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# Dedication

To my triplets, Vinai, Varun, Ishana and my wife Rowmela, I could not have accomplished this without your overwhelming love and support.

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# Appendices

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# Abbreviations

BbCMS Blackboard Course Management System

CEPUTT Centre for Educational Programmes University of

Trinidad and Tobago

CMS Course Management System

ICT Information and Communication Technology

UK United Kingdom

UTT University of Trinidad and Tobago

# Abstract

This interpretative qualitative study was designed to examine the experiences and perspectives of teacher educators as they worked to integrate the Blackboard Course Management System (BbCMS) into their courses. More specifically, it focused on how teacher educators’ perspectives of the value of the affordances of course managements systems for course delivery and their pedagogical beliefs influenced their integration of the BbCMS into their courses.

The study consisted of two stages. In the first stage data were collected from 53 out of 112 teacher educators using an open-ended questionnaire. In the second stage I collected data from eight teacher educators who were purposively selected and individually interviewed. My framework for analyses focuses on Pajares’ (1992) assumptions of teacher beliefs, Becker’s (2000) principles of teacher-centred pedagogy and Savery and Duffy’s (1995) principles of constructivist instruction.

The results suggest that teacher educators hold the perspective that the affordances of the BbCMS can enhance teaching and learning when used with face-to-face classroom sessions. The affordances most used were accessibility, followed by communication and collaboration and diversity. The study also found that many teacher educators with espoused constructivist beliefs did not integrate the BbCMS in ways that were consistent with their beliefs. Additionally, teacher educators experienced several challenges which may have prevented them from integrating the BbCMS in ways consistent with their espoused constructivist beliefs. These challenges included: administrative, teacher and technical issues.

My recommendations include a comprehensive professional development programme which provides training in both the technical aspects of the BbCMS and also how to use the affordances of the BbCMS to create a constructivist learning environment. I also recommend that a dedicated support desk be establish to provide assistance to teacher educators in resolving pedagogical issues that they may encounter while attempting to integrate the affordances of the BbCMS into their courses.

# Chapter 1 Introduction

The tertiary teaching and learning environment is a multifaceted system where students and teachers work together to foster learning. Over the last two decades there has been fundamental changes to the way teaching and learning have been conducted at tertiary institutions. In many of these institutions, there has been a move towards the integration of information and communication technology (ICT) by teachers into their courses. The term “information and communication technologies” (ICT) has many interpretations. It generally refers to, “forms of technology that are used to transmit, process, store, create, display, share or exchange information by electronic means” (Toomey, 2001, para. 3).

A more recent introduction into the teaching landscape of tertiary institutions has been the introduction of a category of ICT called course management systems (CMSs). Malikowski, Thompson and Theis (2007) described a CMS as a broad set of web-based resources that supports some or all aspects of course preparation, delivery, communication, participation and interaction. According to West, Waddoups and Graham (2007, p. 2) “course management systems are now probably the most used educational technologies in higher education, behind only the Internet and common office software.” However, research has also shown that while the introduction of CMSs is increasing in tertiary education there has been limited usage by teacher educators (Bongalos, Bulaon, de Celedonio, de Guzman & Ogarte, 2006; Garrote, 2006). This problem of limited usage of CMSs has also been discussed in several staff meetings at the Centre for Educational Programmes University of Trinidad and Tobago (CEPUTT). It seems that many teacher educators have not embraced this new educational paradigm. Why this situation exist is still not clear, as there may be many reasons for the limited use of CMSs by teacher educators at teacher education faculties. In an effort to bring greater clarity to the underutilisation of CMSs by teacher educators, this study focuses on how teacher educators’ perspectives of the value of the affordances of course managements systems for course delivery and their pedagogical beliefs influenced their integration of the BbCMS into their courses.

Pajares (1992) explained that the investigation of teacher beliefs is an essential means of educational inquiry for research and education. According to Borg (2001) “a belief is a proposition which may be consciously or unconsciously held, is evaluative in that it is accepted as true by the individual, and, is therefore imbued with emotive commitment, it further serves as a guide to thought and behaviour” (p. 186). Teachers’ beliefs about teaching and learning which are commonly referred to as pedagogical beliefs are associated with two classical ideologies – teacher-centred beliefs and student-centred beliefs. Teacher-centred belief has its origin in objectivism and highlights the importance of knowledge reproduction. Student-centred belief has it origin in constructivism and highlights the importance of knowledge construction. Therefore, being able to recognise and describe the influence of teacher beliefs on instructional actions would extend and enrich our understanding of the teaching process (Aguirre & Speer, 2000).

Researchers Cuban, Kirkpatrick and Peck (2001) argued that “teachers’ beliefs and values that teachers hold drive many of the choices they make in the classroom” (p.169). Ertmer, Addison, Lane, Ross and Woods (1999) also pointed out that successful integration of technology into teacher instruction and classroom practices is dependent on the beliefs teachers have about technology. In addition, research has shown that teachers who believe that integrating technology into their classroom practices will result in enhanced student learning may be more inclined to place a higher importance on technology integration, while those with more traditional attitudes may be less inclined (Cuban, 2001; Sandholtz, Ringstaff & Dwyer, 1997).

A number of researchers (Cohen & Ball, 1990; McLaughlin, 1989) found that many educational reform programs were unsuccessful because they had little impact on teachers’ beliefs or practices. Ringstaff and Kelley (2002) argued that teachers’ beliefs about teaching, learning and technology must change if technology is to be used in ways that alter classroom practices. Therefore, if we understood more about the influence of beliefs on the integration of technology, we might better understand how to promote or change beliefs about teaching and learning with CMSs. This study therefore sought to understand the experiences and perspectives of teacher educators as they worked to integrate the Blackboard Course Management System (BbCMS) into their courses. More specifically, it focuses on how teacher educators’ perspectives of the value of the affordances of course managements systems for course delivery and their pedagogical beliefs influenced their integration of the BbCMS into their courses. This chapter firstly deals with the background to the problem. This is followed by an explanation of why I conducted this research. The next section gives a statement of the problem. This is followed by the fourth section which describes the significance of the study. The final section lists the topic and the key research questions.

## 1.1 Background to the problem

At the World Education Forum Dakar Senegal 26-28 April 2000 ‘A Framework for Action. Education for All: Meeting our collective commitments’, it was noted that the current technological revolution in ICT has produced new ways for people and organisations to relate to one another. In the forum it was suggested that education cannot remain outside of these changes and as such teachers must assume the role of facilitator and mediator so that students may critically utilise new technologies. It was also stated that new technologies should be included as a key factor in the improvement of processes and opportunities for teaching and learning. At this forum the participating countries pledged to support the use of information and communication technologies in the classroom (UNESCO, 2000).

