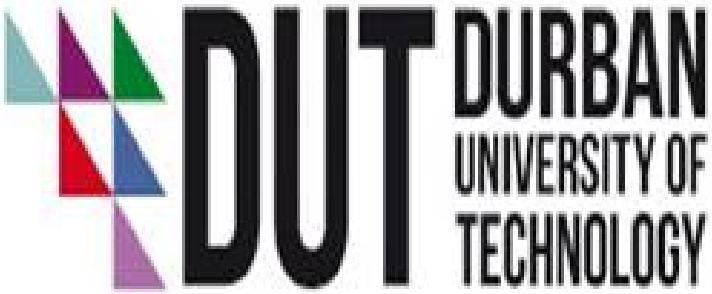

Assessing students' experiences of the effectiveness of the Blackboard Learning Management System in the Department of Information and Corporate Management at the Durban University of Technology.

Submitted in fulfilment of the requirements

of the Degree of

Masters in Information and Communications Technology

In the Faculty of Accounting and Informatics at the

Durban University of Technology,

Durban, South Africa

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Supervisor: Professor RC Millham (PhD)

Co-Supervisor: Dr JP Skinner (PhD)

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Declaration

I, Yathiraj Naidoo, declare that the content within this dissertation is a representation of my own work both in conception and execution. This work has not been submitted in any form for another degree at any university or institution of higher learning. All information cited from published and unpublished works have been acknowledged.

23 April 2020

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Yathiraj Naidoo Date

Approved for final submission

23 April 2020

Supervisor: Professor R Millham (PhD) Date

_____ __23 April 2020

Co-Supervisor: Dr J Skinner (PhD) Date

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Abstract

Assessing students' experiences of the effectiveness of the Blackboard Learning Management System in the Department of Information and Corporate Management at the Durban University of Technology

The use of Learning Management Systems by universities worldwide has grown exponentially in the last several years and has become an important tool to help connect students and lecturers without the confines of the traditional classroom. It is an environment with digital software which is designed to manage user learning interventions as well as deliver learning content and resources to students. Since 2013, online education has been supported at the Durban University of Technology (DUT) using the Blackboard (Bb) LMS. Traditionally DUT students have been accustomed to face-to-face teaching methods.

The purpose of this study was to examine students' experiences of using Bb because understanding students' experiences is a critical issue for academics and course designers in order to improve this LMS's usage and to understand how to improve learner satisfaction and behavioural intention, and to enhance the effectiveness of online teaching and learning.

Two main data collection instruments were used in this study. The first data collection instrument included a questionnaire which was only administered to the current cohort of students from the Department of Information and Corporate Management (ICM) who volunteered to participate in the study. This involved 109 respondents (n=109). The questionnaire was used mainly to gauge their overall experience of the online classroom in order to determine which features, used in the intervention, were of most use to the students and to guide future e-learning content designers on how to better design more effective content. The second data collection instrument involved a focus group comprising six IA3 students who volunteered to participate. The objective of the focus group was to assess in greater depth, allowing for open-ended discussions, the specific learning advantages of Bb.

Other data collection instruments used informally in this study included observations of students' behaviour on Bb use, which were made throughout the duration of the study by the researcher in his capacity as a technician in the computer laboratories, as well as a comparison of the assessment results of the current cohort of Information Administration 3 (IA3) students who were taught using a blended learning approach (n=184), compared with the assessment results of students from the previous three years who were taught using traditional face-to-face methods. These two informal data collection instruments were included for informational purposes and did not follow established research guidelines for data collection.

The study found that students appreciated the flexibility of being able to access course information at their convenience although most were only able to access the online classroom using the computers at the university. While most students were satisfied with their learning experience of the online classroom in Bb, they felt training on the advanced features of the LMS could be improved. Most importantly, students viewed the role of the lecturer as having the greatest impact on their online experience. Students viewed a lecturer who posted frequently, responded promptly to student queries and demonstrated a caring attitude, was more likely to encourage students to commit themselves to using the LMS.

During a comparison of the assessment marks between past students who received course instruction the traditional way, and the current cohort of students who received their course instruction through the online classroom, the study noted little difference in the results. However, what was important to note was that the class size of the current cohort of students was more than double the class size of any of the previous three years used in this study, and thus it can be inferred that there is a clear advantage in the support of an LMS system in contexts of growing student numbers, with no accompanying disadvantages.

An examination of the findings reveals that, if implemented properly, Bb or any other similar LMS for that matter, has an important role to play in improving teaching and learning at DUT (and by implication other universities of technology in South Africa)

both from a student and instructor perspective, by being able to create richer learning experiences for students, and for instructors to be able to manage larger classes.

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Chapter One

Introduction to the study

1.1 Introduction

The current study's background is a case study that revolves around students' use of the online classroom/s using the Blackboard (Bb) learning management system (LMS). The LMS has been established in a number of universities worldwide to help connect students and lecturers without the confines of the traditional classroom. Online learning, through the use of LMS, has become ubiquitous in higher education institutions. As a result, the research field and subject area of this study emanates from this background with a particular focus on student experiences of the online classrooms in Bb. This chapter sets the scene for the study by describing the context of the study and the problem that motivated the research. This chapter will also describe the theoretical framework underpinning the study as well as present the research questions, aims and objectives of this research.

1.2 Context of the study

Digital technologies are now an integral aspect of the university student's experience. In recent years, advances in communication technologies have prompted many higher education institutions to equip themselves with Learning Management Systems popularly known as LMS, as an alternate/additional way of delivering instruction to learners. An LMS can be defined as an information system which allows instructors and students to share instructional material, cooperate and communicate online without the confines of the traditional classroom. It is an environment involving digital software which is designed to manage user learning interventions as well as deliver learning content and resources to students (Adzharuddin and Ling 2013; Alharbi and Drew 2014; Binyamin, Rutter and Smith 2017). An LMS is useful for all kinds of learning activities and is a tool capable of reaching a wider audience and reducing the

disruptions associated with traditional learning. This is due to opportunities provided by LMSs to allow students access to learning content anytime and in any place and to help meet the demands of students who need a flexible and convenient way to assist them in their learning without having to sacrifice quality (Conradie, Moller and Faleni 2014; Squillante, Wise and Hartey 2014).

However, a study by Roby *et al.* (2013) suggests that even as online learning becomes an integral element of student experience at university, online course design and facilitation are still emerging concepts and therefore the challenge is to make online classrooms in Bb convenient, accessible and attractive to a wider cohort of students. According to Douglas (2012) many instructors and course designers use learning technologies such as LMSs just to make existing learning approaches more efficient, rather than using them as part of new strategies to make learning more effective. Further support for this claim was given in a similar study by Aguti, Walters and Wills (2014) who found that while LMS systems like Bb supported the process of teaching and learning, there was evidence to suggest that its utilisation by students was limited.

Few studies have reported on students' experiences of Bb and how these students felt the online classroom in Bb could be improved to meet the desired learning outcomes. Understanding students' experiences of these online classrooms has implications for the effectiveness of the teaching strategies. Therefore, there is a perceived need to gain a better understanding of learners' experiences of Bb, in order to improve its usage and effectiveness for online teaching and learning. The current study's background revolved around assessing student experiences of the content and design of the online classrooms, and measuring the performance impact of utilising the Bb content while assessing which features of Bb students' preferred as a teaching and learning tool.

The Durban University of Technology (DUT) is a leading university of technology in KwaZulu Natal, South Africa. DUT is a multi-cultural and multi-campus university. It has five campuses in Durban and two in Pietermaritzburg and together has six faculties. Traditionally DUT students have been accustomed to face-to-face teaching methods, however with the university's recent focus on moving most of its

programmes online, Bb was chosen as the LMS of choice, and a blended learning approach has been adopted by the university. Aguti, Walters and Wills (2014) describe blended learning as learning that makes use of a mix of course delivery strategies during face-to-face classroom teaching with e-learning technologies which are facilitated by Virtual Learning Environments (VLEs) such as the LMSs Bb.

Thus, online education has emerged as a popular alternative to face-to-face classroom instruction (Crawford-Ferre and Weist 2012) and according to Hrastinski *et al.* (2012), this has led to the gaining popularity of this form of instruction in higher education institutions worldwide. According to Black, Louth and Martin (2014), there has recently been a move towards offering University courses in an online mode to amongst other things, increase access for marginalised groups of students.

Understanding learners' experiences of Bb is therefore a critical issue for academics and course designers in order to improve its usage and to understand how to improve learners' satisfaction and behavioural intention to use the system, and also to enhance the effectiveness of online teaching and learning in general in the University. This knowledge, according to Blackmon and Major (2012), can provide information about whether students will likely continue to accept online delivery of instruction willingly, and which factors will influence their persistence and retention in these courses.

The research field and subject area of this study are therefore ICT and teaching and learning. According to Holland (2016), introducing electronic content to supplement an existing traditional course can be done flexibly and in an incremental manner using student feedback mechanisms to optimise its impact on student learning. In any teaching, learning and assessment (TLA) process, the introduction of new methodology or technology needs to be evaluated to determine its effectiveness/benefits to the process as described in the Task-to-Performance Chain model (Goodhue and Thompson 1995) which asserts that for Information Technology to have a positive impact on individual performance, the technology must be utilised and the technology must be a "good fit" with the task it supports.

A study by Baleghi-Zadeh *et al.* (2014) found that a LMS offers certain benefits that can improve key competencies, personal development and interpersonal development as a whole for students. However, a similar study by Asoodar, Vaezi and Izanloo (2016) also found that, although learning with technology such as LMS does bring diversity and flexibility in assessment and learning approaches, regardless of how advanced or capable the learning tools are, their effective and efficient implementation depends on the users and their attitude toward using them. In support of these claims, at the time of their study Baleghi-Zadeh *et al.* (2014) found that although an LMS supports the process of teaching and learning, its utilisation by students was limited, and the use of Bb at DUT is still very much a developing teaching and learning strategy. Also, when technology resources are incorporated into teaching practice, lecturers may not be aware of the impact on students' learning experiences (Hallas 2008).

According to Kiili (2005) technology is often used as a teacher substitute to deliver information to students, rather than supporting active learning processes. This finding is supported in a recent study by Holmes and Prieto-Rodriguez (2018) who suggest that LMS structures are too instructor-centric as these primarily allow instructors to increase their efficiency but that, in order to enhance the learning process instead of simply information transfer, both staff and students need to recognise the value in participating in these collaborative components. Furthermore, Ally (2004); Douglas (2012) cite studies which also suggest that learning is also influenced by the content and instruction built into learning resources, rather than the technology which is used to deliver the instruction. A study by Kauffman (2015) suggests that while much research has been done examining traditional models of delivery (i.e. classroom), extensive information regarding the online classroom is still emerging.

Harrati *et al.* (2016) argue that a positive user experience is of prime importance for educational learning systems, playing a vital role for the acceptance, satisfaction and efficiency of academic institutions. According to Ssekakubo, Suleman and Marsden (2012) one way to attract and retain the learners on the LMSs is by identifying the LMS services that are most desired by the students and make such services more effective. Hence the study attempts to identify key factors and the extent of their

impact on e-learning system (Bb) use that will enable instructors to be more focused with their effort and work more effectively on future improvement.

1.3 Theoretical Framework

The theoretical framework used to inform this study was based on one of the most widely used theories used to explain the acceptance of information technology (IT) by its users, the Technology Acceptance Model (TAM) (Davis 1989). TAM is well-known and widely accepted in Management Information System (MIS) literature. According to Harrati *et al.* (2016), TAM is tailored to include questions to explore two aspects of user satisfaction which are: perceived ease-of use and perceived usefulness. TAM explains perceived usefulness and usage intentions in terms of social influences and cognitive instrumental processes. TAM is one of the most influential extensions of Ajzen and Fishbein's theory of reasoned action (TRA) in the literature. The TAM identifies perceived ease of use, and perceived usefulness as key independent variables. Perceived usefulness is also influenced by perceived ease of use. TAM demonstrates that the adoption of technology by students is explained by perceived ease of use and perceived usefulness.

The effectiveness of the Bb online classroom was informed by supplementary evidence measured by comparing student performance over a period of three years to include pre-Bb classroom and post Bb classroom performance in order to determine whether or not students obtained better results after interacting with the contents in the Bb classroom. Perceived ease of use was also measured by analysing students' responses from the questionnaire and the focus group interview relating to how user-friendly and effective students found the online course material in Bb and to what extent they thought Bb contributed towards improving their understanding of the subject matter, as well as which features of Bb students found particularly useful.

1.4 Rationale of the study

According to Wong, Tatnall and Burgess (2014), the adoption of LMSs by stakeholders does not necessarily mean that students will want to use it, and even if they have little choice and are compelled to use it, that they will get the best use out of it. It was therefore very important to determine what impact the increased use and availability of online teaching resources in Bb, and the use of a blended learning approach, have had on students' academic performance up to now, and whether this is reflected in improved learning outcomes. The researcher considers this study to be an important step toward improving understanding on how the Bb learning management system is used by students in reality, in order to suggest ways of supporting high quality instructional design in a way that achieves the desired learning outcomes.

Whilst there have been many recent studies carried out on student experiences of the various features of Bb, many of these studies favour different features of Bb as being preferred by students. A report on the impact of Bb software in education (Katsifli 2010), claims that students are choosing to use the technologies, or features of LMSs, that meet their specific needs, further re-enforcing the need to assess which features of Bb students at DUT find most useful in helping them meet their course or study objectives. There are indications that students are simply being strategic in selecting technologies and tools to meet their immediate needs with perceived usefulness and satisfaction being important factors (Katsifli 2010). Students should feel satisfied with their learning outcomes after completing a given task in the online classroom.

1.5 The Research problem and aims

According to Fageeh (2011) the use of technology in the classroom does not necessarily equate to improved student academic achievement, but it can change the motivation and attitude of students, which are instrumental for enhancing academic achievement. These claims are supported in a study by Badawy (2012); Henderson, Selwyn and Aston (2017), who argue that learning outcomes depend on how this

technology is used in practice. Despite some proven benefits of using e-learning technologies such as Bb, a study by Aguti, Walters and Wills (2014) found that some higher education institutions have not utilised e-learning to its full potential to foster student-centred learning.

As has been found in other studies, mentioned in the preceding paragraph, the researcher has also observed some similarities to these findings at DUT. The researcher has noted that in many of the subjects the online classrooms are used merely for administrative purposes to make announcements to students and to distribute course notes. It appears that many lecturers still have not made an effort to create engaging and interesting online classrooms by using some of the advanced features of Bb which makes a LMS like Bb such a powerful teaching and learning tool. On the other hand, the researcher has also observed that students were reluctant to get involved in some of the online classroom activities such as discussion forums, blogs and journals, especially considering that these features were specifically included in the online classroom and their use encouraged by the lecturer.

Universities globally are now making more use of information and communications technologies(ICT) such as the internet, and many have adopted a "blended learning" approach to deliver course content (Wade 2012). 'Blended learning' is the term used to describe a hybrid model of learning where traditional face-to-face teaching approaches and newer electronic learning activities and resources are used together (Glogowska *et al.* 2011; Aguti, Walters and Wills 2014; Wong, Tatnall and Burgess 2014). However, the use of technology in the classroom does not necessarily equate to improved student academic achievement, but it can change the motivation and attitude of students, which are instrumental for enhancing academic achievement (Fageeh 2011). While some studies suggest that the use of technology such as Bb is an indispensable vehicle for teaching and learning Badawy (2012); Henderson, Selwyn and Aston (2017) argue that learning outcomes depend on how this technology is used in practice. Despite some proven benefits of using e-learning technologies such as Bb, a study by Aguti, Walters and Wills (2014) found that some higher education institutions have not utilised e-learning to its full potential to foster student-centred learning. A study by Johnson-Smith (2014) compares traditional and online learning

methods and argues that neither of these methods guarantees automatic learning but suggests that learning occurs only when students are actively engaged, have opportunities for interaction, and are presented with challenging lessons that require critical analysis. This further supports the need for this study. Data collected from students on their experiences of using Bb in this course is therefore important to this study, as this information will help academics and course designers create more student-centred online classrooms which in turn could improve the desired learning outcomes.

It has been observed by the researcher and lecturers that students have been reluctant to access the online learning resources within the Bb classrooms. So why this reluctance and what can be done to encourage greater use of the Bb classrooms by learners? The aim of this study is therefore, to examine students' experiences of the use of Blackboard using multiple methods, because understanding learners' experiences on Blackboard is critical to improving or increasing its use.

The aim of the study is therefore to examine student experiences in the use of Bb in order to better understand the information preferences of students with the intention of designing online content that is both relevant and engaging and supports the active learning processes of students.

The research objectives, designed to achieve this aim, were the following:

- To establish students' degree of satisfaction with Bb as a method of learning and teaching beyond traditional learning
- To establish which aspects of the Bb system students found most valuable for improving their learning experience.
- To establish which aspects of the Bb system students found least valuable for their learning experience.
- To provide clear guidelines for online classroom design by taking the findings into account in order to ensure that it is both relevant and engaging and supports the active learning processes of students.

1.6 Research questions

The objectives of the study have led to the following research questions:

- To what extent were students satisfied with Bb as a method of learning and teaching beyond traditional learning?
- Which aspects of Bb did students find most valuable for improving their learning experience?
- Which aspects of Bb did students find least valuable for improving their learning experience?
- How can the findings of the study be used to provide guidelines for online classroom design that is relevant and engaging, and supports the active learning process of students?

The first three questions will be addressed in chapter 4 where the research questionnaire and focus group responses will be analysed. The fourth question will be addressed in chapter 5 where conclusions and recommendations will be made.

1.7 Significance of the study

Online classrooms are still a relatively recent and growing form of instruction at DUT, and while this is increasingly becoming an important teaching and learning tool for lecturers and students, no study has been undertaken to determine the effectiveness of the online classrooms in Bb from a student's perspective. While the topic of online learning is well researched, understanding students' perspective on their online classrooms will help lecturers and course designers to determine what teaching practices, strategies, and methods work best to promote student learning in online settings at DUT (and, arguably, at other universities of technology in South Africa).

The findings could be useful to lecturers/course designers who are responsible for creating and maintaining online classrooms because according to Arghode, Brieger and Wang (2018) successful online instruction requires new methods of course design, interaction among course participants, and instructor preparation and support.

1.7 Outline of Chapters

Chapter one – Introduction to the study

This study introduces and explains the research study through the presentation of the research field and subject area, problem statement, aim, research questions and objectives, along with an outline of the content of the chapters.

Chapter two – Literature review

This chapter reviews existing research and literature on:

- Current e-Learning trends at higher education institutions locally and internationally;
- the role of Learning Management Systems as a teaching and learning tool;
- students' experiences of e-Learning;
  students' utilisation of aspects of e-Learning and its effects, including feedback on design;
- the theoretical framework informing this study; and
- gaps in the literature that the study will identify.

Chapter three – Research methodology, design and implementation

Chapter Three of this study presents the research design and methodology used. This chapter describes the design of the research instruments used to collect data that aided in addressing the research objectives. This chapter also describes how the research instruments were administered and the methods used to facilitate data collection, sorting and capturing. This chapter also explains the data analysis techniques that were employed to deduce results from the gathered data.

Chapter four - Data results presentation and interpretation

This chapter presents and discusses the descriptive and detailed inferential statistical and focus group findings of this study. These findings show how, or to what extent, the research questions of the study were answered and also the extent to which the study's objectives were met.

Chapter five - Conclusions and recommendations

Chapter Five concludes the study with regards to objectives achieved and/or explains why they were not achieved. Recommendations presented in this chapter further address the implications of the findings of this study with regards to Blackboard classroom design and content, towards the improvement of students' online classroom experience including what Bb tools are most popular with students; what type of online classroom content, relevant to the course, most students prefer; and how to avoid the limitations experienced in the course of the current study.

1.8 Summary

This chapter has attempted to provide an overview of the research study conducted. The chapter also outlines the breakdown of chapters within the dissertation. It was important to review the body of knowledge around the scope of this study in order to indicate the context clearly. The following chapter discusses the literature reviewed for the study.

Chapter Two

Literature Review

2.1 Introduction

Information and communication technologies (ICT) are a ubiquitous and nowadays taken-for-granted feature of our society (Glogowska *et al.* 2011). With the latest development of internet technologies, universities are investing considerable resources in e-learning systems such as Learning Management Systems (LMS) to support teaching and learning (Islam 2013: 387). A similar study by Conradie, Moller and Faleni (2014) suggests that while technology education literature has explored the success determinants of LMS implementation, how to create engaging, media rich online classrooms has become an important research question. These online classrooms should take student satisfaction, student learning outcomes and student preferences into account. Furthermore Conradie, Moller and Faleni (2014) argue that the ability of students to utilise a LMS effectively is also important, especially when it is required that an active and interactive learning environment be established, one in which the student has the ability to engage with media rich content.

