papers utilising CBA (ACCA Global, 2023). [Appendix twelve](#) outlines the computational and discursive style questions utilised by the ACA exam papers (ACA, 2023).

The CPA, in respect of preparing learners for use of CBA, identified a number of preliminary areas for development at school and undergraduate levels in regard to preparing learners for professional accountancy examinations and their professional endeavours as part of a career in accounting and finance, including developments in online research, and the improvement in analysis skills in terms of case study style questions and written ability to respond to such case study style questions. This research, conducted by Specht and Sandlin (2006) identified that some learning institutions changed their teaching and assessment approaches as they prepared for such computer-based examination.

The introduction of CBA at professional accountancy level sparked a concern in relation to the prestigious nature regarding the accreditation of the degree. As part of their studies, Bunker and Flesher (2013) conducted research on the transition from the traditional pen-and-paper

style examination to the modern CBA on the CPA examinations. As part of their study on such CPA examinations, they noted that such a transition to CBA did not have a negative impact on the prestigious perception of the CPA certification.

Whilst many educators introduce CBA due to a practical level (automation of correction for larger class sizes, ease of use, etc.), one driver for the introducing CBA at an undergraduate level in accounting and finance modules is responding to a key aim of the students; where students are expecting an educational experience that prepares them for the employment in this sector coupled with success in the professional accountancy examinations. Studies have outlined that many students expected learning institutions, at a faculty level, to provide provisions to prepare learners for the professional accountancy examinations, outlining the more skills and educated the faculty teaching team were in relation to CBA, the better informed learners would be in this regard (Peterson, Kramer and Reider, 2002). Indeed, it is evident from the literature that learners expect to be best prepared for such professional accountancy examination, meaning the introducing of such assessments techniques at undergraduate level would provide the opportunity for learners to gain experience and knowledge in such areas.

Since the introduction of computer-based (online) examination at professional accountancy level, with some professional accountancy bodies introducing such online assessments methods in response to COVID 19 such as ACA, there is a commitment by such bodies to continue the provision of education and assessment online, utilising and enhancing the existing educational platforms, embracing best-in-class educational software. ACA have also committed to an increased exam-focused online education delivery incorporating the preparation for such digital CBA by including tutorial videos and the opportunity to sit practice examinations as formative assessment tools, providing the opportunity for learners to gain experience in the area for the final examinations (ACA, 2020). Furthermore, in their latest publication in relation to learners' performance at the CAP 2 Financial Reporting Interim Assessment, the Professional Examination Committee noted a strong correlation between student engagement with practice examination papers (formative assessment) on their e-assessment platform and actual students' performance (ACA, 2023).

It is evident that all professional accountancy bodies utilise online CBA as their preferred mode of assessment technique. This poses the question, should undergraduate programmes be

utilising such modes of assessment as part of their assessment techniques to readily prepare learners for their advancement in studies at the professional accountancy levels, including ACCA, CPA, ACA, and CIMA examinations.

It should also be noted that professional services firms, such as Deloitte, utilise an online e-learning platform to train and assess staff members in areas such as professional development and the revision or introduction of accountancy standards (Deloitte, 2022). Examples of the e-learning platform, including assessment, feedback, and additional supports, can be found in [appendix thirteen](#). The introduction of CBA at undergraduate level would foster an environment of online assessment which would mirror the professional accountancy profession, enabling learners to be exposed to such assessment strategies.

Appendix 2: Primary Research – Survey Questions

The below survey questions are colour coordinated to link them back to the original research aim, as follows:

Aim 1 - To explore the attitudes of learners in relation to utilising computer-based assessments in comparison to hand-written assessments.

Aim 2 – To identify the benefits and drawbacks of utilising such a method of assessing learners.

Aim 3 - To investigate the potential challenges to introducing computer-based assessments at undergraduate level in accounting and finance related modules.

Black text: General questions to obtain data on the survey participants.

Survey Questions:

1. Consent

Please indicate your consent to participate in this research by ticking the boxes below:

- I **agree** to complete the questionnaire as part of this research.
- I **do not agree** to complete the questionnaire as part of this research.

2. How did you find completing computer-based assessments in comparison to hand-written assessments?

3. Have you had any positive or negative experiences in relation to completing computer-based assessments? Please provide some insights into such experiences.

4. Which assessment technique did you prefer:

- Computer-based assessments
- Hand-written assessment

5. Please explain why you selected either computer-based assessments or handwritten assessments as your preferred choice of assessment technique.

Enter your answer.

6. **The following question is a ranking question:
1 is strongly disagree and 5 is strongly agree:**

Computer based assessments are helpful in terms of completing your studies and preparing for assessments such as class tests/examinations?

1	2	3	4	5
---	---	---	---	---

7. **The following question is a ranking question:
1 is strongly disagree and 5 is strongly agree:**

The use of computer-based assessments makes the module more engaging and/or interactive?

1	2	3	4	5
---	---	---	---	---

8. **The following question is a ranking question:
1 is strongly disagree and 5 is strongly agree:**

The use of computer-based assessments, in comparison to hand-written assessments, alleviated (removed) any study / exam fears or stresses?

1	2	3	4	5
---	---	---	---	---

9. **The following question is a ranking question:
1 is strongly disagree and 5 is strongly agree:**

The use of computer-based assessments encouraged a deeper sense of learning or understanding for the module content?