Following the World Education Forum in Dakar, the Government of the Republic of Trinidad and Tobago developed the ‘ICT in Education’ policy document. One of the objectives of this ICT policy is the adoption and integration of emerging technologies by educators into their teaching and learning (Ministry of Education, 2005). As such, the University of Trinidad and Tobago (UTT) a relatively new university in the Trinidad and Tobago education system has made tremendous efforts in providing computers, multimedia equipment and the internet for faculty members and students of the university since its inception in 2004. It is, however, not clear if such efforts have resulted in corresponding application and integration of the technologies in teaching and learning. This may be because envisioning technological use and actual implementation appears to be a long and difficult process for many teacher educators.

## **1.2 Why this research?**

This research was prompted by my personal and professional experiences as an ICT teacher and teacher educator. My private and professional lives influenced my ontological and epistemological beliefs as my undergraduate degree is in Mathematics and Computer Science. I have post graduate diplomas in the teaching of Mathematics and Educational Technology. I also have a Master’s degree in Education and now I am enrolled in a Doctorate in Education (EdD) programme both of which focuses on technology integration. I have spent all my working life in education. I am an author and a teacher. I have co-authored several text books on ICT for students at the secondary school level. I taught computer studies for fifteen years in the secondary school and ICT integration into the primary school curriculum at a teachers’ college for three years. While I was at the teachers’ college I completed a Masters’ thesis on the use of ICT as a teaching tool in primary schools. I also worked as a part-time lecturer at the University of the West Indies where I taught the ‘Computers in Education’ course. While I was doing my Diploma in Educational Technology part of my final project included the use of the Moodle Course Management System. That was my first experience with a course management system (CMS) and I started experimenting with the software. This life trajectory means that I am very passionate about the use of technology as a teaching resource as I have spent most of my adult life teaching computer science as a subject or how to integrate ICT into teaching and learning.

For the past seven years at the UTT I have been teaching ICT integration into the primary and secondary school curriculum. Recognising there was an underutilisation of the Blackboard course management system (BbCMS) which the university spent millions of dollars to acquire and maintain, I started to discuss with my colleagues the reasons for this situation. They reported that they did not have enough time to use the system, the system is difficult to learn and the system is not suitable for use in a teacher education programme. My conversations with them made me curious about the difficulties and frustrations they were experiencing with the software. My personal experience as an ICT teacher and teacher educator led me to feel strongly that this limited usage may not necessarily be due to the several challenges they pointed out alone but may also be due to a change to a new pedagogical approach and teacher educators’ perspectives of the suitability of the affordances of the BbCMS for use in teacher education.

This personal journey was one of the defining reasons for my wish to learn more about the system. I wanted to learn more about teacher educators’ experiences with the integration of this new technology in their classroom. For example, how did they utilise the system and, which tools did they use in their classes. I also wished to learn about their perspectives of the value of the affordances of the BbCMS and the relationship between their pedagogical beliefs and their integration of the BbCMS.

## 1.3 Statement of the problem

Information and communication technology (ICT) permeation into developing nations such as Trinidad and Tobago is a welcome development which is likely to help bridge the information barrier between itself and more developed nations. However, improved access to ICT does not seem to necessarily result in enhanced utilisation for teaching and learning. Lynch (2002) study of ICT innovations found that, while 80% of colleges in his study have CMSs available, faculty only use these tools in 20% of courses offered. A later study by Morgan (2003) at the University of Wisconsin found that although many teacher educators were using the CMS available at the university their use were limited to a few specific tools resulting in an underutilisation of the software. The question therefore arises, why is there such an underutilisation of CMSs and CMSs tools in educational settings?

Although universities are aware of the possible achievements in learning brought by CMS usage (Nelson, 2003), encouraging teacher educators to integrate CMSs into their courses remains a challenge. According to Nicolle (2005), “University faculty members have been among the last educators to experience the educational thrust toward technology integration” (p. 36). This view is supported by Keengwe (2007) who argued that university faculty are not playing a major role in modelling the use of technology in teaching and learning. In addition, Windschitl and Stahl (2002) found that even with the same equipment, teachers with different beliefs and attitudes about instruction usually have very different perspectives on technology integration, and therefore achieve different outcomes. This suggests that no matter how researchers or administrators promote technology integration, teacher educators are the people who decide, if or how to implement technology in their classrooms.

Thus, despite the growing number of studies on the integration of new and emerging technologies within higher education, there continues to be a gap in our existing knowledge as to teachers’ perspectives of the value of the affordances of a CMS for course delivery and the relationship between their beliefs and the integration of CMSs into their courses. During my literature trawl, I found no published research on the influence of pedagogical beliefs on the integration of CMSs in Trinidad and Tobago and the Caribbean in general. This is a significant gap in research as there are a number of universities and tertiary education institutions using CMSs to deliver courses in this country and the region.

In addition, while university teachers’ pedagogical beliefs have been investigated to some extent in technology environments, their beliefs about CMSs themselves have been largely overlooked, particularly as they relate to the value, role and use of CMSs for teacher educators at teacher education faculties. In this regard, Palmer and Holt (2009) insisted that there is a pressing need to better understand how university teachers are using CMSs in their teaching and the pedagogical sophistication of CMS usage. Therefore, there is need for a more complete understanding of how teacher educators’ pedagogical beliefs and their perspectives of the value of the affordances of CMSs influence their integration of a CMS into their courses.

## 1.4 Significance of the study

The integration of technology in teaching and learning is growing worldwide (Anderson & Kanuka, 2003). Research on teacher educators’ use of technology in instruction is therefore important, because it shows that educators who are comfortable about using technology model positive uses of technology to learners (Chiero, 1997; Kagima, 2001). Conducting research on teacher educators’ pedagogical beliefs and the CMS tools they integrate in teaching is also important, because the findings will help us to understand the relationship between teacher educators’ beliefs and the integration of CMSs which can provide ways to better integrate this technology into courses at the university.

The study also proposes to contribute to the growing body of research in the area of teacher educators’ beliefs and CMS integration in universities by:

* Contributing to a better understanding of how teacher educators’ perspectives of the value of the affordances of the BbCMS and their pedagogical beliefs influence the integration of the system.
* Identifying staff preferences of using CMS tools in traditional classroom environments.
* Assisting management and faculty in using a course management system to enhance teaching and learning in a blended learning environment.