While much of the literature highlights the significant benefits of LMSs in higher education, a study by Bell and Federman (2013) notes that the growth of e-learning, specifically LMSs, has been accompanied by a continuing debate about its effectiveness in higher education. A similar study by Driscoll *et al.* (2012) agrees that understanding the relative effectiveness of online learning environments is an issue of increasing importance for academics and course designers in order to improve the quality and design of online classrooms which in turn could result in a more rewarding experience for the student. Lecturers and students value the LMS as an enhancement to their teaching and learning experiences, but relatively few use the advanced features and even fewer use these systems to their fullest capacity (Dahlstrom, Brooks and Bichsel 2014). A study by Ellis and Goodyear (2013) found that students' experiences of e-learning in higher education can help instructors/teachers and university managers understand how e-learning relates to, and can be integrated with, other student

experiences of learning. According to Dahlstrom, Brooks and Bichsel (2014), whilst students' general digital literacy may be solid, their skills and experiences do not necessarily transfer to institutionally specific technology services and applications such as the LMS

The purpose of this chapter therefore, is to review empirical literature on student experiences of using e-learning, more specifically, the use of the Blackboard (Bb) LMS as a learning tool to aid in their studies. Empirical literature consists of similar studies that introduce and help explain the key terms as well as the background to the use and experience of Bb by students, while the conceptual literature or theoretical framework of the study will consider concepts and theoretical models that may be used to help predict ways of improving the student experience of Bb use.

2.2 Defining e-learning

E-learning has been defined in a range of different ways. Whilst the literature abounds with various descriptions of e-learning, in the context of this study an appropriate description by Khan (2005 as cited in (Al-Qahtani and Higgins 2013: 223) defines e-learning as "an innovative approach for delivering well-designed, learner-centred, interactive, and facilitated learning environments to anyone, any place, anytime by utilising the attributes and resources of various digital technologies along with other forms of learning materials suited for an open, flexible, and distributed learning environment". Other descriptions of e-learning appropriate to the context of this study include "the use of internet technologies to create and deliver a rich learning environment that includes a broad array of instruction and information resources and solutions, the goal of which is to enhance individual and organisational performance." (Rosenberg, 2006).

A similar but more recent definition describes e-learning as the use of electronic educational technology to deliver courses, and that it is a rapidly developing area causing transformational changes to the numbers of students accessing these courses, and in the range of subjects available (Holland 2016: 1).

From the above explanations, it is fair to suggest that the broad definitions of e-learning have not changed significantly over the years. However the technologies and digital media networks that they incorporate to enhance teaching and learning, as well as the sharing of information and knowledge management, are continuing to evolve (Evans 2014: 20).

A study by Adzharuddin and Ling (2013) contends that e-learning systems can be divided into four types: the Learning Management System (LMS), Learning Content Management System (LCMS), Learning Design System (LDS), and Learning Support System (LSS). For the purpose of this study, the researcher will be focusing on the Blackboard (Bb) Learning Management System (LMS), which is an e-learning system used by various universities all over the globe. At DUT the use of Bb occurs within a blended learning environment, where traditional face-to-face teaching is combined with e-learning.

2.3 What is a Learning Management System?

With ICT evolving constantly, students in Higher Education Institutions (HEIs) are becoming increasingly dependent on the internet for many of their daily activities. The LMS is a software environment designed to manage user learning interventions as well as deliver learning content and resources to students (Adzharuddin and Ling 2013: 250). More specifically, LMSs can be described as web-based software applications that are used to co-ordinate course materials and activities (Lonn, Teasley and Krumm 2011; Driscoll *et al.* 2012). Studies by Gosper, Malfroy and McKenzie (2013) have suggested that most universities support an LMS as part of their standard operating environment. These usually include a wide variety of features and have the potential to offer new learning and teaching methods that meet a variety of educational needs (Islam 2013: 387).

LMSs provide an online portal that connects lecturers and students. “It provides a way for classroom materials or activities to be shared easily and enables lecturers and students to interact outside of the classroom” (Adzharuddin and Ling 2013: 250).

According to Lyashenko and Frolova (2013) LMSs focus on the organisation of interaction between teachers and students and are appropriate for both full-time and part-time study. With the increasing availability and accessibility of the internet, it has become more convenient than ever for both students and instructors to access coursework through LMSs (Squillante, Wise and Hartey 2014).

According to Driscoll *et al.* (2012) and Adzharuddin and Ling (2013) most LMSs possess features and a framework that allows for scheduling, posting readings and assignments, conducting discussion boards and live chats, running an online grade book, conducting online quizzes and assignments, and the subsequent teaching and management of a course including various interactions with students taking the course.

2.4 Global e-learning trends in Higher Education

Few can deny the pivotal role that ICT plays in facilitating learning and teaching in higher education (Gosper, Malfroy and McKenzie 2013: 268). Baleghi-Zadeh *et al.* (2014); Holland (2016) found that in recent years the use of modern ICT technology has revolutionised the way that higher education institutions operate their learning and teaching role. Studies by Lonn, Teasley and Krumm (2011); Yang (2013) found that technology-assisted learning is increasingly becoming a standard in higher education with the use of digital technologies, especially web-based technologies continuing to extend the reach of settings for education and training by including a more organic, integrated array of learning experiences.

A more recent study by Harrati *et al.* (2016) relating to the global trend of using e-learning technology such as LMSs in education, has noted that the evaluation of e-learning applications in terms of user experience and satisfaction has received considerable attention from the research community in order to assess and quantify the satisfaction and effectiveness level for both students and lecturers.

From the literature presented, it is evident that although the inclusion of ICT for educational purposes has increased substantially over the past decade, more research needs to be done to improve the design and implementation technologies such as

LMSs because according to Harrati *et al.* (2016), there are concerns that, despite the wide use of e-learning technologies globally, the intended impact on education is not being achieved.

2.5 Traditional teaching methods versus e-Learning

Traditional classroom teaching focuses on a number of elements where learning is conducted in a synchronous environment. According to Simon, Jackson and Maxwell (2013), traditional teaching involves the instructor and the students being in the same place at the same time. Students derive motivation and instruction from the teacher as well as from the other students. A study by Douglas (2012) claims that traditionally, a major part of education has been to get information into the head of the student. Thus the traditional lecture is usually about presenting information to passive listeners and the traditional testing is checking whether it has been retained (at least at the time of the test). This system may no longer be achievable, or desirable, in the modern age. As already mentioned, universities globally are now making more use of ICT such as LMSs, and many have adopted a "blended learning" approach to deliver course content (Wade 2012: 152).

The term "blended learning" is defined as a pedagogical approach that includes a combination of face-to-face instruction with computer-mediated instruction (Wong, Tatnall and Burgess 2014; O'Byrne and Pytash 2015). According to Mantilla and Lewis (2012), internet technologies have profoundly influenced all aspects of education, and these are changing at a rapid rate. With such rapid growth in the use of these systems, it is important to understand how these technologies are being used and how they impact on users (Heirdsfield 2011: 1).

Like other higher education institutions, DUT has also introduced an online LMS to its academic community. The importance of such decisions not only helps DUT keep pace with the technological trends in the higher educational fields but according to (Squillante, Wise and Hartey 2014), it also helps meet the demands of students who need a flexible and convenient way to assist them in their learning without having to

sacrifice quality. Since 2013 online education has been supported at DUT with the Bb LMS but despite the increasing use of e-learning by academics to support their teaching practice, claims by DUTs newsletter the *Conduit*, that the university was making excellent progress towards its aim of becoming a digital University (Conduit, 2 February 2015) may be optimistic as there is evidence to suggest that it still faces several challenges. These reservations are further supported in a study by Dlalisa and van Niekerk (2015) who concluded that since the introduction of Bb as a teaching and learning tool at DUT, it appeared that staff and students at DUT were not making full use of the system.

From 2016 students at DUT have been automatically enrolled into Bb classrooms for all the subjects for which they are registered. This has simplified the process for academics and course designers as they now need only be concerned about creating the content in Bb and not for enrolling students into the online classroom, which proved to be complicated for the inexperienced.

Traditionally DUT students have been accustomed to face-to-face (F2F) teaching methods. While online learning is not new to most students, Asoodar, Vaezi and Izanloo (2016) argue that learning with technology does bring diversity and flexibility in assessment and learning approaches. A study by (Driscoll *et al.* 2012; Marchewka and Kostiwa 2014) concluded that understanding learners' experiences of Bb is a critical issue for academics and course designers in order to improve its usage and to understand how to improve learners' satisfaction, behavioural intention to use the system, and to enhance the effectiveness of online teaching and learning.

Whilst the potential success of technology in education has been made clear in numerous studies, others have shown that the implementation of online education is not simply a technological solution, but a process of many different factors such as social and behavioural contexts (Tarhini, Hone and Liu 2013). At DUT little is known about whether such factors have an influence on technology adoption and more specifically, what impact such factors have on students' experience of Bb.

2.6 E-Learning in Higher Education Institutions

ICT provides different opportunities for universities in order to improve their educational systems, meet students' needs and prepare the new generation for the challenges of tomorrow's world (Hernandez *et al.* 2011: 2224). As already mentioned, the use of a LMS has become very popular and many universities have combined the use of LMSs together with traditional teaching methods (Wong, Tatnall and Burgess 2014; O'Byrne and Pytash 2015). A study by Holland (2016) notes that the ubiquitous nature of modern ICT means that it is possible to seamlessly integrate it into traditional courses to supplement traditional learning and to enhance students' ability and encourage them to self-learn outside of curricula timetables. Additionally, a study by Liaw and Huang (2013) found that enhancing environmental satisfaction improves learners' positive learning attitudes of behavioural intentions toward e-learning. Moreover, effective learning activities, including self-regulated activities, provide a chance for learners and instructors to share their knowledge and experience.

As mentioned previously, although there is much literature on the success of e-learning at universities, preliminary investigations indicate that e-learning systems remain under-utilised (Fahad, Hassan and Salman 2013; Aucamp and Swart 2015). In fact the online education literature is characterised by a debate on the effectiveness of online versus F2F classrooms (Driscoll *et al.* (2012),. Although technology is now used throughout education, it is often used just to make existing learning approaches more efficient, rather than used as part of new strategies to make it more effective. Therefore whilst developing a more effective use of technology is important for improving educational practice, it is also important to understand how these technologies are being used and how they impact on users (Heirdsfield 2011; Douglas 2012). Similarly, according to Liaw and Huang (2013) the most important task for instructional designers and educators is to develop effective learning environments that encourage students to become active, autonomous, and self-regulated learners.

2.7 What is Blackboard?

The Blackboard Learning Management System is software that allows educational institutions to create and host courses on the Internet. Courses created with this software can serve as entire online courses or as a supplement to traditional classroom courses. Studies by Lin, Persada and Nadlifatin (2014); Ntlabathi (2014) also describe Bb as an e-learning tool that provides an online space and includes a number of tools which can be used to enhance the teaching and learning experience. It is used by many universities worldwide for their education processes, both as online courses or used in combination with face-to-face interaction.

A study by Baleghi-Zadeh *et al.* (2014), claims that LMSs like Bb make the process of teaching and learning more flexible and provide different opportunities for interaction between instructors and students. In other words "LMS offers certain benefits that can improve certain key competences, personal development and interpersonal collaboration as a whole" (Lyashenko and Frolova 2013). Academics are often encouraged to find ways to help their students improve their learning skills both inside and outside of the classroom. With the advance of the Internet and Web technologies, instructors can make online demonstrations of real world applications, as well as facilitate and guide students through the process of analysing real world cases, gathering information, testing validity and applicability, and creating meaningful solutions. Moreover, students can use Web-enabled technologies to access course materials, contact instructors, submit assignments online, and collaborate on team projects (Marchewka and Kostiwa 2014). A study by Heirdsfield (2011) also lists some of the potential benefits of Bb to include increased availability, quick feedback, improved two-way interactions, tracking, and building skills such as organisation, time management and communication.

Some of the benefits of Bb as explained in an earlier study by Bradford *et al.* (2007) include being used to communicate important information about courses such as announcements, discussions, providing a virtual classroom and e-mail links as well as serving as a repository for course material and a forum for online learning and student activities. A report by Katsifli (2012) claimed that Bb was constantly improving its

technology and included collaborative tools like journals/blogs and wikis, with the additional ability to link seamlessly to external tools (e.g. Facebook and YouTube) and to be accessed via mobile devices. A related study by Al-Qahtani and Higgins (2013), claimed that the inclusion of features such as these allows students extended access to learning materials, and for them to have the opportunity to repeat and to reflect until they are comfortable with their level of understanding. Also, according to Katsifli (2012), Bb has the ability to provide quick feedback which would include instructor initiated feedback to student questions and queries as well as automated feedback such as instant grading. Also, by providing students with active and constructivist learning tools, Bb can promote learner-centred approaches.

Whilst there are many positive factors associated with the use of the Bb LMS, several studies have also pointed out some negative factors associated with Bb use. According to Marchewka and Kostiwa (2014), while students can access the course materials and engage in collaborative learning, this is necessarily only as long as they have a reliable internet connection. As with all technology there are advantages and disadvantages. Studies by (Bradford *et al.* 2007; Al-Qahtani and Higgins 2013) found that at some universities Bb was under-utilised and some of the reasons cited for this negative feedback included students not being as proficient with technology as expected, students' reluctance to participate in discussion forums due to lack of anonymity which, according to Hrastinski *et al.* (2012), meant that student posts could be accessed by all participants (as well as the lecturer) and could "create a fear of public ridicule". Another negative comment, according to Al-Qahtani and Higgins (2013), related to students feeling isolated at the lack of social interaction and very often loss of motivation and the preference to learn from verbal clues or observing from others. Another similar study by Arkorful and Abaidoo (2015) also mentioned disadvantages including:

1. Clarification, interpretation and explanation were less effective than with traditional methods, the learning process being much easier face-to-face with instructors or teachers.

2. Students' communication skills may be affected. Though learners might have an excellent academic knowledge, they may not possess the needed skills to deliver their acquired knowledge to others.
3. E-learning may negatively impact socialisation skills and limit the role of instructors as directors of the educational process.

2.8 Student Experience

A study by (Aguti, Walters and Wills 2014) explains that student-centred learning focuses on improving communicative and collaborative skills amongst the students in an effort to engage students more in their learning activities rather than students being passive in the learning process. A similar study by Crawford-Ferre and Weist (2012) suggests that successful online instruction requires new methods of course design and interaction among course participants together with instructor preparation and support. An earlier but similar study by Liaw (2008) relating to student experience found that students cited reasons such as the lack of a learning atmosphere in Blackboard, reduced opportunities for contact or discussions with other students and lecturers, delayed feedback from instructors and a less efficient learning process with students required to dedicate more time to learning the content, as the basis for their dissatisfaction. There has, however, been much improvement especially to the design and implementation of online classrooms since this study was published. However, some of the concerns expressed by students in this study still currently exist.

A similar study by Milheim (2012) suggests that improving the student experience of online classrooms includes implementing consistent course formatting and interface/material design, which can also help alleviate students' difficulty in preparing for an online classroom. Milheim (2012) further suggests that while consistency, particularly in an LMS like Bb containing multiple online classrooms, assists students with knowing what to expect as they progress, it does not mean that all online classrooms should be identical in media and activities. Kearns (2011), for example, suggests varying media and other content, including learning activities, and optimizing

opportunities to capture student attention and maintain their interest. However, she warns this should be done with a carefully selected and pre-determined set of media so as to present a structured environment that does not deviate too radically from what students are used to and comfortable with.

Recent studies conducted at other South African universities (Boshielo 2014; Ntlabathi 2014) concluded that while students enjoyed using Bb, they were still not confident with this mode of learning and felt uncomfortable with being assessed online as they did not feel they were competent enough in the use of Bb. A study by Liaw (2008) examined learners' satisfaction, behavioural intentions, and the effectiveness of the Bb system and found that perceived self-efficacy was a critical factor that influenced learners' experience. Self-efficacy, specifically towards online learning is described by Lee and Mendlinger (2011) as referring to individuals' judgment of their capabilities to use online learning systems (including computers, the internet, and web-based instructional and learning tools). Self-efficacy is the personal belief a person maintains as to how well they can perform a task. In addition to this, Lee and Mendlinger (2011) found that familiarity with the technology provided a better online learning experience by enhancing interaction between students and instructors. Similarly, this study aimed at testing this theory amongst students at DUT to see if similar conclusions could be reached.

The implementation of e-Learning or online environments in South African higher education institutions (HEIs) differs from one institution to the next (Czerniewicz and Ngugi 2007). This reflects the variety in organisational cultures and approaches as well as varied learner communities served by different institutions. This would indicate that factors affecting students' experiences of Bb online classrooms may not be the same in different HEIs. Studies by Liaw and Huang (2013) also found that learner usage and experiences were essential factors in assessing the success of learning systems. A similar study by Mehra and Omidian (2011) agrees with Liaw and Huang but also suggests that measuring students' experiences with e-classrooms provides a beneficial construct to predict learning outcomes.

Studies by Crawford-Ferre and Weist (2012) and Aguti, Walters and Wills (2014) both agreed on the importance of enhancing the online classroom experience for students and they also recognise that students learn in different ways and have different learning styles and also claim that student learning is a dynamic process in which students continually create connections between facts, ideas and processes. Therefore, they felt that technology should be compatible with varying students' needs when creating online classrooms. Similarly, a study by Conradie, Moller and Faleni (2014) suggests that in order to obtain the full benefit of an LMS, both instructors and students must explore the opportunities provided by LMSs and the instructional formats supported.

Some of these concerns by students included in a study by Douglas (2012), where it is argued that despite its high cost, LMSs are being used simply as a repository for notes for students to download and print. A study by Badawy (2012) and Baleghi-Zadeh *et al.* (2014) have also suggested that although an LMS supports the process of teaching and learning, its utilisation by students is limited. There are indications based on observations made and from the researcher's experience, that these concerns are still valid.

2.9 Role of the Instructor

According to Milheim (2012), research supports the notion that students participating in online courses experience some dissatisfaction. This has led instructors to search for ways to enhance learning and increase levels of satisfaction with respect to all aspects of the online classroom experience. While the use of digital technologies is widespread and increasing, it is not always optimised for effective learning because many academics have little time and limited support to work on innovation and improvement of their online teaching, which often means they simply replicate their current practice in a digital medium (Laurillard *et al.* 2013). However, for e-learning to be successful, instructors need to remain as close as possible to the online environment to be able to design the e-learning environment to help students engage with the tools and the knowledge they are teaching (Sun *et al.* 2008). Instead of just imparting knowledge, instructors need to provide more guidance and assistance to

learners, consider how to integrate online resources to organize learning content, create a high quality online learning environment, and emphasize course process management to stimulate students' learning motivation and enhance learning effect (Ma *et al.* 2015). Taylor-Massey (2015) suggests that in order to improve the student experience of an online classroom, instructors need to change their perspective and lead in a different way by lecturing less and mentoring more. According to Jaggars and Xu (2016), recent studies have shown that lecturers who participate actively in the online classroom by posting regularly, inviting student participation through various modalities, responding promptly to student queries and who demonstrated a caring attitude encouraged students to commit themselves to the course and perform at an enhanced academic level.

Studies by Blackmon and Major (2012); Arghode, Brieger and Wang (2018) found that while some of the responsibility affecting students' online experience rests with the students themselves, much responsibility also rests with the instructor to create vibrant online experiences that allow for new intellective skills to be developed and used. In an online environment, instructors should not merely be disseminators of information but rather facilitators of information, in order to stimulate students (Taylor-Massey 2015). To facilitate the active learning process (Arghode and Wang 2016), an engaging instructor must use strategies to increase participation in learning by generating learners' curiosity to learn to apply the gained knowledge and skills (Burch *et al.* 2015). With such changes in learning contexts and in the roles of instructors and students, corresponding changes may have taken place in students' expectations and perceptions regarding the competence with which instructors should provide assistance, whether in advance of engaging in online studies or while in the process of doing so (Matzat 2013; Zingaro and Porter 2014).

Taylor-Massey (2015) suggests that an instructor in an online classroom should be multi-skilled in order to create a better quality of experience for both instructor and students. She suggests five main skills that instructors should possess namely:

- **E-learning designer**: to be able to develop the online classroom to meet the learning objectives

- **Technology specialist**: to be technically savvy in order to choose tools that are appropriate for learning goals and that are within the technical capabilities of students.
- **Content coach**: to find ways to ensure learning in the virtual classroom by providing tips or concise snippets about content, pinpointing crucial areas upon which to focus, or offering critical thinking questions for consideration
- **Social director**: to be able to purposefully establish a sense of community and modes of interaction among all participants.
- **Managing correspondent**: to be able to encourage, critique and, ultimately, use typed words to support students as they proceed through the learning experience.

Taylor-Massey (2015) concludes that when all of these skills are executed successfully, students should feel confident and competent in their online course.

The findings from other research discussed above seem to correspond with the observations made by Taylor-Massey (2015) which further re-enforces her suggestions of the qualities an online instructor should possess.