1	2	3	4	5
---	---	---	---	---

10. What other benefits have you experienced in relation to using computer-based assessments.

Enter your answer.

11. What other advice would give on how computer-based assessments could enhance the student's learning experience?

Enter your answer.

12. In your opinion, what blockers/barriers/challenges are there to using computer-based assessments compared to hand-written assessments?

Enter your answer.

13. Please select your current study mode:

- Full Time
- Part Time
- Blended

14. Please select your gender:

- Male
- Female
- Non-Binary
- Prefer not to say

15. Please select your age category:

- 17-22
- 23-29
- 30-39
- 40+
- Prefer not to say

16. What is your nationality?

Enter your answer.

Appendix 3: Primary Research – Focus Group Questions

These questions for the focus group are derived from the responses from initial primary research conducted via surveys, coupled with secondary research. The below focus group questions are colour coordinated to link them back to the original research aims, as follows:

Aim 1 - To explore the attitudes of learners in relation to utilising computer-based assessments in comparison to hand-written assessments.

Aim 2 – To identify the benefits and drawbacks of utilising such a method of assessing learners.

Aim 3 - To investigate the potential challenges to introducing computer-based assessments at undergraduate level in accounting and finance related modules.

1. Should there be a greater use of technology for assessing students in college? Is there an expectation to use such technology from the student's point of view?
2. According to the surveys completed by students, 75% of respondents said they preferred CBA in comparison to 25% of respondents preferring HWA. What do you think is driving such statistics?
3. Results from the survey outline that 50% of respondents 'strongly agree' that CBA [formative] are helpful in terms of completing student studies and preparing for assessments such as class tests/examinations – can we discuss this further? What are your thoughts on this? Why are they helpful?
4. Does CBA encourage learners to engage with a deeper sense of learning in terms of course content, etc; or does it encourage rote learning?
5. Results from the survey indicate that 50% of respondents 'strongly agree' that CBA makes the module more engaging and interactive – can we discuss this further? What are your thoughts on this? Does the use of CBA make the module more fun, enjoyable, and interactive/engaging?
6. Stress / anxiety: How does the use of CBA in comparison to HWA impact stress when completing assessments/examinations?
7. Is it important to have formative assessments [practice tests] in advance of the final summative assessment?

8. Focusing on both formative and summative assessments, does the use of CBA enable greater flexibility in terms of the end user such as, easier to read, easier to understand, functionalities such as individual timer, flagging questions, etc. Is it more convenient for the end user, or does it hinder the student's performance?
9. Many graduates from an Accounting and Finance degree proceed on to professional accountancy examinations. Do you think undergraduate studies should prepare students for such professional accountancy studies, all of which are completed using CBA?
10. Feedback: Does the use of CBA facilitate better feedback and impact the overall performance in the module?
11. Do you believe students possess the skills to complete CBA? Or is training required?
12. Can we discuss some of the benefits and negatives/drawbacks in detail?

Appendix 4: Primary Research – Interview Questions

The questions for the interviews were derived from the responses from previous primary research conducted via surveys and the focus group, coupled with secondary research. The below interview questions are colour coordinated to link them back to the original research aims, as follows:

Aim 1 - To explore the attitudes of learners in relation to utilising computer-based assessments in comparison to hand-written assessments.

Aim 2 – To identify the benefits and drawbacks of utilising such a method of assessing learners.

Aim 3 - To investigate the potential challenges to introducing computer-based assessments at undergraduate level in accounting and finance related modules.

1. Do you think undergraduate studies should equip students with the tools required for future industry employment?
2. Participants in the focus group outlined that many future employers use technology when preparing accounts, and for use in their day-to-day roles, with little use of pen and paper – do you think the current teaching and assessment strategies utilised in college prepares learners for such employment?
3. One of the key themes coming out of the focus group was ‘confidence’. Many learners outlined they lacked confidence to do the CBA. Do you think if the college taught the accounting and finance modules with such technology in the classroom to equip learners to do CBA, would this help build confidence in learners?
4. Muscle Memory: the focus group revealed that many learners like to make notes, etc. whilst studying to assist with the muscle memory, enabling learners to remember what they are learning. Do you think CBA, in terms of practice/formative assessments, assists or hinders muscle memory?
5. Deep v Rote Learning: The focus group outlined that the use of CBA enabled learners to develop a greater understanding of the subject matter and apply it to exam questions. However, some learners outlined that CBA may encourage learners to rote learn, practising the questions repeatedly. In your opinion, did the use of CBA help

facilitate a deeper understanding of the module content and the application of such, or did it encourage rote learning amongst students?

6. Access to IT: A theme emerging from the surveys and focus groups was access to IT. As a student in a private college paying fees, do you think all students should have already purchased their own laptop, or do you believe the learning institution should provide such access to IT?
7. Stress / anxiety: How does the use of CBA in comparison to HWA impact stress when completing assessments/examinations?
8. If the college moved to solely CBA, would you require access to any paper to make notes as part of the exam, access to a printout version of the exam paper, or would you be satisfied completing the exam solely online via CBA, with no access to paper?
9. Professional Accountancy: do you think undergraduate studies should implement CBA similarly to professional accountancy examinations?
10. Can we discuss some of the benefits and negatives/drawbacks in detail?