In addition, faculty training has been found to be an essential factor for successful implementation of new technology in higher education teaching and learning environments (Butler & Sellbom, 2002; Morgan, 2003). This study is therefore valuable for university administrators because it helps to establish a foundation for any training program for faculty CMS integration.

## 1.5 Research Questions

Using qualitative research methods, this interpretive study sought to understand the experiences and perspectives of teacher educators as they worked to integrate the Blackboard Course Management System (BbCMS) into their courses. More specifically, it focuses on how teacher educators’ perspectives of the value of the affordances of course managements systems for course delivery and their pedagogical beliefs influenced their integration of the BbCMS into their courses. In this regard, the study targeted 112 teacher educators via an open-ended questionnaire and eight teacher educators who were individually interviewed. The study consists of four key research questions which are:

1. What are teacher educators’ perspectives of the value of the affordances of the Blackboard Course Management Systems (BbCMS) as a teaching and learning resource for their courses at the CEPUTT?
2. How have teacher educators at the CEPUTT integrated the BbCMS into their courses?
3. What is the relationship between teacher educators’ pedagogical beliefs and the integration of the BbCMS for course delivery at the CEPUTT?
4. What challenges did teacher educators encounter as they integrated the BbCMS into their courses at the CEPUTT?

## 1.6 Overview of the chapters

Chapter 1 begins with an introduction of the need to better understand the relationship between beliefs and the integration of CMSs. This is followed by a background to the problem, purpose of the research and the significance of the study. I then state my research questions. The last section gives an overview of each chapter.

Chapter 2 provides a description of the research setting. It describes the origin of the University of Trinidad and Tobago (UTT) and the Centre for Educational Programmes where this study is based. A description of the technology resources and personnel present at the Centre for Educational programmes is also provided. A discussion on the introduction of the BbCMS focusing on when the system was introduced and how it was introduced is also included.

Chapter 3 provides a review of the literature that informs this study. It firstly explains the concept of affordances by focusing specifically on the affordances of ICT. The second section discusses the concept of teachers’ belief, followed by a discussion on teachers’ pedagogical beliefs. The perspectives of objectivism, constructivism and the relationship between teachers’ pedagogical beliefs and ICT integration are then discussed. The next section discusses the features of a CMS, the utilisation of CMSs and the relationship between CMSs and pedagogy. This is followed by discussion on three of the most used affordances of a CMS; accessibility, communication and collaboration and assessment. The last section discusses some of the challenges teachers face when integrating a CMS into their courses.

Chapter 4, the theoretical framework, provides the tools for analysing the data obtained from the open-ended questionnaires and semi-structured interviews. The theoretical tools used are Pajares (1992) assumptions of teachers’ beliefs, Becker’s (2000) principles of teacher centred pedagogy and Savery and Duffy (1995) principles of constructivist instruction. These tools are used to support the discussion on teachers’ beliefs and teachers’ pedagogical beliefs developed in the previous Literature Review chapter.

Chapter 5 describes the methodological issues such as the appropriateness of the design of the study; the methods of data collection and the sampling techniques used. The chapter also contains a description of how the data were coded, analysed and interpreted. It also describes ethical issues and the effects of the researcher on the data collected.

Chapter 6, Data presentation and analyses 1 presents and analyses the data generated from the open-ended questionnaire. The data for each item in the open-ended questionnaire is presented and analysed according to the key research question it addresses.

Chapter 7, Data presentation and analyses II, presents and analyses the data generated from the semi-structured interviews. The data is presented and analysed according to the key research question to which it pertains.

Chapter 8 provides a discussion of the findings obtained from analysis of the data from the open-ended questionnaire and the semi-structured interviews. The research sought to ascertain teacher educators’ perspectives about the use of an electronic course management system as a teaching and learning resource for course delivery, how teacher educators integrated the BbCMS into their courses, the relationship between teacher educators’ pedagogical beliefs and the integration of BbCMS into their courses and the challenges they experienced as they integrated the software.

Chapter 9 the concluding chapter, summarises the study as a whole and discusses the implications of the study both at a practical and theoretical level. A summary of the findings is presented, followed by recommendations for the institution. Suggestions for further research are made, and limitations of the study are identified. The next chapter describes the research setting.

# Chapter 2 The Research Setting

## 2.1 The University

The University of Trinidad and Tobago (UTT) is a state owned university in the twin island state of Trinidad and Tobago. It was established in 2004 and was accredited in December 2010 by the Accreditation Council of Trinidad and Tobago (ACTT). Its main campus is currently located in O’meara Arima. Presently, its campuses are an amalgamation of nineteen former technological colleges throughout the island of Trinidad. There are nine teaching campuses including, the Chaguaramas Campus, Corinth Campus, ECIAF Campus, John S. Donaldson Campus, O' Meara Campus, Point Lisas Campus, San Fernando Campus, UTT Campus at NAPA and the Valsayn Campus. The UTT also has a presence in the island of Tobago.

The UTT’s primary focus is on the development of Trinidad and Tobago. With its genesis in the Trinidad and Tobago Institute of Technology (TTIT), the UTT initially focused on programmes in engineering and technology. However, the programmes currently offered go far beyond engineering and technology to include a number of educational opportunities in a range of disciplines. The UTT offers more than 80 programmes at Certificate, Diploma, Bachelors, Masters and PhD levels and has a student population in excess of 10,000.

The Bachelor of Education programme offered at the UTT is designed to prepare teachers for all levels of the education system, early childhood, primary and secondary. It is a four year programme which combines professional training and disciplinary knowledge. The programme consists of both a pre-service programme for full-time students and an evening programme for in-service teachers who wish to upgrade their qualifications to degree level (UTT, 2012).

## 2.2 The Centre for Educational Programmes University of Trinidad and Tobago

The research setting for this study is the Centre for Education Programmes University of Trinidad and Tobago (CEPUTT). The faculty has two campuses: one located at Valsayn in the northern part of the island and the Corinth campus located in the southern part of the island. Both campuses offer the same courses and have the same time-table. In some instances, faculty members may be teaching at both campuses in a semester.