2.10 Gaps in the literature

Whilst there is a vast array of literature surrounding e-learning acceptance and its success in higher education, Aguti, Walters and Wills (2014) found that there were limited studies that offered a comprehensive framework for effectively using e-learning systems such as LMSs to support student-centred learning in higher education institutions. A recent study by Fahad, Hassan and Salman (2013) has also found that there have not been many studies which have focused on learner satisfaction with online instruction, particularly in the transition to online learning from traditional approaches. Similar claims were also highlighted by Paechter and Maier (2010) who noted there was very limited understanding of student online experiences, and which online activities are preferred by students and why. Whilst much has changed since

this study was published, the literature suggests that this is still the case. In support of these claims, a more recent study by Kauffman (2015) suggests that, while much research has been done examining traditional modes of delivery (i.e. classroom); extensive information regarding online classrooms is still emerging because this mode of course delivery is still relatively new. These claims are significant for the focus of this study.

While Islam (2013) suggests that LMSs have the potential to offer new learning and teaching methods that meet a variety of educational needs, Blackmon and Major (2012) found that first it is critical to begin to uncover and understand students' experiences with online learning because doing so can help to show effective online practices, student perceptions of online learning, and student satisfaction in the online environment. Such information could benefit the field of higher education in general providing information to help institutions and faculty design and deliver better courses. This in turn could help improve student learning in these courses and determine what challenges students face with the use of Bb.

A study by Heirdsfield (2011) agrees that while it is important to look for methods and technologies to facilitate learning for all learners, understanding the current ways in which these technologies are being used by learners and instructors may be the first important step in achieving this aim. A report by Katsifli (2012) on the impact of Bb software in education, claims that students are choosing to use the technologies, or features of LMSs that meet their needs, further re-enforces the need to assess which features of Bb students at DUT find most useful in helping them meet their course or study objectives.

[The researcher acknowledges that many of the references included in this chapter are from earlier studies and, considering the rapid advancement of technology in education, these references may be considered outdated. However, current literature searches in 2019 do not reveal any new literature to the contrary, and from a South African context, which assesses students' experience of using LMS. Thus this seems to indicate an ongoing gap in the literature that this study is helping to fill.]

2.11 Theoretical Framework

The acceptance of technologies and systems has been studied through various theories and frameworks, such as the theory of reasoned action (TRA) (Fishbein and Ajzen 1975), the Technology Acceptance Model (TAM) (Davis 1989), the Extended Technology Acceptance Model (TAMs) (Venkatesh and Davis 2000) and the Unified Theory of Acceptance and Use of Technology (UTAUT) (Venkatesh *et al.* 2003).

TAM, which has been used to inform this study, remains one of the most widely used models in understanding the acceptance of technologies and has been employed in many empirical studies. According to this theory, a technology's perceived usefulness and its perceived ease of use are determinants of developing a particular attitude towards the use of innovation (Davis 1989). TAM is therefore an information system theory that models how users come to accept and use a particular technology (Van Raaij and Schepers 2008; Marchewka and Kostiwa 2014). A study by Mehra and Omidian (2011) suggests that the theory of technology acceptance was really designed to test attitudes of users towards new technology. Based on the theory of reasoned action, TAM suggests that user acceptance of technology is driven by their beliefs about the consequences of that usage (Aucamp and Swart 2015). Figure 1 represents the original TAM model as developed Davis (1989).

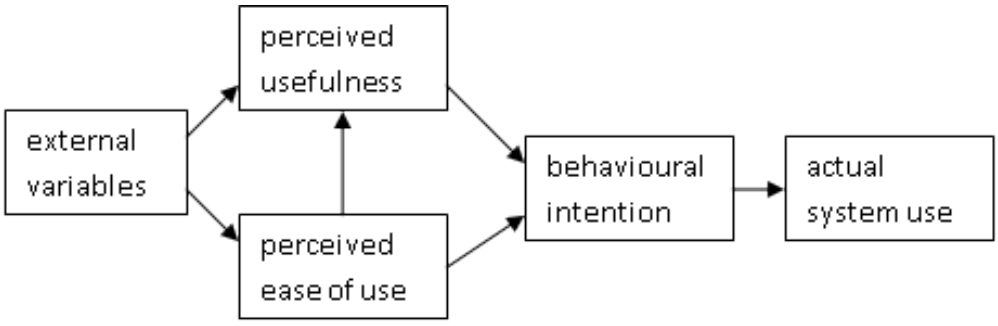

Figure 4. 1-Technology Acceptance Model (TAM) developed by Davis (1989)

According to a study by Rafi, Samsudin and Hanafi (2015), based on these interrelations, satisfied learners will perceive the system to be beneficial to their learning and will most likely use the system more persistently.

In TAM, external variables related to this study (online classroom design characteristics, training, computer self-efficacy, user involvement in design, and the usefulness of the information presented in the online classrooms) have an impact on perceived usefulness (PU) and perceived ease of use (PEOU) as all of these have an impact on the student experience. Both PU and PEOU determine the user attitude towards behavioural intention to use the actual computer system. A study by Dlalisa and van Niekerk (2015) concurs with the literature which suggests that TAM is a popular framework widely adopted to predict the acceptance and usage of Information Systems (IS) but they go on to say that despite external factors being attributed to a certain extent as influencing the acceptance and usage of IS, these factors are not applicable to all IS systems, including LMSs. Studies by Alharbi and Drew (2014) suggested new external variables which include the lack of LMS availability, prior experience, and relevance. The overall research model suggests that all mentioned variables either directly or indirectly affect the overall behavioural intention to use an LMS. The TAM was, however, selected to inform this study due to its predictive ability in studies involving students in technology adoption Teo (2009). TAM will be used as a baseline to assess the extent to which various features of Bb and Bb classroom design enhance students' experience and influence their adoption and usage on the proposed model. The model comprises three major factors (i.e., personal, technological, and organizational) (Dlalisa and van Niekerk 2015). This model was used to investigate factors that influence the student experience of using Bb.

Dishaw and Strong (1998) agree that the integration of TAM will be useful in understanding software utilisation (Bb) in a variety of circumstances, which is important for academics and course designers because they need to understand

how students actually choose to use or not to use certain functions. The key to understanding software use decisions lies in understanding how the functions provided by the software fit the perceived needs of user (Dishaw and Strong 1998).

While TAM assists in the formation of a model for this study, a study by Lee and Mendlinger (2011) suggested that perceived self-efficacy (PSE) also influenced students' experience of the online classroom. Lee and Mendlinger (2011) also suggested that the students' experience of online learning and satisfaction also depended on the confidence of their abilities and capabilities, PSE. Accordingly, they developed five hypotheses, complementing TAM and which have relevance to this study: (Lee and Mendlinger 2011: 245)

H1: PSE will have a positive effect on perception of ease of use (PEOU) toward online learning;

H2: PSE will have a positive effect on perception of usefulness (PU) toward online learning;

H3: PSE will have a positive effect on behavioural intention to accept online learning and student satisfaction;

H4: PEOU will have a positive effect on behavioural intention to accept online learning;

H5: PU will have a positive effect on behavioural intention to accept online learning.

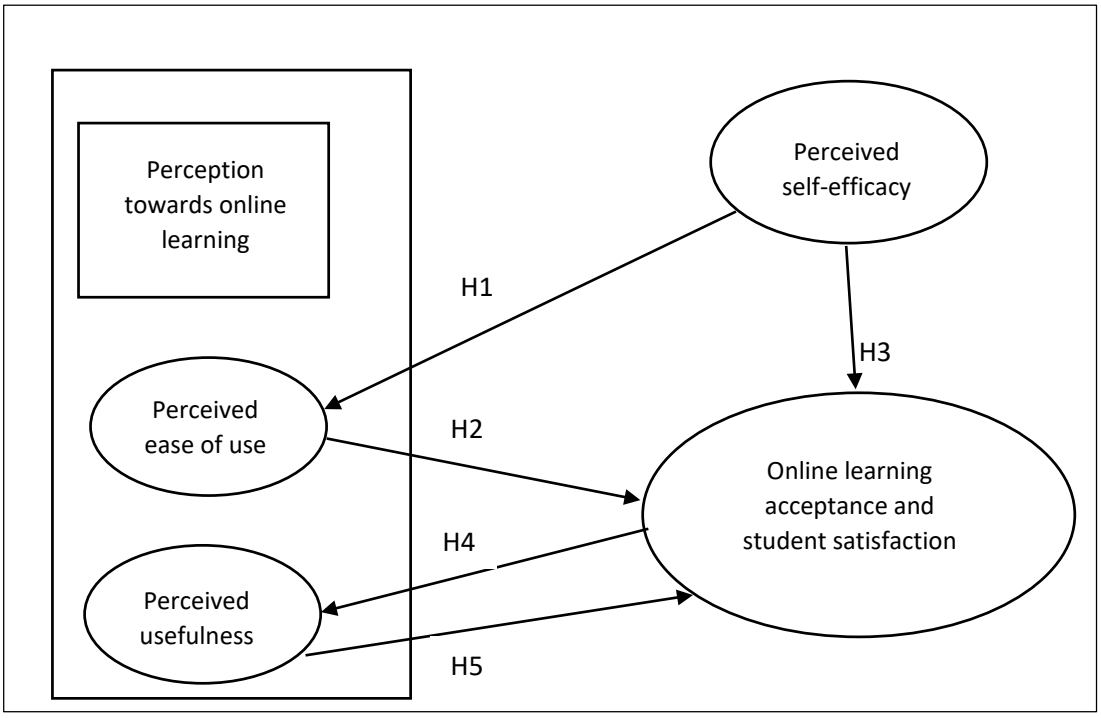

Figure 4. 2- Research Framework and Structural Model developed by Lee and Mendlinger (2011)

While this study also incorporated influences of other research theories related to TAM, TAM was used to guide the model of this study mainly to validate the relationship between the TAM core constructs and student experiences of Bb, and a modified version of the basic TAM framework called Research Framework and Structural Model (Lee and Mendlinger 2011) was used. However, in hindsight, the researcher realises that UTAUT would have been a more appropriate technology acceptance model to use in this study because UTAUT (Venkatesh *et al.* 2003) is a more recent model and considered a better instrument and is a synthesis of eight existing models of technology acceptance - including TAM. It is used widely in educational settings.

2.12 Summary

This chapter presented an overview of the literature relating to the trends in online teaching and learning using LMSs in a blended learning environment at HEIs. It was important to examine literature reflecting the trends in online teaching and learning using an LMS both globally and in a South African context. The following chapter will review the research methodology that was employed in this research project.

Chapter Three

Research Methodology and Design

3.1 Introduction

Research methodology refers to the specific procedures or techniques used to identify, select, process, and analyse information about a research topic. The methodology section answers two main questions: How was the data generated? And how was the data analysed? (LibGuides: Research Support: Research Methodology at University of Witwatersrand 2019)

Creswell and Creswell (2018: 179) describe the function of a good research design as being able to allow the researcher to ensure that the evidence obtained is able to effectively address the research problem as logically and as unambiguously as possible**.** It refers to the overall strategy that is chosen to integrate the different components of the study in a coherent and logical way, thereby ensuring the research problem is effectively addressed. It constitutes the blueprint for the collection, measurement, and analysis of data.

In this chapter the researcher outlines the research problem and related research questions in order to provide a rationale and clear account of this study's research design and methodology. The study was developed so that the teaching staff who design learning experiences for students, could have a better sense of students' experiences and use of the online learning environment, and could use this information to improve the student learning experience. In the course of the discussion that follows, the research design, methodology, standards and techniques that were used to obtain representative data from a sample of students from the Durban University of Technology, will be explained.

A mixed methods' research design was implemented to investigate and explore the assumptions of this study. This chapter further presents the research instruments used in this study. These include a questionnaire that incorporated both qualitative and quantitative data collection methods; and a focus group interview. A comparison of the online test scores achieved by the current cohort of students, compared to the test scores achieved by past students during traditional written tests in the previous three years covering the same/similar section of the syllabus (social networking), was also included in the study. This comparison however, was included for informational purposes only and was not a formal data collection instrument as it did not adhere to rigorous research guidelines for such comparisons. This chapter further presents the administration of a pilot study that was conducted to affirm the research instruments' design feasibility and the feasibility of the projected main study data collection procedures.

3.2 Research Problem

Traditionally DUT students have been accustomed to face-to-face teaching methods. Although Bb was introduced as a teaching and learning tool in 2013, it appears, according to Dlalisa and van Niekerk (2015), and to current observations by the researcher, that staff, and more especially students, are not yet making full use of the system. As discussed above, understanding learners' experiences of Bb is a critical issue for academics and course designers in order to improve its usage and to understand how to improve learners' satisfaction, behavioural intention, and to enhance the effectiveness of online teaching and learning (Driscoll *et al.* 2012; Marchewka and Kostiwa 2014). Given the need to better understand the learner's experience of Bb in order to improve its usage and effectiveness for online teaching and learning, this study assesses student experiences of the content and design of the online classrooms, measures the performance impact of utilising the Bb contents, and assesses students' preferred features of Bb as an effective teaching and learning tool.

3.3 Research Methods

A mixed methodology approach was used in this study. The study involved 109 participants (n=109) and was conducted as a case study within the Department of Information and Corporate Management (ICM) at DUT. Three main data collection instruments were used in this study:

- The first quantitative data collection instrument included a questionnaire which was only administered to the current students who participated in the study and was used mainly to gauge their overall experience of the online classroom relating to the various Bb tools used as well as the "look" and "feel" of the online classroom used in the study.
- The second data collection instrument was a qualitative one which took the form of a focus group interview comprising six IA3 students who volunteered to participate. The objective of the questionnaire and the focus group was to assess specific learning advantages of Bb from the students' perspective and to perform a subjective evaluation of the useful features of Bb.
- While not forming a formal part of the data collection instruments, a third informal comparison was also included to further inform the study. An assessment of the results of the current cohort of IA3 students (who were taught using a blended learning approach) with the assessment results of students from the previous three years who were taught using traditional face-to-face methods. The objective of this informal comparison was to be able to identify improvement, if any, between the traditional and online teaching methods.

3.4 Research Design

According to Creswell (2013), research design provides insights on how to conduct research using a particular methodology. Obtaining information relevant to the research problem generally entails specifying the type of evidence needed to test a theory, to evaluate a program, or to accurately describe and assess meaning related to an observable phenomenon (Trochim 2006). Scientific and systematic types of research usually utilise two types of research methods, namely, quantitative and qualitative methods, in their endeavour to answer or address research questions and/or hypotheses (Creswell 2014).

3.4.1 Population

According to Trochim (2006), there are two main populations in research. These are the theoretical population to which the researcher needs to generalize the research findings, and the accessible population to the researcher. With a student population of approximately 23 000 students in six faculties, DUT is a multi-cultural and multi-campus university of technology. While the theoretical population for this study were all students at DUT, the target population accessible to the researcher for this study was the selected full-time, third year OMT students who were registered for IA3, on the Ritson Campus of the Department of ICM at DUT, Durban.

Students registered for this subject were selected as the accessible population because of the co-operation of the IA3 lecturer and her willingness to work with the researcher during the study. In total, the department had 150 students registered for IA3 in 2017. The researcher only considered students from the Ritson campus because of their accessibility during normal working or student campus hours. Furthermore, these students received advanced Bb training prior to the commencement of the module, enabling them to participate effectively in this study.

This study, therefore, intends to generalise its findings to the:

- Above described accessible population; and
- DUT student population

3.4.2 Sampling Procedure

3.4.2.1 Sampling Technique

Sampling represents a subset of the population who actually participate in the study (Jackson 2014). Sampling, therefore, is the process of selecting representatives of the entire population of interest and if the sample is truly representative of the population in question, researchers can then take their results and generalize them to the larger group by studying the sample. This selection according to Mooney and Garber (2019), is called the sampling frame.

In order to ensure that specific participants would be able to provide the desired information required for this study, the researcher used a purposive sampling approach to select the participants mentioned above. The term purposive sampling means that the participants are hand-picked from the accessible population because they are the ones who can provide the desired information, either because they are the ones who have it, or conform to some criteria set by the researcher so that they presumably will be representative or typical of the population (Sekaran and Bougie 2016; Gliner, Morgan and Leech 2017).

3.4.2.2 Sample Selection

The university's ITS (student information) system was used to get a list of all students registered for the relevant subject in the above-mentioned Department within the Durban University of Technology. The choice of this sample was made mainly based on the willingness of the respective instructors to assist in the study as well as the students' willingness to participate in the study.

3.4.2.3 Sample Size

One hundred and fifty (150) Information Administration 3 students from the Department of Information and Corporate Management were selected for this research study. These students were asked to complete the questionnaire during their class time, with the permission of the lecturer. A printed questionnaire was handed out to students for completion. Before completing the questionnaire, students were informed of the

study by the researcher. Students were also assured of confidentiality and of their rights not to participate in the study if they chose not to, without being prejudiced. Therefore, completion of the questionnaire was voluntary and care was taken to ensure the anonymity and confidentiality of all respondents who completed submitted the survey.

3.5 Quantitative research

Quantitative research explains phenomena according to numerical data which are analysed by means of mathematically-based methods, especially statistics (Yilmaz 2013). The main quantitative data collection tool for this study was a questionnaire as it was a convenient way of getting information from a large number of respondents. A questionnaire, according to Sekaran and Bougie (2010), is a means of eliciting the feelings, beliefs, experiences, perceptions, or attitudes of some sample of individuals.

3.5.1 Questionnaire Development

Questionnaires usually ask questions that elicit ideas and behaviours, preferences, traits, attitudes and facts. The questionnaire that was used as an instrument to collect data in this study was made up of questions that related to the students' experience of the Learning Management System (Bb) and was in the form of a printed document. It was hoped that the printed questionnaires would have a higher response rate compared to electronic questionnaires during the data collection process of this study. Questions included in the questionnaire were adapted from other published studies that were similar in nature and of relevance to this study, as well as after carefully considering the information gathered from the literature review. Each question that was designed in this study provided a number of alternative answers for respondents to select from. The responses were then quantified and put into categories for statistical analysis. Cronbach's alpha was used to check that for each construct, the group of variables provided a reliable measure and that the questions in the group were consistent (See Appendix C).

The design of these questionnaires attempted to conform to the design rules as outlined by Trochim (2002) and also by Creswell (2014). These included the proper

development of questions in order to extract the appropriate data from the respondents, choosing the appropriate response format i.e. open-ended or closed questions. Closed questions helped the respondent answer more easily and helped the researcher accumulate and summarise responses more efficiently; these included mainly Likert scale question formats that required placing a tick or a cross on the most appropriate answers, perceptions or opinions. Finally, it was also important for questions to be worded satisfactorily in order to ensure clarity in terms of communicating the question items' ideas or prompting for responses from respondents (Cohen, Manion and Morrison 2009; Williams 2014).

The questionnaire comprised 39 items. The sample rating scales which were used when developing this questionnaire were multiple choice single response questions, five point Likert-scale questions and open-ended questions to capture students' experiences of Bb. The questionnaire sought to ascertain from research participants which Bb tools were most popular based on the frequency of their selection in the questionnaire. This experience was analysed quantitatively and qualitatively using appropriate means to measure the results. Further discussion of the data analysis is presented in Chapter four. The purpose of collecting this information was to get a better understanding of students' information preferences which potentially could assist course designers in creating more engaging and interesting online classroom content in order to provide a richer learning experience.

Through the use of open-ended questions, the questionnaire also probed research participants' ideas about how they thought the content of the online classroom could be improved.

3.5.2 Piloting of Questionnaire

The main purpose of this pilot study was to pretest the questionnaire to ensure that the respondents' interpretation of the questionnaire was correct and at the same time evaluate the quality of the collected data. The pilot study involved distributing a sample questionnaire to a small group of respondents to determine if the questionnaire was coherent and consistent with the research aims. Before the final questionnaire was

administered, 11 volunteers from the target population were randomly selected to participate in the pilot survey. It was hoped that this random selection would include participants with varying Bb skills in order to get a wider range of feedback on the quality of the questionnaire. The pilot study was considered a "dry run" of the entire research project as described by Hunt, Sparkman Jr and Wilcox (1982) which was administered to all participants in one session. The administering of the pilot questionnaires took 30 minutes to complete. This included an explanation to participants of the purpose of the study as well as the confidentiality clauses relating to the study. The piloting of the questionnaire allowed the researcher to rigorously assess the validity of the survey instrument. As a result, changes were made to the questionnaire as follows:

- Question 5 – "How do you access Bb on campus"? was added to the questionnaire to find out whether students used their own devices on campus or whether they relied on the University's resources to access Bb on campus.
- Question 19 was re-worded to make it more specific and easier for respondents to understand. The original question/statement that participants were required to respond to was: "*I enjoyed the related videos in the Blackboard classroom*". Following the responses from participants, the researcher subsequently found that this statement was not specific enough to identify how the use of videos benefitted students. Therefore, this question/statement was modified, with the final statement reading: "*The related videos in the Blackboard classroom provided an additional understanding of the topic*". This modified statement would now allow the researcher to gauge participants' level of agreement specifically to videos improving their understanding of the topic.

- Question 30 – "Briefly describe how you found the tool/feature you mentioned in question 29 useful"? was added to the final questionnaire

in order to try and get a more detailed response to the answer of the previous question.

This process proved valuable in ensuring both the validity and the reliability of the questionnaire items (See discussion of these terms below).