Appendix 5: Ethical Approval Documentation

Part One: Completed Form

This form should be completed by the researcher (with the advice of the research supervisor), for all research which involves human participants.

Research Title	Exploring the suitability of utilising computer-based assessments in accounting and finance related modules at undergraduate level.
Researcher(s)/Learner	William McBride
Supervisor (where relevant)	Lloyd Scot
Programme of Study (where relevant)	MA in Education, Learning and Development

Checklist:

<i>Please attach to all forms:</i>	
Summary of Project Proposal (no more than 500 words)	X
Participant Information Sheet	X
<i>If applicable, application should also include the following:</i>	
Draft Consent Form	X
Draft Research Instrument e.g., survey, interview schedule, focus group questions etc	X

Part (a)

		Yes	No	N/A
1	Will you describe the main research procedures to participants?	X		
2	Will you tell participants that their participation is voluntary?	X		
3	Will you obtain written consent for participation?	X		
4	If the research is observational, will you ask participants for their consent to being observed?	X		
5	Is the right to freely withdraw from the research at any time made explicit to participants?	X		
6	Will you tell participants that their data will be treated with full confidentiality and that, if published, it will not be identifiable as theirs?	X		
7	Will you debrief participants at the end of their participation?	X		
8	Will your research involve discussion of topics which the participants might find sensitive?		X	
9	Will financial inducements (other than reasonable expenses or compensation for time) be offered to participants?		X	
10	Will your project involve deliberately misleading participants in any way?		X	
11	Is there any realistic risk of any participants experiencing either physical or psychological distress or discomfort?		X	
12	Does your research involve participants who are particularly vulnerable or who may feel unable to give informed consent e.g., prisoners; children; people for whom English is not their first language; learners in a programme you teach on?	X		
13	Will any non-anonymised and/personalised data be generated and/stored?		X	

If you answered YES to any of questions 8 to 13, please complete Part (b) of this form. If there are any other ethical issues that you think the Committee should consider, please explain them in Part (b) of this form. It is the researcher's obligation to bring to the attention of the Committee any ethical issues not covered on this form.

Part (b)

For each question 8 to 13 that you answered YES, please give a summary of the issue and action to be taken to address it (no more than 300 words in total):

As part of this research, the researcher will be conducting interviews and focus groups with participants that meet the following criteria of question 12 above:

- people for whom English is not their first language; and
- learners in a programme you teach on.

Addressing the first concern raised, many learners, upon receipt of consent to participate in interviews and focus groups, will not have English as their first or primary language. It should be noted that all learners on the Business faculty courses, who are potential candidates for participation in this research, must have a required appropriate level of English before they are accepted on to the programme. Therefore, this ensures that learners will have no issues with understanding the research area of questions being posed, or any comprehension issues in relation to understanding the consent process and providing such consent to participate in the research.

The second concern is in relation to some (not all) participants in this research are currently learners on programmes I teach on within Griffith College. As their lecturer, there could be a potential concern in relation to influencing the situation. Addressing this, there are a couple of aspects that can be considered:

- avoid asking question that are directly about the research, and more so asking questions about past events, avoiding opinion-based questions, and focusing on experiences, etc.
- If possible, the researcher may try get another independent member of the faculty to conduct the research instruments.
- If the researcher conducts the research instruments, participants will be reassured about the quality control policies and procedures within the college which will prevent a situation of bias in terms of the students' outcomes in the module.

Potential other ethical issues:

To the best of the researcher's knowledge at the time of completing this form, there are no other potential ethical issues to be noted at this time. If this changes, the researcher will bring this to your attention.

Signed (by Researcher): *William McBride*

Date: 29 March 2023

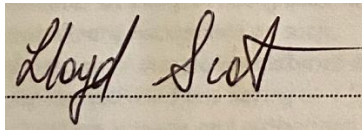
To be completed by the supervisor (in the case of a learner application)

PLEASE TICK ONE

As the supervisor of this research project, I confirm that I believe that all ethical issues relating to research have been dealt with in accordance with the College's policy on research ethics.

The application requires the attention and approval of the Research Ethics Committee. (In general, forms which answer 'yes' to questions 8-13, should be forwarded to the Research Ethics Committee).

Comments:

A handwritten signature in black ink on a light brown background. The signature reads "Lloyd Scott" in a cursive script. The signature is written over a horizontal dashed line.

Signed (Supervisor):

Date:29/March/2023

Appendix 6: Participants Consent Form

Consent Form – Questionnaires / Interview / Focus Group Candidates

Research Topic: Exploring the suitability of utilising computer-based assessments in accounting and finance related modules at undergraduate level.

You are invited to take part in a research study on exploring the suitability of utilising computer-based assessments in accounting and finance related modules at undergraduate level.

Aim and Benefits of this Research:

This research aims to explore the suitability of utilising computer-based assessments in accounting and finance related modules at undergraduate level in Griffith College, gaining an insight and perspective from the different stakeholders within the College, including students and the teaching team.

Researcher:

This research will be conducted by William McBride from Griffith College Cork in partial fulfilment of the requirements for the MA in Education, Learning and Development – QQI Level 9 at Griffith College Dublin.