The population at both the Corinth and Valsayn campuses at present is approximately 1600 students. Each campus has one academic administrator, one facility manager and a combined staff of 112 teacher educators. The class size varies according to year level and course. In the year one and year two foundation courses, the class size varies between 20 and 35 students. Each campus has three computer laboratories each holding 24 IBM computers, purchased in 2006. All computers on campus are outfitted with the Microsoft Office version 10 software suite. Any additional software can be obtained based on specific departmental needs. The Blackboard course management system (BbCMS) was introduced in all campuses at the UTT in 2007. All the computers are connected to a local area network (LAN) and have high speed internet access. These computers are maintained by an existing staff of four full-time technicians in each campus. In addition, each teacher educator has an IBM Thinkpad laptop given to them by the UTT for use on and off campus. Each campus also has a number of multimedia projectors, digital cameras, video cameras, headsets and speakers which can be accessed when required.

## 2.3 The Blackboard Course Management System at the UTT

The BbCMS version 6 was introduced to the university in 2007. A course management system is a software package that contains several tools for students and teachers to engage in online learning and teaching. The system was introduced without any consultation with the staff of the CEPUTT. Faculty was informed via staff meetings and emails about the existence of the system after it was purchased and installed.

To assist with the integration of the BbCMS into courses, an implementation committee was formed and a dedicated help desk to assist with technical issues was created. Training programmes were carried out at different locations to facilitate faculty adoption and integration of this new software. However, the Blackboard committee of which I was a member from 2008 to 2009 found out from the Information Technology support department that only a small number of teacher educators were making use of the system. The committee discussed ways to try to encourage faculty to adopt and integrate the system. Additional training programmes were organised on how to use the system but usage remained very low.

However, in January 2011 it became mandatory for all teacher educators to integrate the BbCMS into their courses. To assist teacher educators in the integration of the BbCMS into their courses the ‘Learning Centre’ which provides support and training for all members of staff started a series of workshops. Attendance at workshops was voluntary and teacher educators could choose to attend any workshop that was being run provided a space was available. The sessions during the semester break were well attended, however, sessions held during the semester had far fewer teacher educators.

In this study, as you will see in the Literature Review chapter which follows, I am looking at how teacher educators’ perspectives of the value of the affordances of course managements systems for course delivery and their pedagogical beliefs influenced their integration of an electronic course management system into their courses. Therefore, the following Literature Review chapter seeks to clarify the issues discussed above by exploring a variety of literature on the affordances of ICT, teacher beliefs, teachers’ pedagogical beliefs, CMSs and challenges to integrating a CMS. In addition, it also looks for categories, similarities and differences related to the issues discussed above.

# Chapter 3 Literature Review

## 3.1 Introduction

This chapter provides an overview of the literature that informs my research on the experiences and perspectives of teacher educators as they worked to integrate the Blackboard Course Management System (BbCMS) into their courses. More specifically, it focuses on how teacher educators’ perspectives of the value of the affordances of course management systems for course delivery and their pedagogical beliefs influenced their integration of the BbCMS into their courses.

According to Wellington, Bathmaker, Hunt, McCulloch, and Sikes (2005, p. 73), a Literature Review is an “inquiry trail” to explore a variety of literature and to look for categories, similarities and differences of particular issues. Silverman (2000, p. 231) pointed out that a Literature Review should “combine knowledge with critical thought.” This Literature Review supports my efforts in this thesis by allowing me to acquire an understanding of the topic by reviewing “what has already been done on it, how it has been researched and what the key issues are” (Hart, 1998, p. 1). It therefore works “illustratively as a theoretical background” (Turner, 2006, pp. 34-35) that allows me to build the argument behind my key research questions which are as follows:

1. What are teacher educators’ perspectives of the value of the affordances of the Blackboard Course Management Systems (BbCMS) as a teaching and learning resource for their courses at the CEPUTT?
2. How have teacher educators at the CEPUTT integrated the BbCMS into their courses?
3. What is the relationship between teacher educators’ pedagogical beliefs and the integration of the BbCMS for course delivery at the CEPUTT?
4. What challenges did teacher educators encounter as they integrated the BbCMS into their courses at the CEPUTT?

Although CMSs have become more accessible and have the potential to enhance student learning (Nelson, 2003), many teacher educators are reluctant, or have made very little use of this technology in their courses at the CEPUTT. Their reluctance may stem from many contextual factors in addition to their perspectives about the value of the affordances of CMSs for teaching and learning and their pedagogical beliefs about the integration of CMSs in their courses.

The succeeding sections of this chapter will discuss previously published work on the affordances of ICT, teachers’ beliefs and the relationship to the integration of ICT with emphasis on CMSs. While some of the research that follows is taken from researchers studying teachers’ beliefs and affordances of ICT at the primary and secondary school levels, it would be reasonable to expect that these findings may have relevance to teacher educators at the tertiary level. According to Entwistle and Walker (2000) “while teaching in higher education is bound to have distinctive characteristics, it also has elements in common with the more general ways of describing teaching. Consequently, we can draw on research on school teaching” (p. 343).

The chapter begins by firstly clarifying the term affordances, focusing specifically on the affordances of ICT. Secondly, I examine the debates around teacher beliefs. This discussion clarifies how this term has been understood and will be used in this thesis. I used this wider discourse of beliefs to focus specifically on teachers’ pedagogical beliefs which according to Burns (1992) refers to teachers’ personal beliefs about teaching and learning. I then discuss two opposing perspectives of teachers’ beliefs; objectivism and constructivism. This is followed by a discussion on the relationship between teachers’ pedagogical beliefs and the integration of ICT.

I then examine the general features of a CMS and analyse how its design may support or constrain teacher educators’ pedagogical beliefs with regards to its integration. The different modes of utilising a CMS are then discussed. I then focus on the relationship between pedagogy and the integration of a CMS. This is followed by a discussion on three main affordances of a CMS; storage and accessibility, assessment and communication and collaboration. Finally, I examine some relevant literature on the challenges teacher educators’ experience while integrating a CMS. Although some literature distinguishes between the terms “use” and “integrate” when used with ICT, in this thesis the terms are used interchangeably as it may be difficult to differentiate when a teacher educator is “using” or integrating” a CMS without understanding the paradigm from which the teacher is operating.

## 3.2 Affordances of ICT

Conole and Dyke (2004) argued that little is understood about the affordances of different technologies and, more specifically, how these properties might be exploited in particular learning and teaching contexts. In addition, studies by Jonassen, Hernandez-Serrano and Choi (2000) have found that the affordances of ICT are not readily perceived and adopted by teachers in ICT-mediated classrooms.