3.5.3 Final Questionnaire

The final questionnaire consisted of eight pages excluding the information page, as per Appendix C.

The first page of the questionnaire was the information page for the participants (Appendix E). Here the respondents were informed of the nature of the study and assured of the confidentiality of their participation. Details of the researcher and the research supervisor were also made available on the information page. The other four pages contained the questions on both sides of each page.

The subsections below briefly outline the design and purpose details of the questionnaire instruments in terms of the type of questions or data collection items that the study instruments intended to use.

3.5.3.1 Question items 1-9 (Background Information)

These questions surveyed the respondents' language preference and their ability to understand their lecturers. Further background information to gain an understanding of the research participants' self-efficacy was also surveyed. Self-efficacy refers to an individual's belief that one has the ability to perform a particular behaviour (Lee and Mendlinger 2011). Bandura, Freeman and Lightsey (1999) also defined self-efficacy as an individual's judgment of their own capabilities to organize and execute courses of action required to attain designated types of performances.

This section of the questionnaire also surveyed how research participants accessed Bb on campus and off campus. This information was gathered for the purposes of:

- Gaining an understanding of the extent to which research participants were currently using Bb; and
- Identifying any correlation between participants' Bb experience and participants' ability to access Bb.

3.5.3.2 Question items 10-15 (Usefulness of the online material)

This second section of the questionnaire sought to discover how useful the research participants found the Bb classroom as a supplemental learning tool to traditional teaching and learning methods. In other words, did students find Bb useful?

The purpose of the questions on the usefulness of the online material was to find any correlations between the usefulness of the online material in the Bb classroom and the student experience (measured by the frequency of the selection of the options in the questionnaire).

3.5.3.3 Question items 16-30 (Information Preferences)

The third section of the questionnaire dealt with what type of information, posted in the Bb classroom, students thought was most helpful to them in understanding the topic. The purpose of this section was to find correlations between:

- The usefulness of the information and frequency of access of the Bb classroom
- The usefulness of the information and student performance

3.5.3.4 Question items 31-32 (Online experience)

This section comprised two Likert scale questions. The purpose of this section was to get a general indication from the research participants of their online experience of the Bb classroom used in this study by gauging their level of agreement or disagreement to the questions posed.

Question items 33-37 (Preferred Blackboard tools)

The purpose of this section of the questionnaire was to get an indication of the Bb tools used most frequently by the research participants. This section was important to this study, as the results could help course designers responsible for creating online classrooms in Bb, to include information using the more popular Bb tools.

Question items 37-38 (Classroom design)

The last two questions in the questionnaire dealt with the importance of the design of the online classroom. The purpose of this section was to get an indication from the research participants as to whether the design of the online classroom had any influence on the frequency of their access of the classroom.

3.6 Qualitative research

Qualitative research is primarily concerned with understanding human beings' experiences in a humanistic, interpretive approach. Therefore, since this study involved understanding and assessing student experiences, a qualitative study was also included in this research to add greater credibility to the findings. Apart from open-ended questions being included in the questionnaire, a focus group interview was also conducted as the qualitative data collection instrument. Six participants were randomly selected from a group of volunteers who met the requirements for participation. These requirements included attending all the Bb training sessions and having a good working knowledge of Bb, participating in all the online classroom activities and completing the online test. The purpose of the focus group interview was to probe research participants further on their thoughts and feelings relating to their experience of the online classroom and how they felt it could be improved. The focus group interview also sought to clarify some of the responses from the questionnaire that the researcher found to be inconclusive. The researcher used an interview schedule to conduct a structured focus group discussion. This meant that participants had to discuss specific questions posed to them to ensure that the discussion did not go off

topic (appendix D). Participants had to adhere to ground rules during the discussion to enable the researcher, who was also the facilitator, to document responses. Questions for the focus group were pre-determined in order to stimulate discussions around specific information required for the study.

3.7 Mixed Methods research

Mixed method research can be described as a study in which the investigator draws liberally from both quantitative and qualitative assumptions (Creswell 2013: 12). This provides for better inferences and increased validity and reliability by eliminating the limitations of each single method (Tashakkori and Teddle 2003; Johnson and Onwuegbuzie 2004; Creswell 2013). Therefore, mixed methods research involves collecting, analysing and integrating quantitative (e.g. experiments, surveys) and qualitative (e.g. focus groups and individual interviews) research methods. This approach to research is used when this integration provides a better understanding of the research problem than either of them alone.

The researcher was of the opinion that no single research method (quantitative or qualitative) would provide sufficient data to draw accurate conclusions from the study so by mixing both quantitative and qualitative research data, he was able to gain a wider understanding and corroboration, while offsetting the weaknesses inherent to using each approach by itself. This mixed methods research attempted to assess students' experiences of Bb use, particularly for the IA3 module, in order to establish whether this form of blended learning had any significant impact on students' academic performance compared to traditional face-to-face teaching methods. Feedback from students on their experiences using the online classroom to meet their course objectives was also an important part of this study as this information would assist course designers, academics and other role players in designing more "student-friendly" online classrooms in Bb.

Quantitative data collection instruments for this study included a questionnaire survey and a comparison of marks students scored in the written assessment for the same section of the course over three years preceding the implementation of the Bb

classroom. These marks were then also compared with the marks scored by the research participants during the online test post Bb implementation. The purpose of the comparison was to provide supplementary evidence for the researcher about possible student performance differences attained from traditional versus online teaching and hence, the effectiveness of Bb.

With regards to the qualitative data collection instrument, as already mentioned, a focus group was used in this study. The purpose of the focus group discussion was to probe participants for specific information not clearly established from the questionnaire and furthermore, to establish from the participants what improvements they felt could be made to the online classroom to improve their experience and to better understand the specific course material the study was based on. This was in line with the two core constructs of the theoretical framework this study was based on namely: perceived ease of use and perceived usefulness. The results of the focus group discussion will be discussed in the following chapter.

3.8 Background of prior Blackboard experience and training

Whilst most of the research participants had used Bb previously, most participants admitted that they were only familiar with basic Bb use as they had not received proper formal training on Bb. Consequently, all IA3 students were offered more advanced training and support by the course instructors and the researcher on the use of the various Bb tools they would be required to use in their online classroom for the purposes of this study. Training was necessary to:

I. Enable research participants to actively participate in all the tasks given to them in the Bb classroom, using the various tools required to perform these tasks.

II. Provide research participants with a working knowledge of the various Bb tools enabling them to provide more meaningful feedback during the questionnaire survey and during focus group discussions.

An important point to note is that not all the tools available in Bb were included in this study. Academic staff who assisted in this study were encouraged to use as many of the Bb tools as was considered appropriate, and/or relevant, to the course material.

Apart from simply using the online classroom to retrieve lecture notes and view announcements, which were previously the most common uses of Bb, students were also required to complete various tasks online in the Bb classroom. Some of the tasks included participating in discussion forums, creating blogs, accessing learning material through web links, uploading completed assignments and taking quizzes to test their knowledge. Most importantly, students had to do a formal online assessment which included an assortment of multiple choice, short answer and 'fill in the blank' questions. Marks obtained for this assessment contributed to the student's final mark for the module. The online assessment formed part of the quantitative data collection for this study as the marks obtained for this assessment were compared with traditional written assessments for the same/similar section of the syllabus from previous years to see if any significant conclusions could be drawn between traditional teaching methods and blended learning using the online classroom in Bb.

3.9 Data Collection

3.9.1 Questionnaire

3.9.1.1 Questionnaire Distribution

The main quantitative data collection instrument for this study was the questionnaire survey. As previously mentioned, printed questionnaires were distributed to all IA3 students during class time, with the permission of their respective instructors. Students were informed that their participation in the study was voluntary. Participants were assured of confidentiality. All participants were informed that no information would be linked to them personally. Respondents were thus in a position to complete the questionnaire freely and give input about their experiences of the online classroom.

3.9.1.2 Questionnaire Responses

Although the researcher distributed one hundred and fifty (150) questionnaires to all IA3 students, only one hundred and nine (109) questionnaire responses were returned. Considering that the completion of the questionnaire was voluntary, it is presumed that not all students completed the questionnaire. A response rate of 73% was however sufficient for the researcher to answer the research questions and to realise the objectives of this study.

3.9.2 Comparison of test marks

The marks that participants scored during the online test were compared with the marks that students scored for the same section of the course for the previous three years using the traditional written test. The researcher hoped to establish correlations, if any, between marks scored during traditional testing compared with the marks scored in the online test in an effort to establish whether the transition to the online classroom environment had resulted in any improvement in students' performance. Findings from this comparison would give the researcher an indication of how well students understood the course material in the online classroom and the impact on their performance. Results of the comparison will be discussed in the following chapter.

3.9.3 Focus Group

As already mentioned, a focus group interview was conducted as part of the data collection process during this study. Before beginning, participants were advised that the discussion was being recorded for the purpose of transcribing responses for analysis. There were nine interview questions that participants were required to discuss (see attached focus group schedule). The discussions started by asking participants what their overall impression was of the online classroom in Bb. Whilst this was a general question on the topic, the intention was to stimulate discussions by making participants feel more comfortable before asking specific questions on Bb. Initially participants were reluctant to engage with the facilitator because the session was being recorded and they felt uncomfortable and afraid of being victimised should

any of their opinions be negative. However, after the facilitator re-assured them of their anonymity and the confidentiality of their responses, the participants felt more relaxed and confident.

The main aim of the focus group was to find out if participants' online classroom experiences supported any of the responses from the questionnaire and then to probe these focus group participants for more detailed explanations on their responses. The discussions proved very fruitful in highlighting some of the positive and negative aspects that students experienced with the online classroom. While many of the responses from the participants were an elaboration of the responses from the questionnaire, which was expected, there were also some new ideas and experiences that emerged from the discussions. For example, one participant said she used the information from the online classroom to refresh her memory to accomplish a task given to her at her workplace while on in-service training. Responses from the discussion were analysed and sorted thematically. Details of the findings will be discussed in the following chapter.

3.10 Reliability and validity

The two most important aspects of precision which are used to reduce bias are **reliability** and **validity**. According to Peräkylä (2011), reliability and validity are technical terms that refer to the objectivity and credibility of the research. Validity and reliability are two concepts that can help determine the quality of results or findings from a wide genre of studies such as medical, educational and social sciences research (Drost 2011). According to Cohen, Manion and Morrison (2009), it is often suggested that these two criteria are sufficient for any research design as any threats to these would endanger the significance of the research report. Reliability is a necessary pre-condition for validity (Cohen, Manion and Morrison 2009: 179).

To test validity of the user responses, the researcher attempted to ask the same questions in different ways so that the validity of user responses could be measured. Cronbach's coefficient alpha was then used to measure the reliability scale of the data.

3.10.1 Validity

Validity in research concerns the interpretation of observations. This is a very important part of the research because if any part of the research is invalid, it can render the entire study worthless. Heale and Twycross (2015); Noble and Smith (2015), define validity as the precision with which a concept is accurately measured in a quantitative study.

There are two broad measures of validity - external and internal. External validity addresses the ability to apply with confidence the findings of the study to other people and other situations, and ensures that the conditions under which the study is carried out, are representative of the situations and time to which the results are to apply (Roberts, Priest and Traynor 2006; Drost 2011). Internal validity addresses the reasons for the outcomes of the study, and helps to reduce other, often unanticipated, reasons for these outcomes (Roberts, Priest and Traynor 2006; Drost 2011; Heale and Twycross 2015).

According to Heale and Twycross (2015), there are three types of evidence that can be used to demonstrate that a research instrument has construct validity:

- Homogeneity—meaning that the instrument measures one construct.

- Convergence—which occurs when the instrument measures concepts similar to that of other instruments. Although if there are no similar instruments available this will not be possible to do.

- Theory evidence—this is evident when behaviour is similar to theoretical propositions of the construct measured in the instrument. For example, when an instrument measures anxiety, one would expect to see that participants who score high on the instrument for anxiety also demonstrate symptoms of anxiety in their day-to-day lives.

The aim of this part of this study was to use the data validity scores from the results in order to report on students' Bb experience.

3.10.2 Reliability

Reliability, according to Noble and Smith (2015), relates to the consistency of analytical procedures. In other words, reliability is the consistency of measurement and is the extent to which measurements are repeatable (Drost 2011). For example, a participant completing an instrument meant to measure experiences should have approximately the same response each time the test is completed. As mentioned above, reliability is a necessary but insufficient condition for validity because consistency may not necessarily mean accurate measurement. Although the data collected in the present study is mainly subjective and psychological in nature, the employment of Cronbach's coefficient alpha assured the reliability of the questionnaire items.

3.11 Summary

This chapter detailed the quantitative and qualitative (mixed research) approaches that were used to assess student experiences of Bb in terms of ease of use and usefulness of the online classroom. Many concepts on data analysis and tools were discussed to give understanding for the next chapter when results and findings are reported. The next chapter details the implementation of the study's research method designs in terms of the administration of the data collection instruments and eventually the collected data analysis procedures.

Chapter Four

Analysis and Interpretation of results

4.1 Introduction

This chapter presents the results and discusses the findings obtained from the various data collection methods used, as outlined in the previous chapter. As already mentioned, the study involved mixed methods data collection. The questionnaire was the primary tool used to collect data and was distributed to third-year IA3 students in the Department of Information and Corporate Management at DUT. The data collected from the responses was analysed with SPSS version 25.0. The results will present the descriptive statistics in the form of graphs, cross tabulations and other figures for the quantitative data that was collected. Inferential techniques include the use of correlations and chi square test values, which are interpreted using the p-values. Additional data was collected by comparing student test scores over three previous consecutive years. A similar data analysis was done for the comparison as was done for the questionnaires and will also present statistics in the form of graphs and cross tabulations.

Results are reported on the following themes:

i Background Information
ii Usefulness of the On-line material
iii Information Preferences
iv Online experience
v Preferred Blackboard tools
vi Classroom design
vii Comparison of student test scores over three years
viii Participants' Blackboard classroom experience

The focus group interview was audio recorded and then transcribed. The transcripts were coded thematically in relation to student perspectives on their experiences of using Bb as a learning tool during the course.

4.2 Ethical Considerations

One of the most important ethical considerations in research is the use of human subjects. According to Creswell (2014), research that collects data from people and about people should anticipate some ethical issues. Stahl, Eden and Coeckelbergh (2014), suggest that a perception of moral appropriateness, or the lack thereof, can be an important component of technology acceptance. Creswell (2014) also suggests that ethical issues should be considered in different stages, aspects and/ or components of a research project, such as the research problem, research purposes and questions, research data collection, research data analysis and interpretation.

Ethical considerations for this study were taken into account from the proposal stage, and followed DUT's ethical policies and post-graduate proposal ethical checklist. Ethical clearance was applied for and obtained through the Institutional Research Ethics Committee (IREC), which is dedicated to processing ethical clearances for research studies. The research process was carefully designed to ensure protection of respondents' rights at all times and to ensure anonymity throughout the data collection processes.

To ensure the above:

- Informed consent was signed by the participants and was kept safely.
- Questionnaire items did not ask for personal information and so anonymity was guaranteed.
- Respondents were not compelled to participate or to be part of this research.
- Respondents were treated with respect at all times.

4.3 Data Analysis

4.3.1 Descriptive Statistics

As already mentioned in the introduction, this research makes use of descriptive statistics where a large volume of data is summarised into a few measures.

The research questionnaire consisted of 39 items with a level of measurement at an ordinal level. The questionnaire was divided into 6 sections which measured various themes as illustrated below:

- Background Information
- Usefulness of the On-line material
- Information Preferences
- Online experience
- Preferred Blackboard tools
- Classroom design

The above sections were analysed and are reported in detail under the section analysis for each variable.

The focus group schedule consisted of nine items and measured the same themes as the questionnaire. Participant responses were grouped thematically and analysed and will be reported later in this chapter.

4.3.2 Reliability and validity statistics

The two most important concepts used to evaluate the quality of the research are reliability and validity. Reliability is computed by taking several measurements on the same subjects. A reliability coefficient of 0.70 or higher is considered “acceptable”.

The table 4.1 below reflects the Cronbach's alpha score for the most important items that constituted the questionnaire.

		N of Items	Cronbach's Alpha
B	Usefulness of the On-line material	5	0.782
C	Information Preferences	8	0.818
D	Online experience	2	0.810

Table 4. 1- Cronbach's Alpha score for questionnaire items

The reliability scores for all sections exceeded the recommended Cronbach's alpha value. This indicates a degree of acceptable, consistent scoring for these sections of the research.

4.3.2 Factor Analysis

As already mentioned in the previous chapter, factor analysis is a statistical technique whose main goal is data reduction. A typical use of factor analysis is in survey research, where a researcher wishes to represent a number of questions with a small number of hypothetical factors – as was required in this study. In order to perform factor analysis, the researcher need not believe that factors actually exist, but in practice, the factors are usually interpreted, given names, and spoken of as real things.

Table 4.2 below is a summary of the results of the matrix tables that reflect the results of the Kaiser-Meyer-Olkin measure of sampling adequacy and Bartlett's Test of sphericity. The requirement is that Kaiser-Meyer-Olkin Measure of Sampling Adequacy should be greater than 0.50 and Bartlett's Test of Sphericity less than 0.05. In all instances, the conditions are satisfied which allows for the factor analysis procedure.

KMO and Bartlett's Test

	Section	Kaiser-Meyer-Olkin Measure of Sampling Adequacy.	Bartlett's Test of Sphericity		
			Approx. Chi-Square	df	Sig.
B	Usefulness of the On-line material	0.797	152.758	10	0.000
C	Information Preferences	0.800	181.011	28	0.000
D	Online experience	0.500	70.322	1	0.000

Table 4. 2- KMO and Bartlett's Test for questionnaire items

Component Matrix[a]

Section B	Component 1
I found the relevant course material in the Blackboard classroom helpful in gaining a better understanding of social networking	0.740
I found it easy to understand the material I read on social networking in the Blackboard classroom	0.839
I found it easy to remember the material I read on social networking in the Blackboard classroom	0.783
I have sufficient access to my Blackboard classroom/s to complete tasks	0.620
Blackboard offers a more valuable informative experience than traditional learning	0.706

Extraction Method: Principal Component Analysis.

Table 4. 3- Rotated Component matrix for section B-questionnaire items Q10 to Q14

Rotated Component Matrix[a]

Section C	Component	
	1	2
I found it easy to find the information I was looking for in the Blackboard classroom	0.621	0.375
The information in the Blackboard classroom was appropriate to the topic	0.815	0.259
The information in the Blackboard classroom was easy to read	0.703	0.409
The related videos in the Blackboard classroom provided an additional understanding of the topic	0.489	0.502
I found the PowerPoint slides of the lecture in the Blackboard classroom helpful	0.685	0.141
I found the related discussion forum helpful as it allowed me to ask questions online	0.228	0.823
I found the web-links helpful as it allowed me to go to related websites	0.738	-0.103
I found mashups helpful as it enabled related videos to be incorporated into my course notes	0.022	0.815

Extraction Method: Principal Component Analysis. Rotation converged in 3 iterations

Rotation Method: Varimax with Kaiser Normalization.

Table 4. 4- Rotated Component matrix for section C-questionnaire items Q15 to Q27

All of the conditions are satisfied for factor analysis.

Factor analysis was done only for the Likert scale items. Certain components were divided into finer components. This is explained below in the rotated component matrix.

Table 4.3 on page 53 provides statistics on the usefulness of the online material while table 4.4 above provides statistics on student feedback relating to questions regarding information preferences in Blackboard in the online classroom used for this study. The questions that received negative responses, as represented by the green coloured codes in table 4.4, have significance to this study as they contribute to a negative student experience of the online classroom.

Component Matrix[a]

Section D	Component 1
I find Blackboard a helpful learning tool in my course	0.921
The online support from Blackboard makes the material I read from my notes/textbook easier to understand	0.921

Extraction Method: Principal Component Analysis.

1 components extracted.

Table 4. 5- Component matrix for section D-questionnaire items Q30 and Q31

KMO and Bartlett's Test

		Kaiser-Meyer-Olkin Measure of Sampling Adequacy.	Bartlett's Test of Sphericity		
	Section		Approx. Chi-Square	df	Sig.
B	Usefulness of the On-line material	0.797	152.758	10	0.000
C	Information Preferences	0.800	181.011	28	0.000
D	Online experience	0.500	70.322	1	0.000

Table 4. 6- KMO and Bartlett's test for sections B, C, D of the questionnaire

All of the conditions are satisfied for factor analysis for the sections of the questionnaire indicated in table 4.6. That is, the Kaiser-Meyer-Olkin Measure of Sampling Adequacy value should be greater than 0.500 and the Bartlett's Test of Sphericity sig. value should be less than 0.05.

The statements that constituted sections B and D loaded perfectly along a single component. This implies that the statements that constituted these sections perfectly measured what it set out to measure.

It is noted that the variables that constituted section C along two components (sub-themes). This means that respondents identified different trends within the section.

Within the section, the splits are colour-coded. The yellow colour codes suggest positive responses and the green coloured code suggests negative responses.