What is required of you:

Should you agree to participate in this research, you will be required to attend an interview / focus group (**delete as applicable**) either in person or on Zoom. The duration of this will last circa 30 minutes.

For questionnaires – should you agree to participate in this research, you will be required to complete an online questionnaire. The duration of this will be circa 10 minutes.

Confidentiality:

The data that is collected as part of this research will be treated in the strictest of confidence. Your anonymity will be preserved at all times throughout the research process and will not be identifiable in any version of results submitted for grading or presentation. The interview / focus group recordings will be transcribed, in connection with the questionnaire responses, and will be analysed. Through a process of coding, the data will be synthesised into categories and themes, in order to construct the narrative and provide the research findings. There will be no way of identifying your responses in this research process.

Data Storage:

The Zoom recordings will be safely stored in a password encrypted file on the researcher's laptop and a back-up file of the recordings will be stored on an encrypted USB memory stick. The researcher will be the only person with access to the data.

Research Findings:

Research findings will be submitted to the dissertation examiners and the Examining Board of Griffith College for final grading. The findings will be available to you on request. The final dissertation may be published on the Griffith College dissertations repository.

Ethics Committee:

This research study has been approved by the Griffith College Faculty Research Ethics Committee.

Voluntary Participation:

Your participation in this study is voluntary. You can refuse to take part without giving a reason. You are free to withdraw from the study at any time up to the analysis of findings, at which stage the data will be anonymous. Up to this point you are free to withdraw your data, without giving a reason for withdrawing, and without your withdrawal having any adverse effect for you.

Deletion of Data:

I give my assurance that all information gathered as part of this research will be destroyed after graduation or in 24 months, whichever is sooner.

Contact Details:

For any queries on this research, please contact the researcher, William McBride at william.mcbride@griffith.ie or the research supervisor, Lloyd Scott at lloyd.scott@griffith.ie

Please indicate your consent to participate in this research by ticking the boxes and signing the form below:

Participant Consent Form – to be completed by participant:

- I have read the information sheet about this research.
- I have received sufficient information about this research and understand what is required of me.
- I have had the opportunity to ask questions and I am satisfied with the answers.
- I agree to complete the questionnaire as part of the research.
- I agree to participate in a circa. 30-minute interview / focus group with the researcher.

- I have given permission to the researcher to record the interview / focus group on a laptop.
- I am satisfied that my data will be treated in strict confidence and safely stored for the duration of the research.
- I understand that the anonymised data I provide will be used for the sole purpose of this research and may be published on the Griffith College dissertations repository.
- I understand that this request is voluntary, and I am free to withdraw from this research at any time and I do not have to give a reason.

Participant's signature:

Date:

Participant's name in block capitals:

Researcher's signature:

Date:

Appendix 7: Participants Information Sheet

Date:

Version Number:

Information Leaflet:

Exploring the suitability of utilising computer-based assessments in accounting and finance related modules at undergraduate level.

Dear X

My name is William McBride, and I am a student in the MA in Education, Learning and Development. As part of my studies, I want to explore the suitability of utilising computer-based assessments in accounting and finance related modules at undergraduate level.

The purpose of this study is to explore the suitability of potentially introducing new assessments methods in accounting and finance related modules, with an aim of determining the suitability of such assessment strategies for the various stakeholders. The findings of this study will be incorporated by Griffith College in terms of designing assessment strategies for accounting and finance related modules. The intended duration of this research is from January 2023 until September 2023.

You are being invited to take part in a research study by way of questionnaire / interview / focus group (delete as applicable). Participation is voluntary. We are interested in understanding your experiences and perspectives to date in relation to experiencing computer-based assessments, gaining an insight into your vision for utilising such assessment methods in the future. You are being invited to participate in this study as you have experience with such assessment strategies and/or are a key stakeholder in the assessment process. We are hoping to have representatives from all stakeholder groupings (teaching group and learner group), including representation from full time, part time, and blended stakeholders.

It is up to you to decide whether or not to take part. If you do decide to take part, you will be given this information leaflet to keep and asked to sign a consent form. You are free to withdraw from the study at any time up to the analysis of findings, at which stage the data will be anonymous. Up to this point you are free to withdraw your data, without giving a reason for withdrawing, and without your withdrawal having any adverse effect for you.

If you decide to take part in the study the following will happen:

1. I will arrange a suitable time to meet with you.
2. All interviews / focus groups will be recorded on Zoom. The interview / focus group will last circa. 30 minutes.

(For questionnaires - I will share the questionnaire with you for completion at a suitable time for you)

3. I will ask questions about the potential introduction of computer-based assessments focusing on:
 - Students' attitudes and experiences to date of using such assessment methods, including discussion of benefits and drawbacks,
 - The identification of potential blockers and/or challenges to students using such assessment techniques.

There will be no direct benefits to participants, however we hope the results of the study will help us to shape and design new assessment strategies to address the needs of the various stakeholder groups.

We have taken all measures to minimise any risk to you. All information will be anonymised and treated confidentially. Data will be stored securely on the researcher's password protected laptop and a backup on an encrypted USB memory stick. I give my assurance that all information gathered as part of this research will be destroyed after graduation or in 24 months, whichever is sooner.

Research findings will be submitted to the dissertation examiners and the Examining Board of Griffith College for final grading. The findings will be available to you on request. The final dissertation may be published on the Griffith College dissertations repository.