According to Salomon (1993, p. 53) an “affordance refers to the perceived and actual properties of a thing, primarily those functional properties that determine just how the thing could possibly be used.” In contrast, Norman (1998) argued that an “affordance is not a property it is a relationship that holds between the object and the organism that is acting on the object. The same object might have different affordances for different individuals” (p. 123). Gibson (1979) explained that the affordance of a thing is “neither an objective property nor a subjective property; or it is both if you like… It is equally a fact of the environment and a fact of behaviour” (p. 129). For example, the use of blogging in education entails typing and editing posts, which are not affordances, but which enable the affordances of the sharing of ideas and interaction among users. In addition, Gibson (1979) argued that the affordance of something does not change as the need of the individual changes. The individual may or may not perceive or attend to the affordance, according to his/her needs, but the affordance, “being invariant, is always there to be perceived” (Gibson, 1979, p. 138). For example, a CMS contain the tools to allow for communication between students and teachers and among students. If the teacher or student does not know about the communication tools it does not mean that the tools do not exist. The tools exist as part of the system and may be used quite successfully by other teachers and students.

Lim and Chai (2008) put forward the view that the perception of the affordances of the computer technology depends on the objectives that inform the lesson, and in turn, how the technology constrains or dictates the lesson. They also suggested that the perception of the affordances of the computer technology also depends on the attributes of both the learning environment and the other devices and participants in it (ibid). In this situation the participants are not only part of the environment, but also perceivers of the environment. Interestingly, Norman (1998) pointed out that “the perceived affordances are what determine usability” (p. 123). Norman’s assertion is important to this thesis as it suggests that a teacher educator’s use of a CMS may be based on his/her perceived affordances of the system. In this regard, Fisher, Higgins and Loveless (2006) explain that ICT affordances should not be viewed as stand-alone artefacts; they should, instead, be regarded in relation to the individuals who use them – with their values, beliefs and preferences – and the context in which they are used. This suggests that although affordances may exist for one individual it does not necessarily mean that it exists for all individuals.

In spite of their potential to enhance teaching and learning, ICT affordances have not always been used by teachers. One explanation is that an ICT affordance may be perceived in terms of constraints and acted upon accordingly (Kennewell, 2001). Murphy and Coffin (2003) posited that a constraint can be looked upon as the inability or diminished capacity to utilize a tool at will. An example is the discussion board available in CMSs. Some teacher educators may believe that discussions that take place through the medium of a discussion board does not allow for the deep discussions that may be possible in face-to-face sessions. Hence, these teacher educators may choose not to use a discussion board for their interactions with students, opting instead for face-to-face communication. Therefore, depending on the situation, the affordance of communication which is offered by a discussion board can be considered in terms of both the opportunity and the constraint it offers the user. It is important to point out that constraints are not the opposite of affordances; they are “complementary, and equally necessary for activity to take place” (Kennewell, 2001, p. 106). In addition, affordances and constraints must be considered in relation to the abilities of the participants in the activity they support.

Although the affordances of ICT are innumerable and are based on the perception of the user, I address Conole and Dyke’s (2004) eight affordances of ICT tools to further clarify the concept of affordances. : These affordances are as follows:

Accessibility - ICTs allow users to easily access vast amounts of information through a variety of different methods.

Diversity - ICT offers access to a vast range of diverse and different experiences that can inform learning. These can cater to the different learning styles of students.

Communication and collaboration–There are many online tools such as discussion boards, blogs and email that can be used for communication and collaboration.

Reflection - Asynchronous communicative tools such as blogs and discussion boards offer the potential for encouraging reflection and critique.

Immediacy–Information can be sent from one user to the next very quickly using tools available on the internet.

Speed of change **-** One characteristic of ICT is that it is continually evolving in terms of scope and sophistication. According to Conole and Dyke (2004) the rapid changes in ICT technologies require users to continuously reassess their skills and experiences instead of relying on custom and tradition to guide their actions. In addition, the ability to quickly access large volumes of information may “mitigate against reflective and critical thought, fostering surface approaches to learning” (p. 116). This suggest that the rapid changes in ICT technology and the ability to quickly access large volumes of information can present challenges for the use of new ICT technologies such as the BbCMS. For example the changes in the design and functions of the different versions of the BbCMS may affect teacher educators’ perceptions of the BbCMS.

Multimodal and non-linear **-** ICT has the potential for multimodal and non-linear modes of learning. This can allow teacher educators to adopt strategies and pathways of learning that are suited to the individual needs of their students.

Risk, fragility and uncertainty **-** According to Conole and Dyke (2004), risk in terms of the affordances of ICT is different from fate or natural disasters, as it relates to choices people make about avoiding risks or taking them. Connected to risk are the unintended consequences of actions (Giddens, 1999). These concepts are particularly pertinent to the context of information technologies, where history shows that there have been major unintended consequences, i.e. the technologies have not necessarily been taken up or used in the ways originally intended. Furthermore, another aspect of the rapidly changing nature of ICT is that there is an intrinsic level of fragility in digital technologies and networks. These complex systems are vulnerable to abuses, to disruption from viruses and SPAM, or simply to the servers being down. The increased use of technologies by different groups of users often gives rise to unintended consequences. For example, the increase in the volume of information available on the web has led to new forms of plagiarism.

While these affordances of ICT put forward by Conole and Dyke (2004) represent general affordances of ICT, it is important to note that affordances may be unique to specific categories of ICT and its use are based on an individual’s values, preferences and beliefs. In this study, the affordances of ‘accessibility', ‘diversity', 'communication and collaboration' and ‘reflection' were used in the analysis of the data to understand participants’ perspectives of the affordances of the BbCMS. These affordances were selected because of their prevalence in the responses from the participants. It is important to note that the affordance of ‘immediacy' was incorporated within the affordance of 'communication and collaboration' as many of the communication and collaboration tools available in the BbCMS allow for immediate feedback and communication. Similarly the affordance of 'multimodal and non-linear' was incorporated within the affordance of ‘diversity' as it allowed instructors to use different BbCMS tools to cater to the needs of the different learners. The affordance of 'speed of change' was not used in the analysis of the data as the BbCMS was not upgraded during the period of the study. In addition, the affordance of 'risk, fragility and uncertainty' was used in the analysis of the challenges faced by teacher educators in their integration of the BbCMS into their courses. The next section will explain the concept of teacher beliefs in an effort to understand the relationship between teacher beliefs and the use of the affordances of the BbCMS.