4.4 Section A: Background Information

As mentioned in the previous chapter, the SPSS 25.0 software was used to describe the basic features or characteristics of the data collected. This section summarises the biographical characteristics of the respondents. The various data features are presented as follows:

4.4.1 Participants' gender

Q1. Please state your gender

Although this section had no influence on the outcome of the study itself, it was included to demonstrate that the study included a proportionate gender mix within the sample size, which was representative of the gender mix of the entire student population included in this study. Of the 109 respondents that participated in this study, 40 participants were male (36.7%) and 69 participants were female (63.3%). Overall the ratio of males to females is 1:2, that is there were twice as many female participants compared to male participants (p=0.005). These figures match the gender distribution within the target population.

The table 4.7 below describes the overall gender distribution.

	Frequency	Percent
Male	40	36.7
Female	69	63.3
Total	109	100.0

Table 4. 7- Gender distribution of all research participants

4.4.2 Language

Q2. Is English your first language?

This question was included in the study to get an indication of how proficient students were in English as the Bb online classroom was in English. Most of the participants surveyed indicated that English was not their first language. The overall study sample indicated that only 20.2% of the participants indicated that English was their first language whilst 79.8% of the participants surveyed, indicated that English was not their first language.

The table below indicates whether English was the first language of the respondents.

	Frequency	Percent
Yes	22	20.2
No	87	79.8
Total	109	100.0

Table 4. 8- Language preferences of all research participants

The results showed that significantly more respondents (79.8%) indicated that English was not their first language (p, 0.001).

Question three was not included in the analysis as the results were inconclusive and insufficient to include in this study.

Question 3 was: "*Do you have any difficulty understanding the way that your lecturers speak?*" More than 50% of the respondents returned a "*neutral*" response to this question. While this suggests that respondents were unsure of how they felt, these responses were insufficient to draw any conclusions to this question.

4.4.3 Access to Blackboard on campus

Q5. How do you access Bb on campus?

Bb can be accessed at any time and from anywhere. However, students were asked specifically how they accessed Bb on campus. This question was to ascertain whether students had sufficient resources to access Bb on campus.

The figure below indicates the manner in which respondents accessed Blackboard on campus:

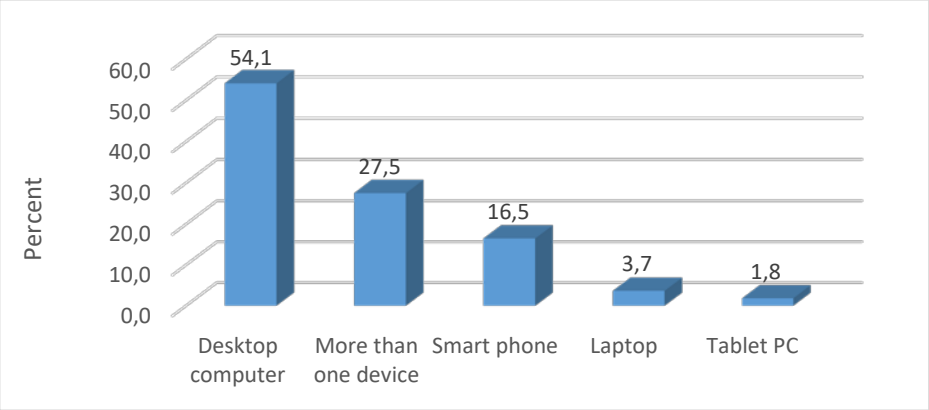

Figure 4. 3-Access to Blackboard on campus

The results revealed that more than half of the respondents (54.1%) used a desktop computer to access Bb on campus, whilst 27.5% used multiple devices. This indicates that more than half of the participants accessed Bb using computers either in the Department's computer labs or other computers at DUT. This would indicate that the majority of students surveyed either did not have their own device to access Bb or that more students preferred to use a desktop computer to access Bb as opposed to a laptop, cell phone or tablet. This data further suggests that more resources should be provided or be made available to students at DUT, which would give them greater access to their online classroom/s in Bb.

Q6. Do you have access to Blackboard off campus?

	Frequency	Percent
Yes	81	74.3
No	28	25.7
Total	109	100.0

Table 4. 9- Access to Blackboard off campus

Table 4.9 above shows that significantly more respondents (74.3%) indicated that they were able to access Blackboard off-campus ($p < 0.001$). This would indicate that for almost three quarters of the research participants, access to Bb off campus was not a reason that could negatively affect their experience of their online classrooms.

Q7. If you answered yes to the previous question, please select how you access Bb (select all that apply)

The figure below indicates the devices used to access Blackboard off-campus.

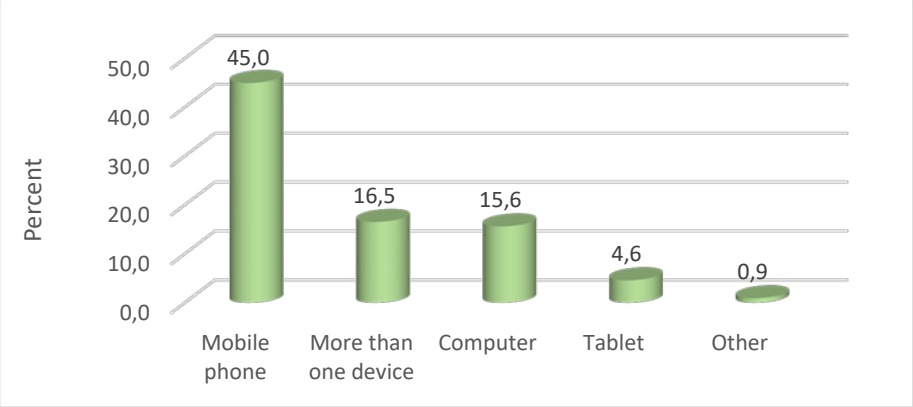

Figure 4. 4- Devices used to access Blackboard off campus

As shown in the figure above, nearly half of the respondents (45.0%) used their mobile phones to access Bb off campus, whilst 16.5% used multiple devices. The table above suggests that for most of the participants surveyed, mobile phones was the most common way of accessing their Bb classroom/s off campus.

4.4.5 Blackboard Training

Q8. The training I received was adequate to support my course

	Frequency	Percent
Strongly Agree	20	18.3
Agree	52	47.7
Neutral	21	19.3
Disagree	11	10.1
Strongly Disagree	5	4.6
Total	109	100.0

Table 4. 9- Adequacy of Blackboard training

The survey showed that two thirds of the respondents (66.0%) agreed with the statement in Q8 ($p < 0.001$). This statistic suggests that two thirds of the respondents were satisfied with the Bb training received and were confident using Bb. However, 34% of the participants were undecided or did not agree with the statement in question eight. These participants are likely to have a negative experience of using Bb.

Q9. If you selected "Disagree" or "Strongly disagree" to the question above, please provide a short explanation why.

The 15% of the respondents who disagreed with question eight gave the following reasons for their choice:

	Frequency	Percent
No formal training	14	12.8
Training not adequate	1	0.9
Training not sufficient/more training required	2	1.8

Table 4. 10- Dissatisfaction of Blackboard training

While most of the respondents who participated in the survey were satisfied with the Bb training and support received, it is noted that there was still a small percentage

(15%) of students who were not satisfied with the Bb training and support given to students as cited in the table above. It is however, quite important for all role players to identify these problems and formulate corrective measures to ensure that all students experience the same level of satisfaction using Bb.

4.5 Section B: Usefulness of the online material

Section B deals with the usefulness of the online material in the Blackboard classroom and its impact on respondents' learning experience.

4.5.1 Section Analysis

This section analyses the scoring patterns of the respondents per variable per section. The results are first presented using summarised percentages for the variables that constitute each section. Results are then further analysed according to the importance of the statements.

		Strongly Agree		Agree		Neutral		Disagree		Strongly Disagree		Chi Square
		Count	Row N %	Count	Row N %	Count	Row N %	Count	Row N %	Count	Row N %	p-value
I found the relevant course material in the Blackboard classroom helpful in gaining a better understanding of social networking	B10	19	17.4 %	63	57.8 %	25	22.9 %	2	1.8 %	0	0.0 %	< 0.001
I found it easy to understand the material I read on social networking in the Blackboard classroom	B11	14	12.8 %	62	56.9 %	27	24.8 %	4	3.7 %	2	1.8 %	< 0.001
I found it easy to remember the material I read on social networking in the Blackboard classroom	B12	8	7.3 %	46	42.2 %	48	44.0 %	7	6.4 %	0	0.0 %	< 0.001

I have sufficient access to my Blackboard classroom/s to complete tasks	B13	16	14.7 %	44	40.4 %	34	31.2 %	14	12.8 %	1	0.9 %	< 0.001
Blackboard offers a more valuable informative experience than traditional learning	B14	12	11.0 %	34	31.2 %	45	41.3 %	17	15.6 %	1	0.9 %	< 0.001

Table 4. 11- Scoring patterns of respondents for questions Q10 to Q14

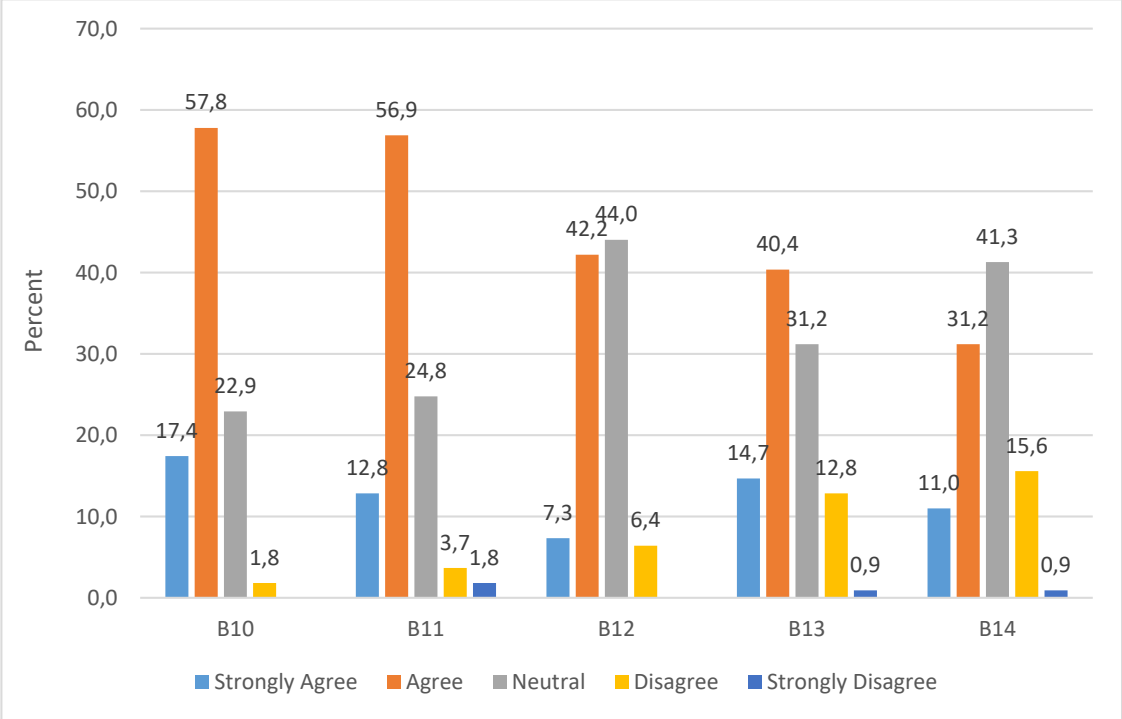

Figure 4. 5- Scoring patterns of respondents for questions Q10 to Q14

The following patterns are observed in section B:

- Some statements show (significantly) higher levels of agreement whilst other levels of agreement are lower (but still greater than levels of disagreement)
- There are no statements indicating higher levels of disagreement
  B12, B13 and B14 show high levels of neutrality
- The significance of the differences is tested and shown in the graph above

4.5.2 Relevence of the online material

Q10. I found the relevant course material in the Blackboard classroom helpful in gaining a better understanding of social networking

The data displayed in figure 4.5 shows that more than 75% of the respondents found the relevant course material useful while almost 23% of the respondents were undecided. Only a small percentage of respondents (1.8%) said that they did not find the course material useful.

Q11. I found it easy to understand the material I read on social networking in the Blackboard classroom

Most of the participants (69.7%) agreed with this statement which indicated that most of the students surveyed did not find language (English) as a barrier to underestanding the course material presented in the Bb classroom. Almost 25% of the participants surveyed were undecided. The statistics representing this statement are inconclusive as the reason for the indecisiveness is unclear. A small pecentage of participants (5.5%) disagreed with the statement in question 11. This is not surprising as most of the participants surveyed indicated that English was not their first language, as presented earlier in this chapter.

It is noted that the scoring patterns for Q10 and Q11 were similar. These statements related to the relevence and understanding of the course material. The majority of the respndents returned mostly positive responses to these statements, indicating that students found the course material useful.

Q12. I found it easy to remember the material I read on social networking in the Bb classroom

This statement returned a high level of neutrality (44%) indicating that participants were undecided whether learning the course material from the online classroom was easier to remember than traditional learning which included learning from text books, and printed and hand-written notes.

4.5.3 Access to online learning material

Q13. I have sufficient access to my Blackboard classroom/s to complete my tasks

While more than half of the respondents (55.1%) agreed with the statement in question 13, there was also a high level of neutrality and some negativity to the same statement (31.2% and 13.7% respectively). These statistics suggest that there are still many students who feel that they do not have sufficient access to their online classrooms on Bb. This could also be a contributing factor affecting students' experience of Bb.

4.5.4. Online learning experience vs traditional learning experience

Q14. Blackboard offers a more valuable and more informative experience than traditional learning

It is interesting to note that the statement in Question 14 also showed high levels of neutrality and some negativity (41.3% and 16.5% respectively), similar to the previous question. These statistics suggest that many students are still not convinced that online learning is an alternative to traditional learning.

Q15. Do you have any suggestions that may improve your Blackboard learning experience in any way?

No significant responses were received to this question, and therefore no conclusions could be drawn.

4.6 Section C: Information Preferences

This section consisted of 15 questions and probed the information preferences of respondents after their experience of the Bb classroom. This section investigates the level of agreement by participants with statements relating to the usefulness of information presented in the Bb classroom. The purpose of this section is to get an indication of the type of information preferred by students.

To determine whether the scoring patterns per statement were significantly different per option, a chi square test was conducted. The null hypothesis claims that similar numbers of respondents scored across each option for each statement (one statement at a time). The alternate states that there is a significant difference between the levels of agreement and disagreement.

The results are presented in table 4.12 below:

The highlighted sig. values (p-values) are less than 0.05 (the level of significance), it implies that the distributions were not similar. That is, the differences between the way respondents scored (agree, neutral, disagree) were significant.

		Strongly Agree		Agree		Neutral		Disagree		Strongly Disagree		Chi Square
		Count	Row N %	Count	Row N %	Count	Row N %	Count	Row N %	Count	Row N %	p-value
I found it easy to find the information I was looking for in the Blackboard classroom	**Q16**	20	18.3 %	55	50.5 %	28	25.7 %	5	4.6 %	1	0.9 %	< 0.001
The information in the Blackboard classroom was appropriate to the topic	**Q17**	20	18.3 %	66	60.6 %	22	20.2 %	1	0.9 %	0	0.0 %	< 0.001
The information in the Blackboard classroom was easy to read	**Q18**	24	22.0 %	60	55.0 %	21	19.3 %	4	3.7 %	0	0.0 %	< 0.001
The related videos in the Blackboard	**Q19**	26	24.3 %	52	48.6 %	23	21.5 %	6	5.6 %	0	0.0 %	< 0.001

classroom provided an additional understanding of the topic												
I found the PowerPoint slides of the lecture in the Blackboard classroom helpful	**Q21**	33	31.4 %	50	47.6 %	15	14.3 %	6	5.7 %	1	1.0 %	< 0.001
I found the related discussion forum helpful as it allowed me to ask questions online	**Q23**	14	14.1 %	42	42.4 %	40	40.4 %	1	1.0 %	2	2.0 %	< 0.001
I found the web-links helpful as it allowed me to go to related websites	**C25**	18	18.0 %	39	39.0 %	33	33.0 %	8	8.0 %	2	2.0 %	< 0.001
I found mashups helpful as it enabled related videos to be incorporated into my course notes	**C27**	6	8.3%	21	29.2 %	33	45.8 %	10	13. 9%	2	2.8 %	< 0.001

Table 4. 12- Scoring patterns of respondents for questions Q16 to Q27

Below is a graphical representation of the results for section C

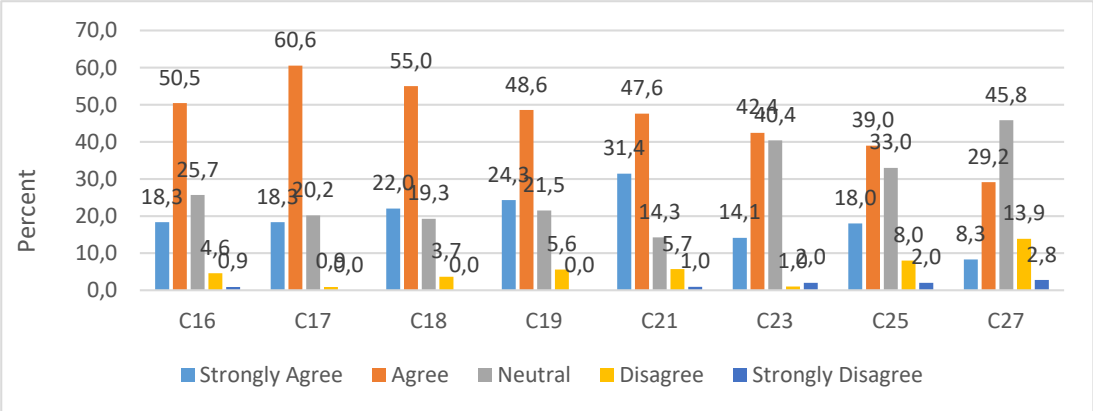

Figure 4. 6- Scoring patterns of respondents for questions Q16 to Q27

Similar to response patterns in other sections, it is noted in this section as well, that most statements have higher levels of agreement. Again, some levels are higher than others, indicating that students were generally satisfied with the information in the Bb classrooms. There are however some statements that yielded lower than expected responses from participants. These responses will be discussed in greater detail when the individual questions are analysed.

4.6.1 Relevance of the Information

Q16 I found it easy to find the information I was looking for in the Bb classroom

This statement returned 68.8% agreement from participants, which indicates that most of the participants had little difficulty navigating through the online classroom.

Q17 The information in the Bb classroom was appropriate to the topic

There was a 78.9% agreement from participants to this statement. This result was encouraging as it indicated that academics were making concerted efforts to include quality information in the Bb classrooms.

Q18 The information in the Bb classroom was easy to read

The majority (77%) of the participants agreed with this statement. This indicates that most students responded positively to the way the course material was presented in the online classroom.

Q19 The related videos in the Bb classroom provided an additional understanding of the topic

72.9% of the participants responded positively to this statement. This statistic suggests that videos are still a popular choice among students and play an important role in assisting students to gain a better understanding the course material.

Q20 Please provide a short reason for your answer to question 19

While 16% of the participants said that they found some of the videos too long and confusing, 59.6% of the participants commented that videos made the topic more interesting and gave them a better understanding of what the lecturer taught in class.

This was the most popular response. The remaining 24.4% of participants did not answer this question.

Q21 I found the PowerPoint slides of the lecture in the Bb classroom helpful

More than 79% of participants agreed with this statement. During this study it was observed that students relied heavily on PowerPoint slides as their source of notes for relevant sections of the syllabus as many students admitted that they either missed classes or simply did not take down notes. The importance of posting PowerPoint slides in the Bb classroom was reaffirmed by participants in the focus group. One participant said: “I was asked to perform a task at work and I did not have my class notes with me to refer to. I simply logged onto my Bb classroom and accessed the necessary PowerPoint slides to get the information I required”. Another student said: “Having the PowerPoint slides of the lesson available in the Bb classroom allowed me to listen more and write less in class”.

Q22 Please provide a short reason for your answer to question 21

In total, 94 participants returned responses to this statement while 15 participants did not respond. Of the 94 responses received, the majority (54.3%) of the participants said that the information in the PowerPoint slides were summarised and easier to understand than the textbooks, whilst almost 24% of the participants admitted to learning new information from the slides.

An important statistic to note is that almost 15% of the participants did not find the PowerPoint slides helpful or did not have access to the slides. It will be important to understand the concerns of these participants in the future.

Q23 I found the related discussion forum helpful as it allowed me to ask questions online

Question set Q23 did not yield the same high levels of agreement as most of the preceding statements in this section. Only 56.5% agreed with this statement. One of the focus group participants found the discussion forums helpful as it enabled her to discuss problems with other students as she said, "lecturers were not always available for discussion" in class. A notably high percentage of the participants (40%) were undecided. These results would indicate that while most participants had experience with the discussion tool in Bb, many participants were still not comfortable using the discussion tool. During focus group interviews, participants agreed that while the discussion tool was useful in getting assistance from peers, they were still not comfortable using it. Another participant said, "*Students are afraid to express themselves because they are scared at being laughed at"*. This was in reference to the fact that some participants cited language (Q2) as a problem and had difficulty expressing themselves in English, in discussion forums in Bb.