Before you decide if you want to take part, it is important for you to understand why the research is being done and what taking part involves.

Please take time to read the information carefully and discuss it with others if you wish. Please ask us if there is anything that is not clear or if you would like more information.

Your participation in this study is voluntary. You can refuse to take part or withdraw from the research at any time without giving a reason.

At a later date if you have any concerns about the study or what you said during our interview / focus group, you can contact me at william.mcbride@griffith.ie

Thank you for reading this information sheet.

William McBride

Data Protection Information

Information will only be used for this research study which aims to develop an understanding of introducing computer-based assessments in accounting and finance related modules. The legal basis for processing your personal data is Article 6(1)(e) of the EU General Data Protection Regulation (GDPR).

You are entitled to request any of the rights below unless it would make it impossible or very difficult to carry out the research study:

- The right to access to your personal data;
- The right to receive a copy of your personal data;
- The right to ask us to restrict our use of your personal data;
- The right to ask us to correct inaccurate information about you; or
- The right to ask us to delete your personal data.

You are entitled to object to any further processing of the information we hold about you (except where it is de-identified).

Appendix 8: Themes from Survey Research Data

The below survey research data is colour coordinated to link them back to the original research aims, as follows:

Aim 1 - To explore the attitudes of learners in relation to utilising computer-based assessments in comparison to hand-written assessments.

Aim 2 – To identify the **benefits and **drawbacks** of utilising such a method of assessing learners.**

Aim 3 - To investigate the potential challenges to introducing computer-based assessments at undergraduate level in accounting and finance related modules.

Themes	Comments
Learner Attitudes	<ul style="list-style-type: none"> - 21st century so there is a need to change away from HWA. - Students are more into gadgets / technology so it is more likely students would prefer CBA. - CBA seems to be quicker and easier to deal with. - MCQs lend themselves to a CBA, however discursive answers tend to work better for HWA. - CBA are efficient and fit in to modern technology lifestyle and society. - CBA seemed very straightforward to use. - Encourages the use of computers/technology, encourages learners to improve typing skills – all of which are required for future employment. - CBA are efficient – less paper wastage.
Functionalities of CBA	<ul style="list-style-type: none"> - Handwritten can be messy, whereas typing is easier to read & amend if errors are made. - Individual timer enables each student to manage their own time, and each student gets their allocated time from when they commence the assessment. - CBA enable the user to increase the screen and therefore increases the test making it easier to read. - CBA are easier to navigate and can flag a question to return to it. Easy to jump between questions. - CBA have no place for rough work - HWA enables the user to highlight specific parts of question and make rough notes. - Students outlined it would be easier to follow their calculations in a HWA. - CBA assists with spelling and grammar. - Reading a question on a screen for CBA are not necessarily helpful for students with learning difficulties.

Stress / Anxiety	<ul style="list-style-type: none"> - CBA makes assessments / exams less stressful. - Being able to practice CBA online [formative assessment] before the class test reduces pressure. - CBA are less stressful as students don't have to worry about handwriting. Students noted they lost marks in previous assessment as their writing was not readable. - It is important to practice the assessment technique before sitting the actual assessment. The online CBA formative assessments helped greatly with this. - CBA increased stress as not all students are proficient in typing skills or are computer literate.
Interactive Learning, Deep Learning	<ul style="list-style-type: none"> - CBA facilitate interactive learning instead of reading textbooks. - Formative assessments on CBA enables immediate feedback which makes learning more interactive and encourages a greater sense of understanding of subject. - Learners receive their CBA back so students can see what they got right and wrong and build on this feedback. HWA does not easily facilitate this. - CBA enabled quicker feedback in comparison to HWA. Lecturers were able to correct CBA a lot faster. - As only one question is presented on the screen at a time, it encourages learners to focus on that one question before moving on. - CBA enables learners to track their learning. - Access to a laptop/computer when studying can distract learners i.e., go to other websites – social media, etc.
Cheating	<ul style="list-style-type: none"> - CBA dilute the opportunity to cheat as students are all sitting randomised tests, so they cannot copy from their neighbour. It is easy to cheat in HWA as all students have the same test. - Access to internet during examination on CBA could encourage cheating. - Students believe that HWA put everyone in the same boat in terms of access to external resources.
Technical issues	<ul style="list-style-type: none"> - Not all students have access to a laptop/tablet to complete the CBA. - There are not enough charging points in the classroom – learners are expected to have a fully charged battery. - Access issues to CBA – some learners were kicked out of the class test which was a CBA. HWA would eliminate this issue. - Not all students have access to strong internet or sometimes the web browser would freeze. - The brightness of the screen can be distracting in comparison to paper. - High costs associated with access to technology.

Appendix 9: Themes from Focus Group Research Data

The focus group was recorded. The researcher has typed out the key themes arising from this focus group which can be found below. The below research data is colour coordinated to link them back to the original research aims, as follows:

Aim 1 - To explore the attitudes of learners in relation to utilising computer-based assessments in comparison to hand-written assessments.

Aim 2 – To identify the **benefits and **drawbacks** of utilising such a method of assessing learners.**

Aim 3 - To investigate the potential challenges to introducing computer-based assessments at undergraduate level in accounting and finance related modules.