## 3.3 Defining beliefs

Pajares (1992) argued that all teachers hold beliefs, about their “work, their students, their subject matter, and their roles and responsibilities” (p. 314). Similarly, Calderhead (1996) suggested that all teachers hold beliefs about – learners and learning, the nature teaching, subjects or curriculum and learning to teach. These beliefs come from three different sources: the teachers’ personal and teaching experiences, teachers’ experiences as a student and teachers’ understanding of the curriculum (Richardson, 1996).

Although, Pintrich (1990) described teacher’s beliefs as the most valuable construct to teacher education, Pajares (1992) pointed out that teacher’s beliefs is a “messy construct”, noting that the “difficulty in studying teacher’s beliefs has been caused by definitional problems, poor conceptualisations, and different understandings of beliefs and belief structures” (p. 307). This conceptual confusion can be attributed to the different terms used to describe teacher’s beliefs; “judgements” (Yero, 2002), “personal theories” (Borg, 2001), “untested assumptions” (Calderhead, 1996) and “perceptions” (Schulz, 2001). Adding to the difficulty in defining beliefs Fullan (2001, p. 44) indicated that beliefs are often “not explicit, discussed, or understood, but rather are buried at the level of unstated assumptions.” This suggests that teachers themselves may not be able to explain their own beliefs.

Kagan (1992) defined teacher’s belief as “tacit, often unconsciously held assumptions about students, classrooms, and the academic material to be to be taught” (p. 65). While Kagan’s definition gives some aspects of beliefs, it is limited in scope as it does not include the effects of the teacher’s unstated assumptions on teaching and learning. In this regard, I adopted Borg’s (2001) definition of belief which states that “A belief is a proposition which may be consciously or unconsciously held, is evaluative in that it is accepted as true by the individual, and, is therefore imbued with emotive commitment, it further serves as a guide to thought and behavior” (p. 186). This definition goes beyond the assumptions teachers may hold about students, classrooms and content to be taught as put forward by Kagan (1992) and includes an emotive component that plays a role in guiding teachers’ actions in the classroom. This definition has significance for technology integration as it suggests that teachers’ decision to integrate technology in the classroom may be guided by their consciously or unconsciously held beliefs. In addition, the concepts outlined in the definition were used to build the theoretical framework which provided the lenses for analysing the data. To understand some of the factors that may have shaped the pedagogical beliefs of the instructors at the CEPUTT it is necessary to understand their culture.

## 3.4 Cultural factors shaping Trinidad and Tobago teacher educators’ pedagogical beliefs and use of ICT

The increasing use of ICT in educational settings around the world has prompted discussions about the relationship between culture and technologies. Collis (1999) argued that culture is a critical factor in influencing how people accept, react to, and use ICT. In this regard, it is important to review the literature which discusses the relationship between culture and teacher educators’ pedagogical beliefs and the use of ICT.

According to Williams (1998) culture is a difficult term to grasp in scholarly definitions because of the multiple ways it can be used. However, for the purpose of this discussion culture is defined as the “description of a particular way of life, which expresses certain meanings and values not only in art and learning but also in institution and ordinary behaviour” (Williams. p. 48). This definition is useful to this discussion because it includes the structure of institutions which express or govern social relationships and the characteristic forms through which members of the society communicate (Williams, 1998)

One of the many factors which may have influenced the culture of the educational institutions of Trinidad and Tobago is its colonial past. Trinidad and Tobago gained its independence from Britain in 1962. However, the results of neo-colonialism which Loomba (1998, p. 6) defined as “economic and social relations of dependency and control”, are still evident in this society (Steinbach, 2012). For example, Brown and Conrad (2007) suggested that the education system of Trinidad and Tobago retains many colonialist structures, particularly in its centralized hierarchy.

The aim of education under colonialism was to provide the infrastructure for power and control, in which legitimacy of metropolitan rule would be established and maintained (Lavia, 2012). As such, the way we teach and what we teach seems to be still entangled in the traditions created during our colonial past (Brown & Conrad, 2007). This practice which Bristol (2008, p. 58) refers to as plantation pedagogy “reduces the intellectual practice of the teacher to that of implementer.” As such, the teacher teaches what was set forth in the curriculum as the students passively assimilate knowledge (Bristol, 2008). Within this context the teacher is “controller” (Theroux, 2002) or “depositor” (Freire, 1970) of knowledge whilst students master knowledge through drills and practice (such as rote learning).

Steinbach (2012) supports this view in his paper entitled ‘Obstacles to change in teacher education in Trinidad and Tobago’ where he argued that “the lack of scholarly culture that existed in the training colleges has continued into the UTT and is entrenched in didactic practices of teacher dominance and student passivity” (p. 73). Steinbach also asserted that a teaching and learning tradition that is not supportive of student participation and inquiry has become culturally embedded in the practice of teacher educators at the UTT. Further evidence can be found in Gaible’s (2009) survey of ICT and education in the Caribbean where he found that secondary school IT teachers were unwilling to collaborate with other teachers in their schools to share their knowledge or expertise in the use of ICT. Gaible also found that there was limited interaction among IT teachers and faculty.

Another factor which may affect teacher educators’ pedagogical beliefs about the use of ICT is their culture of social interaction. According to Hofstede (1997) social interaction is strongly grounded in culture, as every person carries within himself/herself patterns of thinking, feeling, behaving and interacting. Hofstede argued that much of these are learned during developmental processes in childhood. As soon as certain patterns of thinking, feeling and acting have established themselves within a person’s mind, they reside there awaiting activation or inhibition in appropriate situations. To learn new patterns of thinking, feeling and acting one has to unlearn the old patterns, which is more difficult than learning them in the first place for the first time.

The two main groups of people in Trinidad and Tobago, the people of African and East Indian descent, both came from cultures with a strong oral tradition (Cudjoe, 1985). Oral tradition differs from written culture in that messages act as archives of cultural information. Orally passed on messages use culturally relevant language; spoken words in “nation language” which hold more meaning than the words themselves, since the sound of the words expand their significance (Braithwaite, 1984, p. 13). A recent study how the Open Campus, University of the West Indies is coping with the use of online courses conducted by Woodall (2010), found that the oral tradition in the Caribbean region may be negatively affecting instructors view of online communication. Woodall suggested that for the majority of instructors, communicating virtually rather than face-to-face or by phone was relatively new and not necessarily within their comfort zone. Woodall also found that instructors’ unfamiliarity with virtual forms of communication may also be affecting their ability to encourage students to use these forms of communication. These findings support Cogburn and Levinson (2003) study which also found that one of the factors that hindered effective collaboration in virtual projects was the different communication styles from cultural differences

In this section I have described the relationship between teacher educators’ pedagogical beliefs and the culture of teacher educators in Trinidad and Tobago. I noted that their colonial past may have influenced their perception of teacher educators’ role in the classroom as one of authority figure and depositor of knowledge. In addition, the literature also suggests that the oral culture which persists may influence the use of online communication methods for teaching and learning. To further clarify the concept of teacher beliefs the following section discusses the relationship between beliefs and knowledge.