Q24 Please provide a short reason for your answer to question 23

78.9% of the participants surveyed responded to this question. This means that 21.1% of the participants did not answer this question. From all of the responses received, 64% of the participants found the discussion board useful in various ways. What is important to note in this question is that 28.5% of the respondents either never participated in the discussion forums or did not find the discussion board useful. This represents more than a quarter of the respondents surveyed. Therefore, in order to improve the student Bb experience of the discussion board, it will be important to encourage greater use of this tool by more students.

Q25 I found the web-links helpful as they allowed me to go to related websites

The statistics reveal that only 52.2% of the participants agreed with the statement and found this tool helpful, which was a much lower satisfaction level to this question than expected. More than 30% of the participants were undecided. This indicates that this tool was not as popular as the other tools in Bb.

Q26 Please provide a short reason for your answer to question 25

All 109 participants responded to this question. Following the low satisfaction levels returned from question 25, it was therefore not surprising to note that more than half of the participants (54.1%) indicated they had either not used the web-link tool or did not find it useful. There may be several possible explanations for this response not least of which that some of the features of the web-link tool are included in other tools in Bb. Furthermore, a study by Arghode, Brieger and Wang (2018) suggests that the onus of learning is on the learners so for students to take this kind of initiative and explore the various features of Bb, these students would have to be fully engaged and highly confident.

Q27 I found the mashups helpful as this enabled related videos to be incorporated into my course notes

The Mashup feature in Blackboard allows the viewing and sharing of media content from external websites. Of the 109 participants surveyed, 37 participants did not answer this question. Of the 72 participants that responded, it is interesting to note that 60.5% were undecided or not satisfied with this tool. This number, together with the participants that did not answer the question indicates that this was either one of the least favoured or least used tools of Bb in this course. This is possibly because Bb tools such as discussion board, blogs, quiz, course gallery and videos contain some of the features also found in Mashups. However, as with the findings in question 26 above, previous studies suggest that students would need to take the initiative to explore the various features of Bb themselves.

Q28 Please provide a short answer to question 27

This question yielded a low response as 54 (49.5%) of the 109 participants did not answer this question. Of the 54 participants that did respond, 52.7% of these stated that they did not know what the mashup tool was as it was not a tool they were required to use in their course. This statistic shows that mashup was not a popular tool used by instructors and students.

Q29 Did you experience any other interesting Blackboard tool/feature not already mentioned?

88.1% of the participants did not respond to this question. One possible explanation for such a high non-response is that students may have only been familiar with Bb tools that were included by the lecturer in the online classroom. As has already been mentioned earlier in the chapter the onus of learning is on the learner. It seems that students were not taking the initiative to explore the various tools within Bb that were not included in their online classroom. Therefore, these students may not have been familiar with any of the other Bb tools not included or used by the lecturer in the online classroom.

Q30 Briefly describe how you found the tool/feature you mentioned in question 29 useful

Following on from the previous question (Q29) it is not surprising that the same 88.1% of the participants did not respond to this statement. The most likely explanation for was because these participants felt that they had experienced all of the popular features of Bb relevant to their course.

In question sets Q22, Q24, Q26, Q28, research participants were required to provide reasons for their answers to the preceding question respectively.

4.7 Section D: Online experience

This short section looked at what students thought of their online classroom experience in Bb as an additional learning tool to traditional classrooms.

Q31 I find Blackboard a helpful learning tool in my course

A significantly high number of respondents (80.8%) agreed with this statement ($p < 0.001$) as figure 4.7 below illustrates. This would suggest that most students are actively logging into their online classrooms and accessing the course content. However, it is of concern to note the statistics reveal that 19.2% of respondents did not feel that Bb was helpful or did not have an opinion to this statement. Follow up studies may be helpful in identifying the reasons for their dissatisfaction and to offer possible suggestions regarding remedial action.

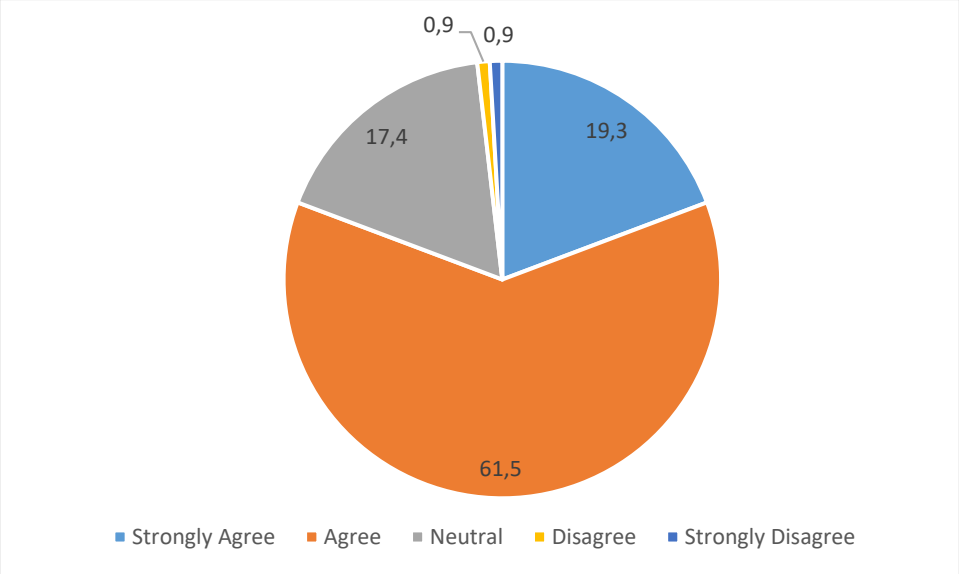

Figure 4. 7- Blackboard as a helpful learning tool

Q32 The online support from Blackboard makes the material I read from my notes/textbook easier to understand

This statement yielded a 66.6% agreement from participants ($p < 0.001$). It is therefore evident from the statistics that more students are making use of the online classroom as an additional source of information and knowledge to traditional notes and textbooks, which would indicate that students are appreciating the value of the course material in the online classroom.

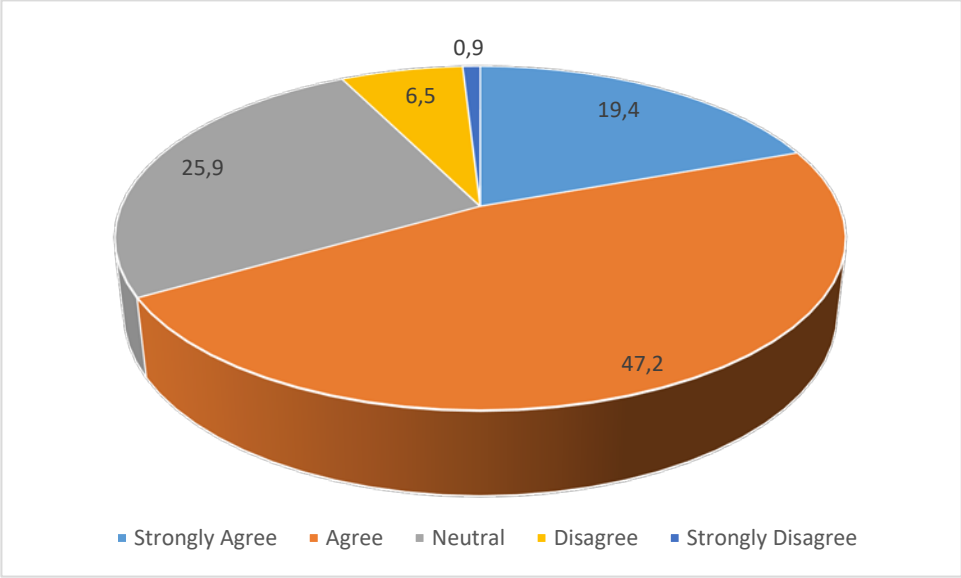

Figure 4. 8- Usefulness of the online course material in Blackboard

4.8 Section E: Preferred Blackboard tools

This section looked at how participants rated their ability to use all the Bb tools required of them for the section of the course they were required to evaluate, which was Social Networking. Furthermore, this section also sought to find out from participants, which Bb tools were most frequently used by participants and which of these tools participants found most useful.

4.8.1 Blackboard Training

Q33 The Blackboard training was adequate for me to be able to use all the tools that were needed in the online classroom for this section on social networking

Figure 4.9 on the following page presents a graphical representation of the response received from participants to this statement.

While more than half of the respondents (51.8%) agreed with the statement ($p < 0.001$), the survey also revealed that more than a third of the respondents were "neutral" regarding training being adequate. An equally concerning statistic was that a further 15.8% of the respondents did not agree with this statement. While participants in this study were given additional Bb training in order for them to participate meaningfully, these results suggest that generally while there was Bb training offered to students within their respective departments, this training was for some reason not reaching all students. Further studies could be conducted to probe the neutral and negative responses of the students in order to find solutions to students' concerns regarding Bb training.

4.8.2 Blackboard Experience

Q34 Which of these Blackboard tools have you used?

Figure 4.9 below provides a graphical representation of the Blackboard tools participants selected in response to Q34, in order of popularity.

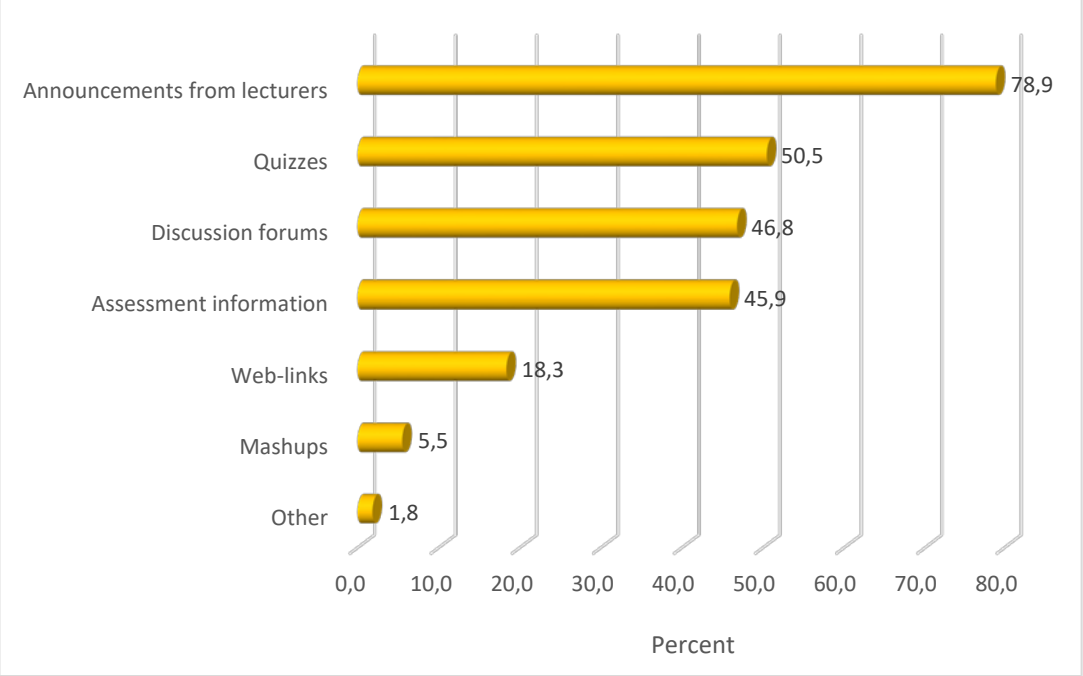

Figure 4.9 - Most frequently Blackboard tools

The most commonly used resource or tool accessed by students was the announcement tool. The Announcements in Bb allow lecturers, tutors and other course administrators to post notices of tests, assignment due dates, course reminders and any other related notice that students should be aware of, in the online classroom. During the focus groups, participants also agreed that they found the announcements helpful. One of the focus group participants said *"announcements help keep you updated"*.

The data reveals that an overwhelming 78.9% of the participants used the announcement tool while, on average, half of the respondents used each of quizzes, discussion forums and assessment information. While some of the participants did use other Bb tools, the tools mentioned above proved to be the most frequently used by participants.

4.8.3 Most useful Blackboard Tool

Q35 Which one tool/feature used so far, would you rate as being most useful in enhancing your understanding of social networking?

The purpose of this question was to probe participants' experience of the various Bb tools regarding its usefulness in understanding the course material. The results are graphically represented in figure 4.10 below.

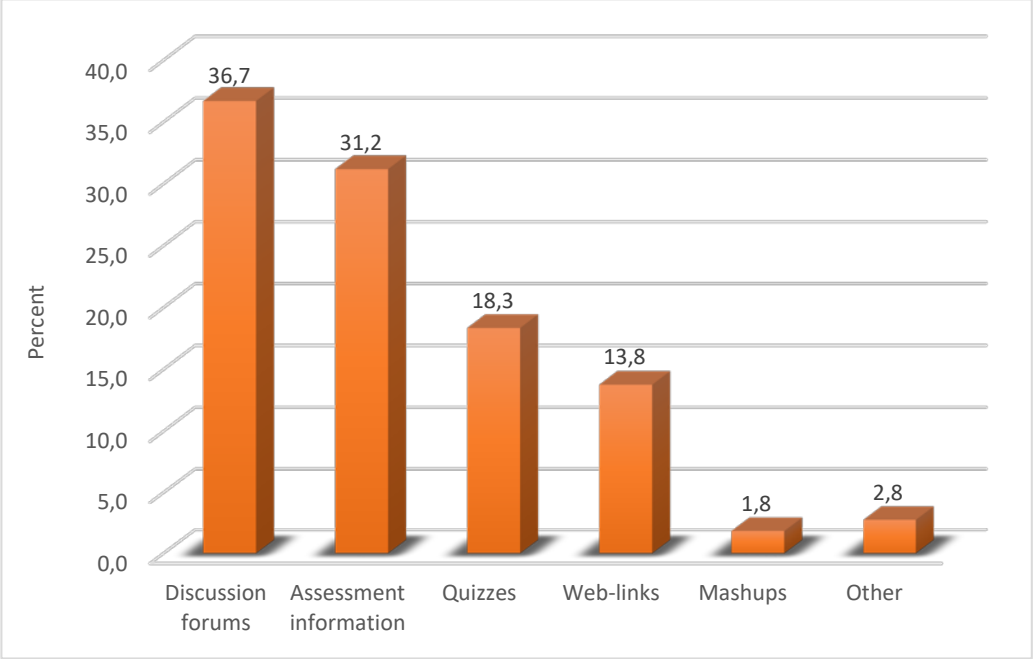

Figure 4. 10- Most useful tool in enhancing understanding of topic

While based on the results obtained, there was no single tool that was overwhelmingly more popular than others, there were however, some tools which were rated higher than others by participants. Discussion forum was chosen by 36.7% of the participants as being the most useful tool. Participants in the focus group also agreed that discussion forums were useful for them to exchange information and construct knowledge through discussion with peers. One of the participants said, *"Discussions were helpful to inform or discuss certain aspects of the course material"*. Another focus group participant added, *"It helps to work together and we feel at ease in the discussion forum"*. Overall, participants of the focus group agreed that the discussion tool in Bb was most useful and important in improving their understanding of the

course material. While these comments were consistent with findings from other studies which claim that discussion boards are one of the most useful tools and widely used tools in an LMS, results from the analysis of the questionnaires seem to be at odds with these findings as results from the survey indicated that respondents did not use discussion boards as much as would have been expected. Only 57% of the respondents of the survey indicated they used discussion forums. One possible explanation for this contradiction is the language barrier that many students may experience with the online classroom, which uses English as the primary language. While most of the respondents recognised the importance of discussion boards in Bb, many of the participants in this study also indicated that English was not their first language. Therefore, a major contributing factor for the lower than expected use of discussion boards by participants in this study could be the fact that many participants did not feel comfortable communicating in English in a public forum such as Bb. Furthermore, when asked which Bb tools students would like to know more about in question 37, discussion forum was one of the tools that students wanted to know more about, indicating that some students were still also not entirely comfortable with how discussion forums worked.

The Assessment tool, selected by 31.2% of the participants was the second most useful tool in Bb, according to the survey. Online assessments in Bb were a new concept for most participants of this study. Many students initially felt intimidated by this form of assessment and expressed concern that the online assessment process may be a disadvantage to them and to their final mark as they were unfamiliar with the process. After several workshops and as many online mock tests with students, to build their confidence, the formal online test on social networking was administered to students using Bb. Verbal feedback from students, post-test was encouraging. Students were impressed that the quality of the course material included in the online assessment was of the same standard as traditional written assessments and that the online test was as challenging as traditional tests. Students were also impressed with how efficient and exciting it was for them to complete the online test and receive their results immediately on completion.

Academics who have used the Bb assessment tool in their online classrooms claimed that while it was more time consuming to create an online test in Bb, these tests could be stored and used again in the future. Test questions could be edited by changing one or more questions before being re-used. However, one of the major advantages of online assessments according to academics was the fact that Bb could automatically mark each student's assessment and publish the results immediately, saving academics lots of marking time and effort, especially when teaching large classes.

Two other significant but less popular tools chosen by the research participants were quizzes (18.3%) and web-links (13.8%). A small percentage of participants chose a variety of other Bb tools but these selections were not significant enough to have any impact on the study.

Q36 Please briefly explain how your selection in question 35 has been helpful to you in understanding social networking

	Frequency	Percent
Learn new information	29	26.6
Information sharing	16	14.7
Understand topic better	14	12.8
Support from peers	11	10.1
Test knowledge	11	10.1
Support from lecturer	3	2.8

Table 4. 13- Usefulness of the selected tool in Q35

The purpose of Q36 was to seek a more detailed explanation of participants' response to Q35. Table 5.6.3a lists the responses to Q36 from participants. Looking at the first three selections in the table above, it is evident that participants prefer tools that they find engaging and challenging as opposed to Bb tools that merely disseminate information. The ability to learn new information and share information were the most popular reasons given by participants.

Q37 Which of these tools/features would you like to learn more about and use further in future?

Multiple responses were allowed for this question. The aim of this question was to get an indication from participants of the specific Bb tools they wanted to learn more about. The results of this question would be particularly useful to academics and Bb support staff when structuring Bb training programmes for students. Table 4.11 below reflects participant responses

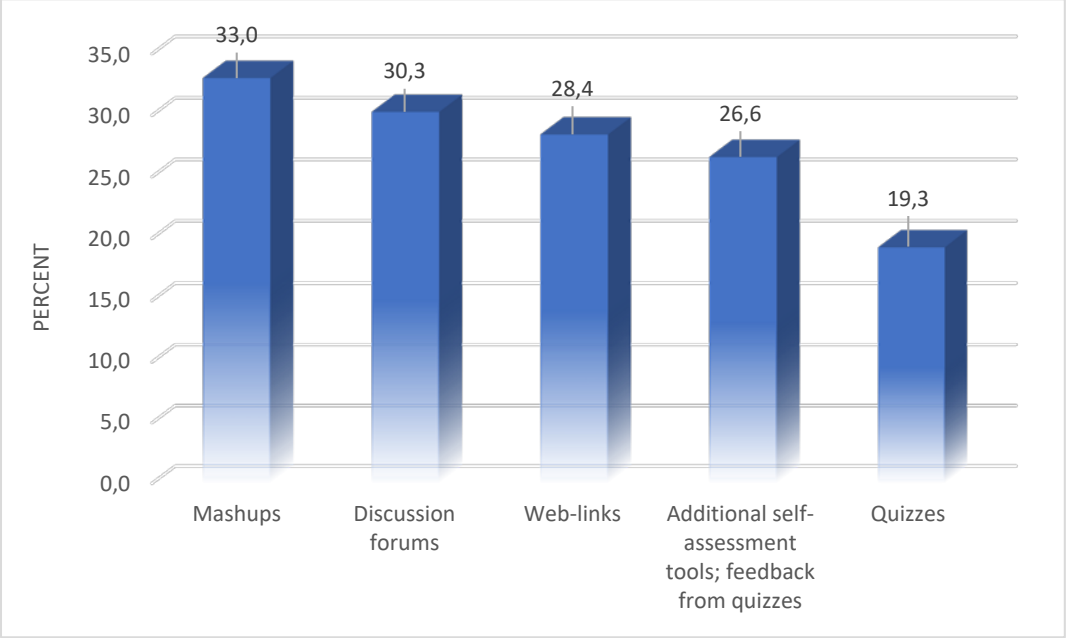

Figure 4. 11- Blackboard tools students would like to learn more about

The results show that there were several tools or features that participants wanted to know more about. Out of all the Bb tools requested by participants, there was no tool particular requested significantly more than any other. There seemed to be a similar number of requests for Mashups, Discussion forums, Web-links and additional self-assessment tools; feedback from quizzes. Based on these results, it seems that training/refresher courses should be ongoing to allow students who missed the initial training to familiarise themselves with the Bb features.