Themes	Comments
Learner Attitudes	<ul style="list-style-type: none"> - Should be greater use of technology in college as the accounting industry use such technologies in the field of accounting; students should be prepared for that lifestyle in work / future workforce. - Preference for HWA for writing answers in relation to theory. Happy to use CBA for computational assessments. - Survey results revealed 75% prefer CBA and 25% prefer HWA: <ul style="list-style-type: none"> o CBA are faster to get results and feedback. o Handwriting is hard to read but typing is easier to read. o CBA enables the use of online calculator, formulas, etc. o CBA assists international students in terms of spelling, grammar, etc. - Students prefer to embrace the use of CBA now in their undergraduate studies as professional accountancy exams complete all assessments using CBA; therefore, students should be experiencing the use of CBA now; college should be preparing students for such future assessments. - The world is evolving around technology, except education.
Functionalities of CBA	<ul style="list-style-type: none"> - The functionality of CBA enables learners to learn at their own pace. They can flag questions and come back to it at their own time [formative assessment]. - Participants outlined it is important for the lecturer to carefully explain the CBA process, outlining the different functions of CBA and the process that CBA will work – this was not completed in advance of all CBA assessments. - CBA enabled users to increase the screen to make it easier to read the question. Students outlined that future functionalities would enable the lecturer to read out the question to the student in the CBA. - Learners like the ability to receive quick timely feedback, and being able to see their actual test back, which was facilitated by CBA. HWA does not

	<p>facilitate the learners to see their actual test script back, which is valuable feedback.</p>
Stress / Anxiety	<ul style="list-style-type: none"> - Confidence – the use of formative assessments helps builds confidence when preparing for CBA. - How does CBA contribute to stress: <ul style="list-style-type: none"> o Decreases stress as everything is in one place. o Increases stress due to lack of battery charge on laptop, access to technology issues, access to broadband, fear if students make a mistake and hit the wrong button to close laptop. o Short assessments such as class test suit CBA. A long end of term exam would be best suited to HWA. - Stress was reduced for CBA with the use of formative assessments in advance of the final assessment. - If the final examinations were to be completed using CBA, learners would expect the module content to be taught using CBA tools and techniques in the class i.e., teaching accounting computational questions using the relevant software in class. - Students need more practice of CBA to become confident in using them.
Interactive Learning, Deep Learning	<ul style="list-style-type: none"> - If the assessments / examinations are going to be CBA, then we should be using this software in class to prepare for such assessments. - Formative assessments in same manner/technique as the final assessment are extremely important for all learners when preparing for assessments. - Some participants noted they prefer to study with handwriting notes, practice questions as it assists with 'muscle memory' – learners remember what they write. - Some participants noted they like using both handwriting notes and practising on CBA to prepare for assessments – student like to have handwritten notes to help when studying, as not to rely on a computer. - Some participants noted they liked to study solely on computer as there is no need for physical notes printed out when there is such access to technology. This participant noted there is software to enable note taking, highlighting on soft copy of notes, etc. - Deep Learning versus Rote Learning: Depends on the attitude of the learner, if you want to do well you will engage in deep learning. MCQ encourages rote learning where discursive answers encourage deep learning. Phrasing of the questions and answers also deters away from rote learning as learners need to understand the topic. - Technology does not make learning fun or boring, but makes it more engaging; however, learners need to engage with the learning. Some learners can get distracted easily when completing formative CBA in class.
Technical / access issues	<ul style="list-style-type: none"> - Issues noted around different types of laptops used by different students i.e., Apple Mac versus HP. - Costs: <ul style="list-style-type: none"> o It is ok to have a requirement to have a laptop for college, but if the college required a certain laptop or certain software to be

	<p>bought, respondents noted that should be provided by the college.</p> <ul style="list-style-type: none">○ Some Learners noted it is expected that students should have a laptop, this generation of learners are tech savvy and should have some access to technology – laptop or tablet.○ One participant noted that students in private education who received student bursaries or scholarships may not be able to buy such technology like a laptop or related accounting software. <p>- Colleges should have facilities in place that provides [lends] a laptop/technology to students when they commence studies. One participant noted that this was the first learning institution that did not provide a laptop at the start of their studies.</p>
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Appendix 10: Themes from Interviews Research Data

The semi-structured interviews were recorded. The researcher has typed out the key themes arising from these interviews which can be found below. The below interview research data is colour coordinated to link them back to the original research aim, as follows:

Aim 1 - To explore the attitudes of learners in relation to utilising computer-based assessments in comparison to hand-written assessments.

Aim 2 – To identify the **benefits and **drawbacks** of utilising such a method of assessing learners.**

Aim 3 - To investigate the potential challenges to introducing computer-based assessments at undergraduate level in accounting and finance related modules.