## 3.5 Relationship between beliefs and knowledge

In the previous section I looked at the relationship between culture, pedagogical beliefs and communication using ICT. In this section, I engage with literature on the differences between teacher beliefs and knowledge to understand if teacher educators’ decision to integrate a CMS into their courses is determined by their knowledge or by their beliefs.

Chen (2008) claimed that belief systems are structured by individuals according to primary beliefs and to beliefs resulting from other beliefs. He suggested that a primary belief or core belief is “too self-evident to explain, whereas a derived belief is related to other beliefs, so it can be explained in reference to another belief that acts as evidence” (p. 66).Green (1971) argued that some beliefs are more central to belief systems and more resistant to change than are other beliefs because the former beliefs are held with “passionate conviction” (p. 53). In contrast, Chen (2008) pointed out that peripheral beliefs are held with less psychological strength and further from the belief systems’ core. As such peripheral beliefs are easy to change. He further argued that while consistent beliefs are held together in clusters, an individual may hold conflicting beliefs in separate clusters. This situation can persist as long as the individual does not compare the consistent and conflicting beliefs.

Kagan (1992) examined research on teacher beliefs and discussed the implications for teaching and teacher education. She positioned her findings on two fundamental assumptions based on the research available. The first assumption states that a major part of a teacher’s professional knowledge can be more accurately regarded as beliefs. She explained that as a teacher’s professional experience increases, his or her knowledge becomes more enhanced and coherent, resulting in a highly personalised pedagogy or belief system that impact on the teacher’s perception, judgement and behaviour. Kagan’s assumption suggests that a teacher’s belief system is based on the knowledge and experiences developed over a period of time.

Kagan’s (1992) second assumption states that the judgments teachers make about teaching and learning are based on a teacher’s knowledge of the profession and are situated in three areas: “in context (it is related to specific groups of students), in content (it is related to particular academic material to be taught), and in person (it is embedded within the teacher's unique belief system)” (p. 74).These assumptions suggest that the beliefs and knowledge of a teacher are intertwined and decisions are made based on both knowledge and beliefs.

Nespor (1987) on the other hand argued that beliefs are similar to knowledge except that it has personal feelings attached to it. However, Nespor (1987) disagreed with the idea that belief systems and knowledge systems are inextricably intertwined. He argued that the difference lies in the fact that while knowledge systems require group consensus and are open to evaluation and critical examination, beliefs which may be quite personal, do not. This suggests that after gaining knowledge of a proposition, teachers are free to accept it as being either true or false. For example, teacher educators may gain knowledge about how to conduct an online discussion using a CMS to enhance student teachers’ learning and they may also know that other teacher educators have used them successfully, yet still not believe that the affordances of communication and collaboration offered by a CMS can be used to enhance learning. Further, Nespor (1987) also argued that “beliefs are far more influential than knowledge in determining how individuals organise and define tasks and problems and are stronger predictors of behavior” (p. 311). This has implications for this study as it suggests that teacher educators’ perspectives about the affordances of a CMS may determine if and how they integrate such systems into their courses.

### 3.5.1 Summary

In this section I have described the relationship between teacher beliefs and knowledge. I noted that there is no consensus about this relationship. However, several researchers have argued that beliefs are far more influential than knowledge in determining the actions of an individual. In an effort to further clarify the concept of teacher beliefs I discuss teachers’ pedagogical beliefs in the next section.

## 3.6 Teachers’ pedagogical beliefs

Pajares (1992) warned that teachers’ beliefs about matters that go beyond the classroom may also influence their practice. As such Pajares (1992) suggested that when doing research, researchers should make a distinction between teachers’ broader, general belief systems and educational beliefs. In this regard I focus specifically on teachers’ educational beliefs about teaching and learning which is referred to as pedagogical beliefs. This discussion is necessary as it clarifies the concept of teachers’ pedagogical beliefs referred to in the third key research question.

In an educational context, pedagogy often refers to the “teaching strategies, techniques or approaches that teachers use to deliver instruction or facilitate learning” (Wang, 2008, p. 412). Pedagogical beliefs are “personalised theories [that] lie at the heart of teaching and learning” (Burns, 1992, p. 64) and are formed over many years of experiences, from life as a pupil in the classroom (Keys, 2007; Richardson, 2003) to a variety of context teachers encounter. Researchers (e.g., Pajares, 1992; Foley & Ojeda, 2007) asserted that teachers’ pedagogical beliefs are powerful forces that greatly influence the decision-making processes and teaching practices of teachers. For example, Yero (2002) pointed out that if teachers value interaction with learners to facilitate learning, they are likely to carry out that belief in the classroom and in the process influence their learners. For example, Robertson (2004) indicated that university teachers use ICT tools only if they are aligned with their beliefs about teaching and learning, and in the way that aligns with those beliefs. Thus, if a teacher believes in the information transmission approach, the teacher will use CMS tools to facilitate this mode of learning, and any aspects of the software that do not align with this approach will be either ignored or misused.

Further, based on their pedagogical beliefs, teachers may choose specific strategies and materials from their range of strategies to deal with particular situations. In this regard, their pedagogical beliefs help decide what problems to focus on and how to solve those problems (Nespor, 1987). This has implications for this study as it suggest that teachers’ beliefs about how problems should be solved in a classroom may determine the technology tools they may use and how those tools will be used; either as an add-on to established teaching practices or as a tool that effects change in their practice.

Teachers’ pedagogical beliefs are commonly associated with two classical ideologies – teacher-centred beliefs or student-centred beliefs (Meirink, Meijer, Verloop, & Bergen, 2009). Teacher-centred belief is based on an assumption of knowledge delivery. It resembles traditional teaching methods, has its foundation in objectivism and highlights the importance of knowledge reproduction. On the other hand student-centred belief has its foundation in constructivism. It emphasises student responsibility for learning and focuses on knowledge construction and how students are influenced to work and learn together (Meirink, Meijer, Verloop, & Bergen, 2009; Roblyer & Doering, 2010). In the following sections I discuss firstly the philosophical perspectives of objectivism followed by constructivism. These two perspectives are important as the objectivist perspective provides the foundation for teacher-centred beliefs and the constructivist perspective provides the foundation for student-centred beliefs.