4.9 Section F: Classroom design

4.9.1 Classroom appearance

Q38 An attractive Blackboard classroom influences how often I access the classroom

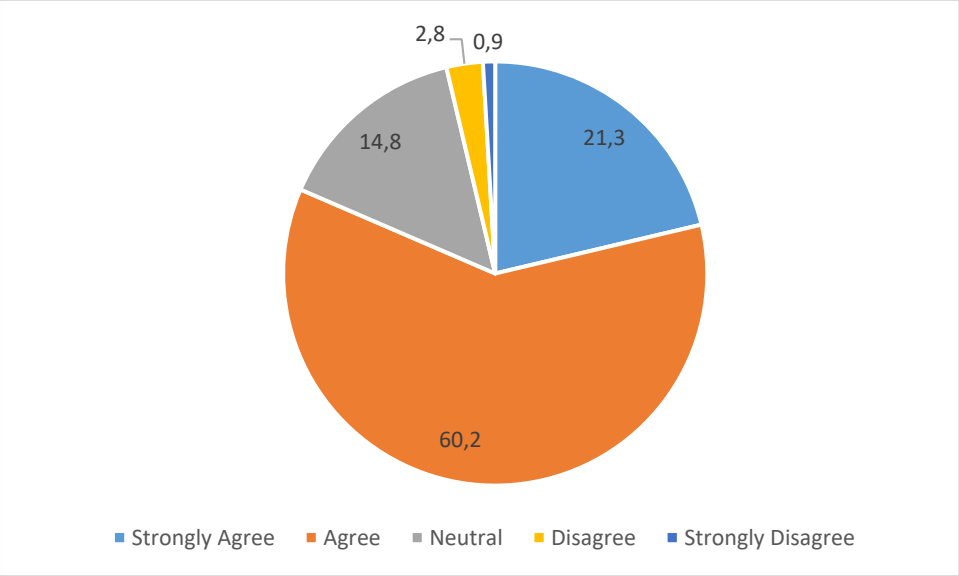

Figure 4. 12- Influence of an attractive Blackboard classroom on student access

Figure 4.12 above shows that significantly more participants agreed that an attractive Bb classroom design influenced how often students accessed the Bb classroom and had an influence on the student experience of Bb. The results confirm that the classroom appearance is an important feature in improving the student experience.

Q39 With regards to Blackboard classroom design, which of the following statements would you agree with most?

Table 4.14 shows that more than three quarters of the respondents indicated they preferred a “more interactive” classroom design ($p < 0.001$). This confirms earlier findings that students prefer a more engaging classroom where they can hold discussions online with other students, ask questions and receive feedback from

lecturers, test their knowledge using online assessments and quizzes, take online assessments and receive assessment scores immediately, among other features.

	Frequency	Percent
More interactive	83	76.1
Less interactive	14	12.8
Undecided	11	10.1

Table 4. 14- Influence of classroom design on student access

4.10 Comparison of results

The Kruskal-Wallis test is the non-parametric alternative to the Anova test. It is used to determine whether there are significant differences between the centre scores (medians) of multiple groups. The results are shown below.

Kruskal-Wallis test	
P value	< 0.0001
Exact or approximate P value?	Gaussian Approximation
P value summary	***
Do the medians vary significance (P < 0.05)	Yes
Number of groups	4
Kruskal-Wallis statistic	119.4

Table 4. 15- Kruksal-Wallis test comparing scores

Dunn's Multiple Comparison Test	Difference in rank sum	Significant? P < 0.05?	Summary
2015 vs 2016	-201.5	Yes	***
2015 vs 2017	-103.4	Yes	***
2015 vs 2018	-25.20	No	ns
2016 vs 2017	98.04	Yes	***
2016 vs 2018	176.3	Yes	***
2017 vs 2018	78.22	Yes	***

Table 4. 16- Dunn’s Multiple comparison test

It is noted that the overall p-value is less than 0.0001. This implies that there are significant differences in the median values. The Dunn's Multiple Comparison Test looks at individual comparisons between the years (and hence the number of students). It is noted that larger classes generally have lower average marks.

The results of the data from the comparison of marks as represented in Figure 4.14 on page 83 shows the average student mark for the section on Social Networking for the last four years (2015-2018). The first two years, 2015 and 2016 represented in blue in the table below, indicate that traditional teaching methods were used i.e. face to face teaching with printed notes and prescribed textbooks. The last two years, 2017 and 2018, represented in red in the table below, indicate that the Blackboard online classroom was integrated into the course together with traditional teaching methods. Figure 4.13 suggests that student performance over the last four years, with and without the Blackboard classroom, was similar, implying that the implementation of the Bb online classroom did not have any significant impact on student performance.

However, figure 4.14 shows the student enrolment numbers for the course over the last four years (2015-2018) has almost doubled. The table clearly shows a substantial increase in student numbers for the course over the last four years. This means that instructors/lecturers have had to deal with increasing class sizes and have had to rely more on the online classroom to provide students with course related information and to accommodate the various learning abilities of all students. The similar class average mark, despite the larger student numbers, could indicate that the Bb classrooms are playing an important role as a learning tool for students and has had a positive impact on these same students.

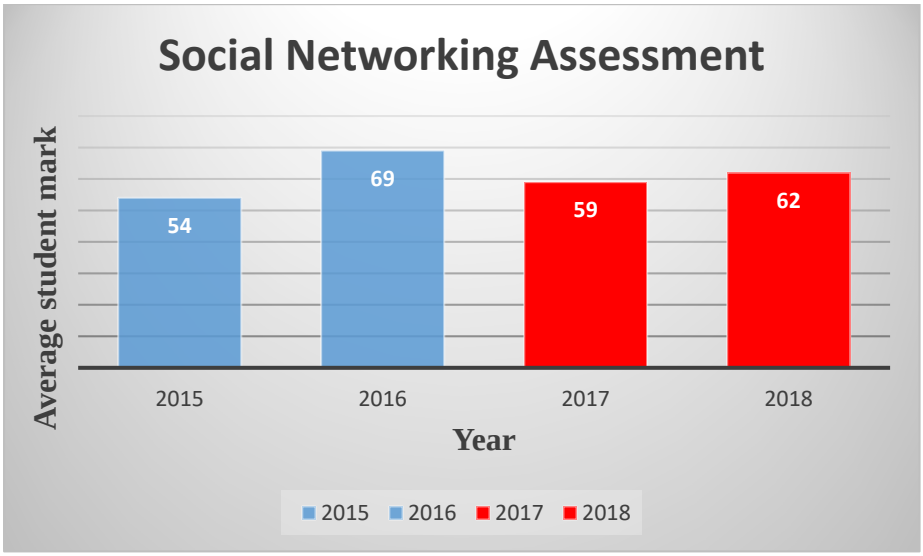

Figure 4. 13- Average mark scored over four-year period

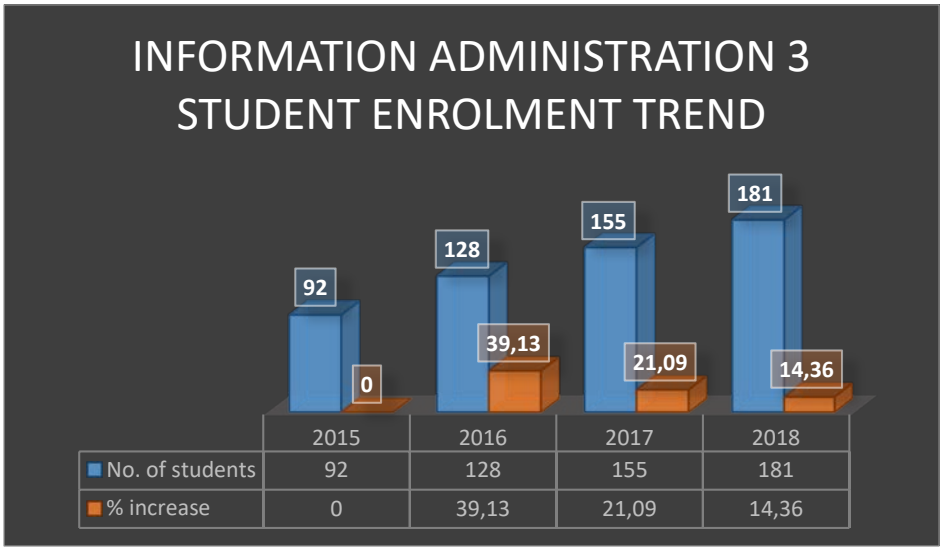

Figure 4. 94- Student enrolment trends over four-year period

To support the claims of the researcher that Blackboard has had a positive impact on student learning, some of the comments from participants of the focus group discussions regarding its importance include:

"Blackboard has been helpful. In class you get theoretical information and in Bb you get a better understanding because of videos posted".

"Blackboard has helped improve my communication skills through online discussion".

"I feel that Blackboard positively impacts on your studies, if you know how to use it".

To explore the impact of Bb on student performance in this study, IA3 students were given a traditional written assessment and an online assessment on social networking to gauge their performance in each of these assessment methods.

Figure 4.15 below shows a comparison of the pass rate of students for both a written and the online assessment administered to students on the section on Social Networking. The results show that students performed much better in the online assessment than in the traditional assessment. While the assessments were of the similar standard, the online assessment consisted of a combination of multiple choice, fill in the blank and short answers. This made it much easier for students to understand and answer the questions keeping in mind that most participants in this study regarded English as their second language.

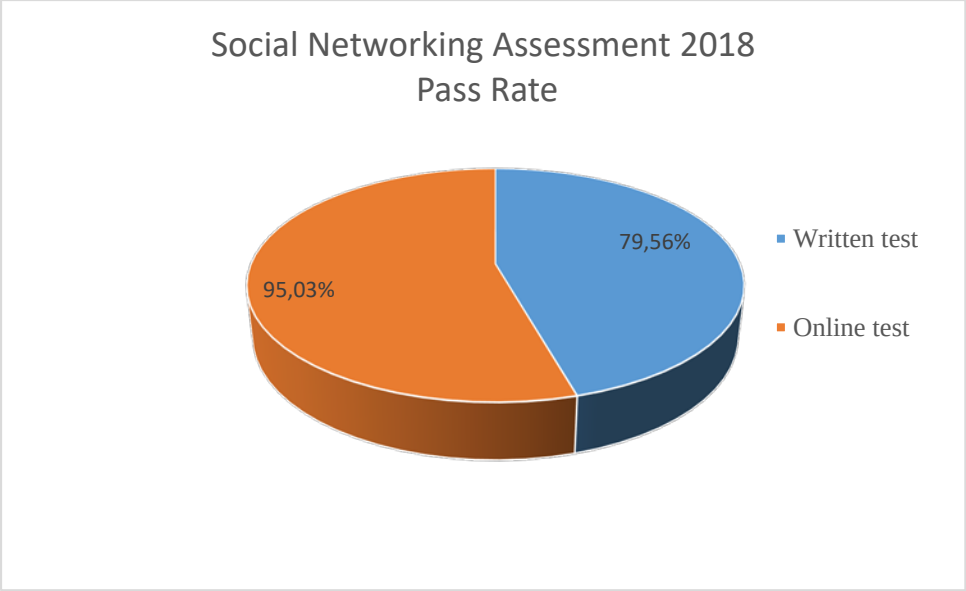

Figure 4. 105- Student performance in online vs written test

The result of this online assessment was encouraging and proved that if Bb was used effectively, it could create positive online learning experiences for students. The instructor that administered the online assessment on Social Networking, used in this study commented:

"*The online formal test was a challenging, yet extremely rewarding, experience for instructors and students. Although the set-up of the test is time-consuming, there are several benefits to this form of assessment. Some of the benefits with an online assessment are enhanced motivation, increase in student engagement, immediate feedback and personalised learning experiences*".

The instructor's comments are supported by findings from a study by Blackmon and Major (2012) which suggests that instructors had a strong influence over student experience in large part through their accessibility and through their efforts to provide opportunities to connect with peers.

4.11 Summary

The aim of the study was to use the Technology Acceptance Model as a guide to determine what study participants thought of their experience of the Bb online classroom used in this study and what improvements they thought should be implemented to enhance their Bb experience and to meet the course objectives. Findings are consistent with TAM related findings from previous studies (Fishbein and Ajzen 1975; Davis 1989; Venkatesh *et al.* 2003).

Previous studies have found that many instructors restrict themselves to uploading course materials to the Bb classroom and never use the interactive features such as chat, discussion forum, email, and messages which, according to the results of this study, many students preferred. The researcher has also observed this practice in many of the online classrooms in Bb. To support this claim, a participant from the focus group commented, *"Some lecturers may not have the skills or sufficient training on Blackboard, that's why they don't post in the classroom"*.

Based on the evidence gathered during the course of this study through the questionnaire survey, focus group interviews and comparison of assessment results, the study found that training and regular student feedback from the lecturer were two of the most common suggestions in improving the student experience in the online classroom in Blackboard. This was evident from the results of the survey of IA3 students, where a significant number of participants returned neutral responses to many of the statements posed. This could indicate that students were not confident or familiar enough with the features of Blackboard to have formed an opinion on its usefulness or ease of use. These findings support other similar studies where it was also noted that issues and implications associated with the effective use of Blackboard involved training, delivery of knowledge, feedback and professional development of staff (Gosper, Malfroy and McKenzie 2013; Arkorful and Abaidoo 2015). An earlier, yet still relevant study by McCord (2006) argues that a new commitment to training is necessary since past models of acquainting students with available technical resources are no longer adequate.

Chapter 5

Conclusion, Research Implications and Recommendations

5.1 Introduction

With increased class sizes, lecturers at DUT are often unable to reach out to all students in the classroom due to the limited time available. The Blackboard LMS has become an increasingly valuable tool for both lecturers and students, not only to keep them updated with their coursework, but also to provide a host of course-related functions including getting instant course-related notifications. In turn, lecturers have an easier time reaching out to their students out of the class hours and can instantly update them over the LMS about issues regarding their coursework. However, a study by North-Samardzic and Jiang (2015), supports the researcher's view by suggesting that there is a disproportionate acceptance and use of such technologies by students.

The TAM is one of the most popular and well-researched theories of technology acceptance in information systems and related fields. The researcher's interest resulting from this study was in presenting the findings and its relationship with TAM. This theoretical framework was used to assist in assessing students' experiences of the effectiveness of the online classroom using the Blackboard (Bb) LMS and informing how it may influence intention to use the online classroom in Bb or any LMS for that matter, in a blended learning environment. Discussions and practical implications of the results from this theory arose from the significance of the following constructs in terms of influence on user's intention to use a technology: Computer Self-Efficacy; English Language Proficiency; Perceived Usefulness; and Perceived Ease of Use.

In the course of the discussions the researcher reported on the patterns of past research in relation to the current study where the LMS's noted constraints and limitations in respect of its design and presentation to students were evaluated. The researcher discusses interventions and future recommendations that could express a further cycle of assessment and improvement for this useful online learning tool.

In this chapter, the study reflects on the research findings in order to draw conclusions based on the possible implications of the results. These conclusions are arrived at based on the various data collection instruments employed in this study i.e. focus group interviews, questionnaire survey, a comparison of student marks and observations which were used to assess research participants' experiences, the results of which were interpreted in terms of the study's objectives. Further conclusions are drawn in relation to the study's findings and the theoretical framework that informed this study. Recommendations, based on the successes and/or limitations of this study, are finally made in this chapter.

The research objectives were the following:

I. To establish students' degree of satisfaction with Bb as a method of learning and teaching beyond traditional learning.
II. To establish which aspects of the Bb system students found most valuable for improving their learning experience.
III. To establish which aspects of the Bb system students found least valuable for their learning experience.
IV. To provide clear guidelines for online classroom design to ensure that the online learning experience is both relevant and engaging and supports the active learning processes of students.

5.2 To establish students' degree of satisfaction with Bb as a method of learning and teaching beyond traditional learning

At the beginning of the study the researcher described the need to get a better understanding of the students' general and specific concerns regarding their experience of the online classroom in Blackboard. This understanding would include: Bb training, Bb tools that students described as having the greatest impact on their learning, the learning advantages that Bb offers compared to traditional face-to-face teaching and learning; and lastly, a comparison of student performance between traditional assessments and online assessments. This understanding would help lecturers in designing more engaging, information rich, online classrooms based on

how students preferred the information presented. However, what made this study different from many other similar studies, was that it captured the student voice and student opinions of their learning environments, rather than the lecturer experience, an approach supported in the literature by (Verdonck *et al.* 2019).

Overall, the study found that students viewed the online classroom in Bb as a useful tool supporting their learning, in particular, being able to access their online classrooms and complete their tasks in their own time and being able to engage in course-related research activities during class and sharing work with other students.

Bb provides two main functions for students, i.e. administrative functions and academic functions. Administrative functions of Bb include announcements, grade centre, course messages and course calendar and is used by students mainly for informational and planning purposes, while academic features of Bb include discussion boards, course content, which incorporates content such as videos, web links, lesson plan and slides, as well as assessments, which includes tests, assignments and quizzes. The academic functions of Bb are actually used for teaching and learning. Therefore, the objective of this study to use the TAM to assist in ascertaining the extent to which student experiences predicted Perceived Usefulness and Perceived Ease of Use of the online classroom in Bb was satisfied.

Students did however express concern that the Bb training they received was very basic and did not teach them how to use the more advanced tools in Bb. Some of these advanced tools included discussion boards, blogs, Bb collaborate, wikis, and journals.

Although the results revealed no significant predictive influence with respect to ease of use for either Computer Self-Efficacy or English Language Proficiency, it was noted that English Language Proficiency also showed no significant relationship with usefulness of the LMS. Nevertheless, course content yielded a significant indication of agreement with perceived usefulness. Regardless of demographics, the participants indicated positive agreement when computer self-efficacy was tested against ease of

use. There was no indication of positive significant difference of opinions between females and males.

5.2.1 Recommendations

- If students are expected to make more use of their online classrooms, the researcher recommends that the university consider providing better LMS training and ongoing on-site support for students. The researcher's view is supported in the literature by Al-Shboul *et al.* (2013); Arkorful and Abaidoo (2015).

5.3 To establish which aspects of the Bb system students found most valuable for improving their learning experience

Observation of the participants made by the researcher in the computer laboratories revealed that students preferred to work in groups and especially enjoyed learning by watching tutorial videos together and discussing course related issues amongst themselves often in their own language.

Also, from the observed results there was a positive significance between student online experience and graphical content in Bb. The study found that videos, web-links and other course material containing graphics greatly enhanced the user experience as compared to just textual content. An analysis of the data from the questionnaires revealed that more than 73% of the respondents found that course material containing graphical content such as videos, diagrams and slides made it easier for them to understand what was being taught or explained. Different learning modes such as pictures and videos make it easier and capture students' attention, according to Aucamp and Swart (2015).

5.3.1 Recommendations

- The identification of collaborative learning as integral to an improved student experience in this space informs lecturers/instructors to harness and incorporate collaborative learning activities in the online classroom.

- Lecturers/course designers should incorporate more graphics content into the online classroom because the use of course content containing graphics is recommended to increase students' understanding of the course material.

5.4 To establish which aspects of the Bb system students found least valuable for their learning experience

The Discussion Board in Bb was the most under-utilised tool of all the tools that students rated as being most useful in their course, even though online discussions were encouraged in this study. While the results of the survey showed that almost 57% of the respondents used the discussion boards in their online classrooms, observations made by the researcher and an analysis of the focus group discussion revealed that students were not using this tool as much as they claimed. This implies that almost half of the participants were not comfortable using this tool. The findings of this study are supported in the literature by Wei, Peng and Chou (2015); Vogt (2016) also found that students tended to post only as many times as was required. However, contrary to these findings much of the previous research on the subject has demonstrated the positive impact that discussions forums have had on student engagement (Badawy 2012; Blackmon and Major 2012; Al-Qahtani and Higgins 2013; Wei, Peng and Chou 2015).

5.4.1 Recommendations

Based on the literature, discussion boards have an important role to play in stimulating student engagement in the course. Therefore, lecturers and course designers should consider incorporating and encouraging more discussions in the online classroom.

5.5 Specific learning advantages of the online classroom

The study found no significant difference in students' average course mark during a comparison of the course marks over a four-year period. However, the study did note that from 2015 to 2017, when traditional written tests were administered, the number of students enrolled for the course were grouped and taught by three lecturers without the use of an online classroom. In 2018 however, when the online classroom was first used actively, the course was taught by only one lecturer and the number of students enrolled had more than doubled from 92 students 2015 to 184 students in 2018. Much of the learning material and course notes relating to the course was posted in the online classroom in Bb and even though such a large number of students were taught by only one lecturer, these students achieved a similar pass rate for the section that was assessed during this study. While inconclusive, these results suggest that the importance of an LMS such as Bb as an important tool to assist lecturers to manage and teach a large number of students without compromising the quality and standard of teaching and learning.

5.6 To provide clear guidelines for online classroom design to ensure that the online classroom is both relevant and engaging and supports the active learning processes of students

The use of videos as a learning tool proved popular amongst participants in this study. However, the researcher observed that short videos had a greater impact on students' learning because it made it easier to capture students' attention, as noted by Aucamp and Swart (2015).