Themes	Comments
Learner Attitudes	<ul style="list-style-type: none"> - Students should be equipped with the tools required for industry. Computers are used in everyday roles in the industry, and therefore students should gain experience of using the computer and its functionalities in the classroom. - Interviewee 1 outlined that there is good use of technology currently in the classroom, but the college needs to provide more resources to students to prepare for CBA if they have confidence issues. - Professional Accountancy: Undergraduate studies should mirror the assessment process at professional accountancy level, students should learn it now and be prepared for the future. - Interviewee 2 outlined that there is a concern amongst students in relation to confidence in the overall assessment process, outlining that some students are concerned they have not received the correct result/grade. Receiving the CBA back as part of the feedback enables learners to see their assessment performance and verify that they have received the correct result. CBA supports this. - Students received their end of term examination results online, receiving a mark per question. Interviewee 2 outlined that if the end of term examinations were completed using CBA, they could receive their result per question, and receive their exam back to students to determine what they got right and wrong. - Interviewee 1 outlined that mature students prefer HWA as they do not have the experience and skills to complete CBA. There is also a concern around typing skills and the lack of such skills. - There is an importance that students should be trained in Microsoft office suite.
Functionalities of CBA	<ul style="list-style-type: none"> - Students would need to have a greater understanding of the functionalities of CBA to enable them to complete the end of term exam.

	<p>If students use the technology as part of the classroom learning experience, this will help a lot.</p> <ul style="list-style-type: none"> - As long as students learn / practice CBA as part of the classroom learning experience, understanding how to make online notes, online highlights of exam script, etc. there would be no need for paper in the exam. - Feedback: receiving typed out feedback in addition to the exam script provided greater learning to students as they received rich feedback. - Interviewee 2 outlined that if they could make notes on the online CBA, highlight the questions, and have a note taking function built in as part of the CBA, they student would be happy to complete the CBA with no paper for rough work, as long as they are taught using these functions.
Stress / Anxiety	<ul style="list-style-type: none"> - Confidence to do CBA: interviewee 2 outlined that they did not lack the confidence, and their classmates had confidence as well to complete the CBA. - Interviewee 2 outlined they had sufficient confidence to do the CBA due to the level of formative assessments [practice tests] available to the students. - Interviewee 2 outlined that they had completed CBA prior commencing studies in Griffith College. - Interviewee 1 outlined that future CBA would enable the lecturer to record the question and read it out to student. They outlined that this would potentially reduce stress / anxiety in relation to completing CBA as some students feel comfortable when the question is read out to them by the lecturer. - Interviewee 2: CBA are less stressful as there is less manual writing in the process, typing is so much easier and easier to review answers. - Interviewee 1: CBA increased stress and anxiety for mature learners as they are creature of habit used to completing traditional assessments.
Interactive Learning, Deep Learning	<ul style="list-style-type: none"> - Formative assessments [practice tests] is important in terms of encouraging deep learning. - Interviewee 2 uses computer and handwriting when studying. Handwriting enables the learner to learn stuff. - Deep versus rote learning: CBA encourages rote learning especially MCQ, unless there is a requirement to provide an analysis of the course content. - Interactive / engaging: access to the technology on the phone in terms of practice online CBA tests / formative assessment, enables the user to access the resources from anywhere. Interviewee 2 outlined they completed such studies on the bus to work, school, etc. Accessibility and ease of use meant interaction with the modules content was increased. - Mature learners appear to like traditional styles of learning and assessing, using paper-and-pen to study and do exams.
Technical / access issues	<ul style="list-style-type: none"> - In today's tech savvy environment, students should have access to the skills to do CBA. - Costs: Interviewee 2 pays private college fees, accommodation fees and has a part time job [full time student]:

	<ul style="list-style-type: none"> ○ All students (most likely) should have some sort of technology (laptop/iPad). ○ International college tuition fees are expensive; therefore, the college should have provisions in place to provide a laptop/technology to students who cannot afford one, especially if the college introduces CBA. No student should be put in a disadvantaged situation. ○ Students would be angry / frustrated if they had to spend further monies on buying certain laptops/software. <p>- Costs: Interviewee 1 pays private college fees, supports a family, and has a full-time job [part-time student]:</p> <ul style="list-style-type: none"> ○ Most students have a laptop to complete any sort of assignment, CBA or otherwise. ○ There is a concern about access to charge point in the classroom. ○ Students would be angry / frustrated if they had to spend further monies on buying certain laptops/software. Supporting a family, working full time, and paying college tuition fees is tough enough in an expensive economy.
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Appendix 11: ACCA Computer-Based Assessments Question Styles

Example of Multiple-Choice Question



Question 1 of 50
Time Remaining: 1:58:36

Go to Question 1*
* Unattempted
Go
EXIT


Which of the following is an example of capital expenditure?

- Paying legal fees in order to recover customer debts
- Paying bonuses to production operatives
- Paying for refurbishment as part of upgrading a building
- Paying carriage outwards in respect of selling goods

SUBMIT

Clear 0 of 2 marks

Example of Multiple-Response Question



Question 2 of 50
Time Remaining: 1:59:24

Go to Question 2*
* Unattempted
Go
EXIT


Which TWO of the following are the most task efficient managerial styles as suggested by Blake and Mouton?

- Country club
- Team
- Authoritarian
- Middle of the road

SUBMIT

Clear 0 of 2 marks

Example of Multiple-Response Matching Question



Question 3 of 50
Time Remaining: 1:59:13

Go to Question 3*

* Unattempted

Go

EXIT

Information relating to two processes (F and G) was as follows:


Process	Normal loss as % of input	Input (litres)	Output (litres)
F	8	65,000	58,900
G	5	37,500	35,700

For each process, was there an abnormal loss or an abnormal gain?

	Abnormal loss	Abnormal gain
Process F	<input type="radio"/>	<input type="radio"/>
Process G	<input type="radio"/>	<input type="radio"/>

[Clear](#) 0 of 2 marks

Example of Number Entry Question



Question 15 of 50
Time Remaining: 1:59:16

Go to Question 15*

* Unattempted

Go

EXIT

Bob acquired 80% of the voting equity shares of Bill. Bill had the following equity at the date of acquisition:

	\$
Ordinary shares \$1	1,000,000
Retained earnings	800,000
	1,800,000

The cost of the investment was \$1,500,000 and the fair value of the non-controlling interest at acquisition was \$360,000.

What was the goodwill on acquisition of Bill?

\$

Your currently accepted answer:

[Clear](#) 0 of 2 marks

Appendix 12: ACA Computer-Based Assessment Question Examples

CAP 1 Financial Accounting Discursive Style Question

CAP1 Financial Accounting Practice Paper

SECTION B - ANSWER ANY TWO OF THE THREE PARTS IN THIS SECTION

SECTION B - PART THREE

You are providing assistance to a portfolio of varied clients. Your manager has asked you to address the issues as set out below.

Issue 1: Sole trader.

Larry O' Toole saw an opportunity to start up his own hardware store and, on 1 January 2019, he founded NUTS & BOLTS. On the same day, Larry opened a business bank account and lodged €/£ 12,000 of his savings. NUTS & BOLTS commenced trading on 1 January 2019.

Larry has provided you with the following additional details in respect of the financial year

QUESTION 8 of 22

QUESTION 8

SECTION B - PART THREE

Issue 1: Sole Trader

Requirement:

Prepare the statement of profit or loss for NUTS & BOLTS for the year ended 31 December 2019.

(8 marks)

FILL IN YOUR ANSWER

A[∞] AI A B I U S x₂ x² := ½= ≡ ≡ ≡ Ω ∅ ☰ ☲ ☱ f(x) ⋮

Previous
Next
➔
Flag
Complete assessment

CAP 1 Financial Accounting Computational Style Question

Learners input tables to answer the computational style questions.

A[∞] AI A B I U S x₂ x² := ½= ≡ ≡ ≡ Ω ∅ ☰ ☲ ☱ ⋮

11. Property, Plant & Equipment

	Buildings €/£	Plant & Equipment €/£	Motor Vehicles €/£	Total €/£
COST				
As at 1 January 2019	2,600,000	1,585,195	125,000	4,310,195
As at 31 December 2019	2,600,000	1,585,195	125,000	4,310,195
DEPRECIATION				
As at 1 January 2019	877,500	695,195	45,000	1,617,695
Charge for Year (W5)	52,000	133,500	25,000	210,500
As at 31 December 2019	929,500	828,695	70,000	1,828,195
As at 31 December 2019	1,670,500	756,500	55,000	2,482,000
As at 31 December 2018	1,722,500	890,000	80,000	2,692,500

Restore answer

Appendix 13: Deloitte E-learning platform

Overview of Navigation Panel

The screenshot shows the navigation panel for the IAS 2 Inventories e-learning module. At the top, there is a blue header with the Deloitte logo, the text "IAS 2 Inventories | Menu", and "01 of 01". Below the header, a welcome message reads: "Welcome to the IAS 2 Inventories e-learning module. In this module, you will learn about the Standard and its application. Select a topic to launch it." There are six topic cards arranged in a 2x3 grid: "Overview" (with an image of a person writing), "Defining Inventory" (with an image of a warehouse), "Measurement of Inventories" (with an image of workers in a warehouse), "Cost Formulae" (with an image of a calculator and a spreadsheet), "Recoverability Test" (with an image of a person using a magnifying glass on a document), and "Assessment" (with an image of a person writing on a document). At the bottom, there is a speaker icon on the left and a "PREV" button on the right.

Example of Assessment Style Question

The screenshot shows an assessment question in the IAS 2 Inventories e-learning module. The header is blue with the Deloitte logo, "IAS 2 Inventories | Question", and a speaker icon on the left. The question is labeled "Q1" and asks: "Which of the following are accounted for under IAS 2?". Below the question, there is a instruction: "Select the correct options, and then click **Submit**." There are six multiple-choice options, each with an unchecked checkbox: "The cows of a cattle farmer", "The gold mineral reserves of a mining company", "WIP of a long-term construction contract", "Maturing wine in the cellars of a wine producer", "Clothing in the warehouse of a retailer", and "Lumber of a wood distributor". A blue "Submit" button is located at the bottom right. At the bottom left, there is a speaker icon.

Overview of Result and Feedback

From the below, the employee can receive immediate feedback of their result, and additional supports in terms of upskilling in the areas of lack of knowledge before retaking the test.

Deloitte. IAS 2 Inventories | Result

Sorry, you did not receive a passing score. Your score was 25 percent.

To pass this course and receive credit, you must receive a score of at least 70 percent in the final assessment. You seem to have difficulty on the topics marked in red below.

Select the links provided below to review the relevant topics, and then select **Retry Quiz** for another attempt.

Good luck!

Definition of Inventories	Definition of Inventories	Measurement of Inventories	Measurement of Inventories
Cost Formulae	Assessing NRV	Measurement of Inventories	Recognition as an Expense

[Retry Quiz](#) [Menu](#)

NEXT →