The study also found that incorporating interactive elements into the online classroom design was also an important feature as it increased student engagement. According to the survey results, students especially enjoyed quizzes and mock tests as it allowed them to test their knowledge and interact with the online classroom. A fundamental mistake made by many course designers is to include too much information into the online classroom instead of uploading quality learning material (Mtebe (2015); Houston (2018). This type of classroom design runs the risk of creating an information overload and of boring students.

The study found that most of the participants accessed Bb whilst on campus. This behaviour was not unusual and is supported in the literature by Ssekakubo, Suleman and Marsden (2012), who in their study found that although the majority of the students possessed smartphones, and would have been expected to use them to access the LMS, there was a stronger preference for using laptops and desktop computers for accessing the LMS. Students in this study expressed various views upon which their preferences were based. More than half of the participants (54.1%) could not afford the mobile data required by their devices to access the online classroom after hours. A small number of participants (22%) did not feel they had suitable devices of their own to access their online classroom and preferred to use the computers in the department which had larger screens and were faster and more powerful than their own devices. Consequently, as already mentioned, many students were only able to access their online classrooms while at the university. This limited the amount of time they had to respond to tasks posted in the classroom by the lecturer.

The effectiveness of an online classroom depends on how well it is designed to create the instructional experience that makes learning possible (Bell and Federman 2013). Insights from students indicate that the online classroom in Bb significantly supports learning and engenders collaboration and active learning providing that instructors or course designers are actively involved in ensuring that course material is kept current and is engaging (Verdonck *et al.* 2019).

5.6.1 Recommendations

With the important role of videos as a learning tool being recognised, it is recommended that lecturers incorporate more videos where appropriate into the online classroom to stimulate students' interest. Greater participation by students in the online classroom should also be encouraged by lecturers in order to keep students engaged and interested. Lecturers can accomplish this by incorporating more of the interactive tools such as quizzes, discussion forums and mock tests into the classroom as mentioned above.

However, lecturers also need to be considerate of the limited access that many students have to the online classroom off campus and should allow for a longer response time from students for tasks and assessments communicated through the online classroom.

5.7 Research Implications and Recommendations

Providing an avenue for students to voice their experiences of online learning and the evaluation of the online learning environment within the Bb classroom proved useful in informing online classroom design and development

Firstly, the majority of the respondents surveyed in this study had the desire and experience to use learning management systems (LMSs). While results of the survey revealed that almost 80% of the respondents indicated that English was not their first language, this statistic did not have a negative impact on their online classroom experience or perceived ease of use, even though English was the language of instruction in the online classroom. However, the researcher recommends keeping vocabulary as simple as possible in the online classroom for the benefit of those students who do have difficulty understanding English and to improve ease of use.

The background information gathered on students who participated in this study involved some demographic information but more importantly, it included information on students' self-efficacy. More than 75% of the respondents surveyed in this study indicated they were comfortable using computers and therefore found the

online classroom useful and easy to use. Findings reported on significant agreement between computer self-efficacy and usefulness and ease of use.

An analysis of the focus group discussions also found that all participants agreed that the involvement of the lecturer/instructor also had an impact on their experience in the online classroom. Students viewed a lecturer's role in the online classroom as someone who not only imparted knowledge but also provided guidance and assistance to learners (Ma *et al.* 2015). Students also indicated that they preferred online classrooms where lecturers frequently posted, responded to student queries promptly, valued student feedback, and showed a sense of "caring" towards students who were then more likely to commit themselves to the course, and to perform at a stronger academic level.

For a lecturer to create, and more especially maintain and be constantly involved in, an online classroom is extremely time consuming and not always possible, considering that lecturers also have traditional face-to face classes to teach. Therefore, the university should look at ways of supporting lecturers such as assigning teaching assistants/course designers to help maintain the online classrooms.

5.8 Limitations of the study

The study focused only on the selected student group from Durban University of Technology. While the sample size of the survey was adequate for this study (one hundred and nine respondents), a larger sample size, according to Jones and Jones (2005), will strengthen the conclusions. The second limitation of the current study was that it did not include a reliable way of measuring any learning advantages between online learning and traditional face-to-face learning. Rather than examining the frequency that each individual interactive function provided by Bb was accessed by students, the study chose to use responses given by respondents through the questionnaire as a way of gauging which of the Bb tools were most popular amongst participants in this study. Thus, future studies could analyse detailed actual-use logs regarding the frequency of students' use of each interactive function and can, in this

way, further clarify the relationships among students' experiences of each interactive function's usefulness, the frequency of students' use of each interactive function, and students' online learning performance, a view supported in a study by (Wei, Peng and Chou 2015). Conducting a quasi-experiment as part of the study would have also increased the validity of the findings relating to whether there were specific learning advantages of Bb. However, there were ethical considerations with using a quasi-experiment in this study as dividing the class and giving some students the advantage over others is not normally seen as acceptable especially with a formal assessment.

5.9 Summary and Future Research

While it is difficult to draw definitive conclusions, overall findings suggest there is a strong relationship between students' online classroom experience and lecturer interaction. This appeared to be key. Students felt that if the lecturers created more engaging course content and were themselves more active in the online classroom, they would be more motivated to access the classroom. These findings undoubtedly validate that an online classroom that is kept updated by the lecturer creates a more positive experience for students.

Another important aspect of online classroom design to consider, and which is supported in the literature (e.g. Ssekakubo, Suleman and Marsden (2012), would be to identify the LMS services that are most desired by the students and make such services more effective and immediately accessible to the students through various technology platforms. A similar study by Vogt (2016) suggests that student engagement measures in use today would benefit from future studies that seek to incorporate the online aspects of the student experience of on-campus students. Providing an avenue for students to voice their experiences of learning and the evaluation of the learning environment within a technology-enabled learning space can be important in informing curriculum design and future learning space development (Verdonck *et al.* 2019). It is hoped that these results and experiences may encourage further pedagogical dialogue about how to deliver and organise courses in this technological environment effectively and successfully, a view supported by Vrielink (2015).

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Appendix A: Ethics clearance to conduct the study

Institutional Research Ethics Committee
Faculty of Health Sciences
Room MS 49, Mansfield School Site
Gate 8, Ritson Campus
Durban University of Technology

P O Box 1334, Durban, South Africa, 4001

Tel: 031 373 2900
Fax: 031 373 2407
Email: lavishad@dut.ac.za
http://www.dut.ac.za/research/institutional_research_ethics

www.dut.ac.za

25 July 2016

IREC Reference Number: **REC 31/16**

Mr Y Naidoo
171 Rinaldo Road
Glenhills
4051

Dear Mr Naidoo

Assessing students' experiences of the effectiveness of the Blackboard Learning Management System in the Department of Information and Corporate Management at the Durban University of Technology

I am pleased to inform you that Provisional Approval has been granted to your proposal REC 31/16 subject to:

- Piloting of the data collection tool
- Obtaining and submitting the necessary gatekeeper permission/s to the IREC and
- The Focus group interview outline be submitted to IREC for review and approval.

Full approval is subject to meeting the above conditions.

The Proposal has been allocated the following Ethical Clearance number **IREC 067/16**. Please use this number in all communication with this office.

Approval has been granted for a period of two years, before the expiry of which you are required to apply for safety monitoring and annual recertification. Please use the Safety Monitoring and Annual Recertification Report form which can be found in the Standard Operating Procedures [SOP's] of the IREC. This form must be submitted to the IREC at least 3 months before the ethics approval for the study expires.

Any adverse events [serious or minor] which occur in connection with this study and/or which may alter its ethical consideration must be reported to the IREC according to the IREC SOP's.

Please note that any deviations from the approved proposal require the approval of the IREC as outlined in the IREC SOP's.

Please note that you may continue with validity testing and piloting of the data collection tool. Research on the proposed project may not proceed until IREC reviews and approves the final document. If there are no changes to the data collection tool, kindly notify the IREC in writing.

Yours Sincerely

Professor C E Napier
Chairperson: IREC (Acting)

DUT DURBAN UNIVERSITY OF TECHNOLOGY
2016 -07- 25
INSITUTUTIONAL RESEARCH ETHICS COMMITTEE
P O BOX 1334 DURBAN 4000 SOUTH AFRICA

Appendix B: Permission to conduct study at DUT

Directorate for Research and Postgraduate Support
Durban University of Technology
Tromso Annexe, Steve Biko Campus
P.O. Box 1334, Durban 4000
Tel.: 031-3732576/7
Fax: 031-3732946
E-mail: moyos@dut.ac.za

18th August 2016

Mr Yathish Naidoo
c/o Department of Information Technology
Faculty of Accounting and Informatics
Durban University of Technology

Dear Mr Naidoo

PERMISSION TO CONDUCT RESEARCH AT THE DUT

Your email correspondence in respect of the above refers.

I am pleased to inform you that the Institutional Research Committee (IRC) has granted full permission for you to conduct your research "Assessing students' experiences of the effectiveness of the Blackboard Learning Management System in the Department of Information and Corporate Management at the Durban University of Technology" at the Durban University of Technology.

We would be grateful if a summary of your key research findings can be submitted to the IRC on completion of your studies.

Kindest regards.
Yours sincerely

_____
PROF. S. MOYO
DIRECTOR: RESEARCH AND POSTGRADUATE SUPPORT

Appendix C: Survey questionnaire for IA3 students

You are required to answer all questions

Please select the most appropriate option with an X

Section A: Background Information:

1. Please state your gender
   - ☐ Male
   - ☐ Female
   - ☐ Other
2. Is English your first language?
   - ☐ Yes
   - ☐ No
3. Do you experience any difficulty understanding the way any of your lecturers speak?
   - ☐ Very often
   - ☐ Often
   - ☐ Neutral
   - ☐ Seldom
   - ☐ Never
4. How would you rate your ability to use a computer?
   - ☐ Excellent
   - ☐ Good
   - ☐ Average
   - ☐ Poor
   - ☐ Very poor
   - ☐ Not applicable
5. How do you access Blackboard on campus? (select all that apply)
   - ☐ Desktop computer
   - ☐ Laptop
   - ☐ Tablet PC
   - ☐ Smart phone
   - ☐ Other (please specify) _____

1

6. Do you have access to Blackboard off campus?

   ☐ Yes

   ☐ No

7. If you answered yes to the previous question, please select how you access Blackboard (select all that apply)

   ☐ Computer

   ☐ Tablet

   ☐ Mobile phone

   ☐ Other (please specify) _____

8. The Blackboard training I received was adequate to support my course

   ☐ Strongly agree

   ☐ Agree

   ☐ Neutral

   ☐ Disagree

   ☐ Strongly disagree

9. If you selected "Disagree" or "Strongly disagree" to the question above, please provide a short explanation why

_____

_____

Section B: Usefulness of the On-line material:

10. I found the relevant course material in the Blackboard classroom helpful in gaining a better understanding of social networking

    ☐ Strongly agree

    ☐ Agree

    ☐ Neutral

    ☐ Disagree

    ☐ Strongly disagree

11. I found it easy to understand the material I read on social networking in the Blackboard classroom

- ☐ Strongly agree
- ☐ Agree
- ☐ Neutral
- ☐ Disagree
- ☐ Strongly disagree

12. I found it easy to remember the material I read on social networking in the Blackboard classroom

- ☐ Strongly agree
- ☐ Agree
- ☐ Neutral
- ☐ Disagree
- ☐ Strongly disagree

13. I have sufficient access to my Blackboard classroom/s to complete tasks

- ☐ Strongly agree
- ☐ Agree
- ☐ Neutral
- ☐ Disagree
- ☐ Strongly disagree

14. Blackboard offers a more valuable informative experience than traditional learning

- ☐ Strongly agree
- ☐ Agree
- ☐ Neutral
- ☐ Disagree
- ☐ Strongly disagree

15. Do you have any suggestions that may improve your Blackboard learning experience in any way?

_____

_____

Section C: Information Preferences:

16. I found it easy to find the information I was looking for in the Blackboard classroom

- ☐ Strongly agree
- ☐ Agree
- ☐ Neutral
- ☐ Disagree
- ☐ Strongly disagree

17. The information in the Blackboard classroom was appropriate to the topic

- ☐ Strongly agree
- ☐ Agree
- ☐ Neutral
- ☐ Disagree
- ☐ Strongly disagree

18. The information in the Blackboard classroom was easy to read

- ☐ Strongly agree
- ☐ Agree
- ☐ Neutral
- ☐ Disagree
- ☐ Strongly disagree

19. The related videos in the Blackboard classroom provided an additional understanding of the topic

- ☐ Strongly agree
- ☐ Agree
- ☐ Neutral
- ☐ Disagree
- ☐ Strongly disagree
- ☐ Not applicable (I did not access any of the videos)

20. Please provide a short reason for your answer to question 19

_____

_____

21. I found the PowerPoint slides of the lecture in the Blackboard classroom helpful

- ☐ Strongly agree
- ☐ Agree
- ☐ Neutral
- ☐ Disagree
- ☐ Strongly disagree
- ☐ Not applicable (I did not access the PowerPoint slides)

22. Please provide a short reason for your answer to question 21

_____

_____

23. I found the related discussion forum helpful as it allowed me to ask questions online

- ☐ Strongly agree
- ☐ Agree
- ☐ Neutral
- ☐ Disagree
- ☐ Strongly disagree
- ☐ Not applicable (I never/ very seldom took part in a discussion forum)

24. Please provide a short reason for your answer to question 23

_____

_____

25. I found the web-links helpful as it allowed me to go to related websites

- ☐ Strongly agree
- ☐ Agree
- ☐ Neutral
- ☐ Disagree
- ☐ Strongly disagree
- ☐ Not applicable (I did not use web-links)

26. Please provide a short reason for your answer to question 25

_____

_____

27. I found mashups helpful as it enabled related videos to be incorporated into my course notes

- ☐ Strongly agree
- ☐ Agree
- ☐ Neutral
- ☐ Disagree
- ☐ Strongly disagree
- ☐ Not applicable (I did not use mashups)

28. Please provide a short reason for your answer to question 27

_____

_____

29. Did you experience any other interesting Blackboard tool/feature not already mentioned?

_____

_____

30. Briefly describe how you found the tool/feature you mentioned in question 29 useful

_____

_____

Section D: Online experience:

31. I find Blackboard a helpful learning tool in my course.

- ☐ Strongly agree
- ☐ Agree
- ☐ Neutral
- ☐ Disagree
- ☐ Strongly disagree

32. The online support from Blackboard makes the material I read from my notes/textbook easier to understand.

- ☐ Strongly agree
- ☐ Agree
- ☐ Neutral
- ☐ Disagree
- ☐ Strongly disagree

Section E: Preferred Blackboard tools:

33. The Blackboard training was adequate for me to be able to use all the tools that were needed in the online classroom for this section on social networking

- ☐ Strongly agree
- ☐ Agree
- ☐ Neutral
- ☐ Disagree
- ☐ Strongly disagree

34. Which of these Blackboard tools have you used? (Please select all that apply)

- ☐ Announcements from lecturers
- ☐ Discussion forums
- ☐ Web-links
- ☐ Mashups
- ☐ Quizzes
- ☐ Assessment information
- ☐ Other (please specify) _____

35. Which one tool/feature used so far, would you rate as being most useful in enhancing your understanding of social networking?

- ☐ Discussion forums
- ☐ Web-links
- ☐ Mashups
- ☐ Quizzes
- ☐ Assessment information
- ☐ Other (please specify) _____

36. Please briefly explain how your selection in question 35 has been helpful to you in understanding social networking_____

_____

_____

37. Which of these tools/features would you like to learn more about and use further in future?

- ☐ Discussion forums
- ☐ Web-links
- ☐ Mashups
- ☐ Quizzes
- ☐ Additional self-assessment tools; feedback from quizzes
- ☐ Other (please specify) _____

Section F: Classroom design:

38. An attractive Blackboard classroom influences how often I access the classroom.

- ☐ Strongly agree
- ☐ Agree
- ☐ Neutral
- ☐ Disagree
- ☐ Strongly disagree

39. With regards to Blackboard classroom design, which of the following statements would you agree with most?

- ☐ I prefer a more interactive classroom design where I can ask questions and get prompt feedback from lecturers during office hours
- ☐ I prefer a less interactive classroom design which means I will have to wait for feedback from my lecturer and I can access information in my own time
- ☐ I am undecided

Thank you for your participation

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Appendix D: Focus group schedule for IA3 students

Introduction:

Hello. My name is Yathish Naidoo and I'd like to start off by thanking each of you for taking time to participate today. We'll be here for about an hour.

The reason we're here today is to gather your opinions and attitudes about issues related to the Blackboard online classroom. We'd like your help in understanding their strengths and weaknesses.

I'm going to lead our discussion today. I will be asking you questions and then encouraging you to answer and to add additional information. I will be moderating our discussion.

I also would like you to know this focus group will be audio recorded. The identities of all participants will remain confidential. The recording allows us to revisit our discussion for the purposes of clarification and developing research papers and presentations. I would like to remind all participants please to complete the letter of consent that you have been given.

Ground Rules:

To allow our conversation to flow more freely, I'd like to go over some ground rules.

1. Only one person speaks at a time. This is especially important as we would also like to make a written transcript of our conversation today. It is difficult to capture everyone's experience and perspective on our audio recording if there are multiple voices.
2. Please avoid side conversations.
3. Everyone doesn't have to answer every single question, but I'd like to hear from each of you today as the discussion progresses.
4. This is a confidential discussion in that I will not report your names or who said what to your colleagues or supervisors. Names of participants will not even be included in the final report about this meeting. It also means, except for the report that will be written, what is said in this room stays in this room.
5. We stress confidentiality because we want an open discussion. We want all of you to feel free to comment on each other's remarks without fear your comments will be repeated later and possibly taken out of context.
6. There are no "wrong answers," just different opinions. Say what is true for you, even if you're the only one who feels that way. Don't let the group sway you. But if you do change your mind, let me know.
7. Feel free to enjoy a beverage and a snack that has been provided for you.

Are there any questions?

Focus Group questions: (50 minutes)

1. What is your overall opinion of the Blackboard online classroom used in this course?
2. What feature(s) of Blackboard have had the most significant impact on your own learning? -- Please explain.
3. What do you like best when using the *[feature mentioned in the previous question]*? Can you give me an example that illustrates what you mean?
4. What do you like least when using Blackboard? Can you give an example that illustrates what you mean? Can you suggest what we might do about those disadvantages or problems?
5. Has the use of Blackboard impacted your ability to understand course material in any way? Why or why not? Please explain.
6. Has the use of Blackboard improved the skills you feel you will need in your career? Why or why not? Please explain.
7. Has the use of Blackboard improved your technology skills? Why or why not? Please explain.
8. Would you like to see more online learning material in Blackboard in your other subjects? Why or why not?
9. Is there anything else you would like to tell us about your experience using Blackboard as a learning tool in this course?

Closing: (2 minutes)

Thanks for coming today and talking about these issues. Your comments have given us lots of different ways to see this issue. I thank you for your time.

Y Naidoo	Professor R Millham	Dr J Skinner
Student	Supervisor	Co-Supervisor

Appendix E: Letter of information to participants

LETTER OF INFORMATION

Title of the Research Study: Assessing students' experiences of the effectiveness of the Blackboard Learning Management System in the Department of Information and Corporate Management at the Durban University of Technology.

Principal Investigator/s/researcher: Yathiraj Naidoo, BTech:IT

Co-Investigator/s/supervisor/s: Professor Richard Millham, PhD (supervisor), Dr Jane Skinner, PhD (co-supervisor)

Brief Introduction and Purpose of the Study: The study seeks to assess learners' experiences of Bb in order to understand how to improve learner satisfaction, behavioural intention, and to enhance the effectiveness of online teaching and learning.

Outline of the Procedures: The online assessment in Bb will take approximately 45 minutes, filling in of the questionnaires will take approximately 15 minutes and focus group interviews (if necessary), will take approximately 45 minutes.

Risks or Discomforts to the Participant: N/A

Benefits: Bb course designers will be able to create online course content that will improve learner satisfaction and behavioral intention based on feedback from the questionnaires. It could also result in the creation of a Bb best practice guide to assist Bb course designers create more student-friendly courses.

Reason/s why the Participant May Be Withdrawn from the Study: Participation in this study is voluntary. Participants may withdraw from the study at any time if they so wish. These participants will not be penalised in any way whatsoever.

Remuneration: N/A

Costs of the Study: N/A

Confidentiality: Confidentiality will be strictly maintained during this study. Results from the quasi-experiment will be secured in a locked cupboard. Questionnaires relating to the study will be completed anonymously to ensure confidentiality. These will also be secured in a locked cupboard.

Research-related Injury: No injuries will be sustained. The nature of this study does not involve any risk of injury or adverse reaction.

Persons to Contact in the Event of Any Problems or Queries:

Please contact the researcher, Mr Yathish Naidoo at 031 373 6881, or my supervisor, Professor Richard Millham at 031 373 5542 or the Institutional Research Ethics administrator on 031 373 2900. Complaints can be reported to the DVC: TIP, Prof F. Otieno on 031 373 2382 or dvctip@dut.ac.za.