### 3.6.1 Objectivism

In the previous section I discussed teachers’ pedagogical beliefs and showed how it determines teachers’ actions in the classroom. In this section I discuss the philosophical assumptions of objectivism. This is important to this study because teacher-centred beliefs are based on an objectivist philosophy.

Objectivists argue that the world exist outside the mind of the knower and provides a model from which to learn. Knowledge about the world is transmitted to the learner who is expected to reproduce its content and structure in his/her thinking (Dick & Carey, 1996). The purpose of the mind in this perspective is to “mirror” that fixed reality and its structure through “analyzable and decomposable” thought processes (Jonassen, 1991, p. 10). Feyton and Nutta (1999) summarised the objectivist perspective (also known as behaviourist, instructivist, rational, or directed learning)as follows:

The role of the teacher or teacher educator – is to transfer or transmit knowledge to a student, who is a more or less passive recipient. The content of ‘what is to be learnt’ is considered to be a stable entity that can be organised into a structure involving a series of steps or subcomponents that are often followed in a sequence. The teacher – directs the process of transmitting the sequence of structured content. (Feyton & Nutta, 1999, pp. 50-51)

In this perspective the teacher has complete control over the materials, pace and direction of learning.

The role of education using this perspective is to assist the learner in “assimilating” this real world (Jonassen, 1991, p. 10). This assimilation results in knowledge creation, or learning (Cooper, 1993). Learning is thus viewed as the acquisition and accumulation of a finite set of skills and facts and is not dependent on how individuals internalise or interpret such information (Carey, 1998).

Research studies (Niederhauser, Salem & Fields, 1999; Stofflett & Stoddart, 1994)have shown that teachers with objectivist pedagogical beliefs are more likely to use directed teaching methods. These teachers tend to see teaching as the transmission of information to students and learning as a passive activity, with students taking little responsibility for their own learning.

The role of the teacher in this perspective is to: (1) Identify the objectives of the instruction, (2) Select the required learning experiences, (3) Organise the learning experiences in the best possible manner and (4) Evaluate learning. Learning in this perspective is viewed as the acquisition and accumulation of a finite set of skills and facts transmitted to the student by the teacher.

Many theorists (McDermott, 1993; Roblyer & Doering, 2010) have severely criticised the teacher-centred approach to teaching and learning. For example, Roblyer and Doering (2010) argued that breaking topics into discrete skills and teaching them in isolation from each other is directed more at basic skills than at higher level ones. McDermott (1993) asserted that connections among concepts, formal representation and the real world are often lacking after teacher-centred instruction. In disagreement with these assertions, Burbules (2000) argued that the “way material is taught may not be the determining factor in how it is learned; even ideas and skills presented in the most structured and directive manner will still need to go through a process of filtering and reinterpretation as they are being learned” (p. 20). In addition, Burbules suggested that there may be situations where some students and certain subject content may be taught best and more easily by using a teacher-centred approach. These views presented by Burbules are of particular importance to this study as it suggest that although some teacher educators may only be using the BbCMS to package and present course material, it does not necessarily mean that the students are not learning since an important ingredient in the learning process depends on how students use and make sense of material.

### 3.6.2 Constructivism

Teaching in universities and schools has been heavily influenced by the theories of constructivism. It is a term used to refer to a body of theories which emphasises the active involvement of students as a key ingredient in the learning process (Cross, 2009). Constructivism can also be described as a view of learning whereby learners construct their own knowledge of the topics they study through their own experiences rather than having that knowledge transmitted to them by some external source (Bradford, Porciello, Balkon, & Backus, 2007; Bruning, Schraw, Norby, & Ronning, 2004). Constructing knowledge is the process whereby students who are participants in a learning process, take responsibility for their own learning by seeking to find meaning in their experiences.

Constructivism embraces a range of different viewpoints and perspectives (Kanuka & Anderson, 1999). However, despite the differences of each position they all have implications for how knowledge is constructed and how the teachers will facilitate knowledge construction. Common to each position is a belief that individuals construct knowledge subjectively based on their earlier experiences and that learning is an active rather than a passive process; suggesting that meaningful learning activities has occurred only when the learner has acquired the strategies that meet the learning objectives or has the ability to apply what has been learned to new situations.

Kauchak and Eggen (2007) pointed out that cognitive constructivism emphasises learning activities that are experienced based and discovery oriented. The role of the teacher in this perspective is not to drill knowledge into students through constant repetition, or to push them into learning through carefully designed rewards and punishments. Rather, the role of the teacher is to facilitate discovery by creating an environment where learners are guided to integrate new knowledge to prior knowledge and to modify the prior knowledge to accommodate the new knowledge.

Cognitivists such as Brown, Bransford, Ferrara and Campione (1983) suggested that students should monitor their own learning. For example, they believe that the use of ungraded tests and study questions enables students to monitor their own understanding of the material. Other methods that have been suggested include the use of learning journals by students to monitor progress and highlight any recurring difficulties, and to analyse study habits. These suggestions about students monitoring their own learning through the use of ungraded tests and journals has significance for this research as these tools are contained in the BbCMS and are available for teacher educators to use at the CEPUTT.

While the discovery method of teaching as espoused by cognitive constructivist can be an effective method of teaching, evidence has shown that direct instruction involving considerable guidance, including examples, results in increase learning when compared to using the discovery method. Moreno (2004) asserted that there is a growing body of research showing that students learn more deeply from strongly guided learning than from discovery. In addition, Prawat and Floden (1994) argued that letting students generate their own knowledge as suggested in discovery learning is time consuming and inefficient as students may lack the prerequisite skills to handle constructivist problem-solving environments effectively. These findings provide conflicting views about how teacher educators should use the discovery method or how to create a constructivist learning environment. This is relevant to this research as it impacts on the strategies teacher educators can use when integrating a CMS.

Social constructivism is based on the belief that social interaction and context is necessary for learning to take place. According to Waite-Stupiansky (1997) the context provided by social interaction among colleagues is a natural learning setting in which logical analysis can develop. In this social learning environment learners defend their opinion, or have the chance to hear the opinions of others. Learners then relate the new knowledge with what they determine important thereby constructing their own knowledge (Gensburg & Herman, 2009). In addition, several researchers (Gauvain, 2001; Greeno, Collins, & Resnick, 1996) argued that individuals who share their individual perspectives within a social construct such as a group, are able to construct understanding together that may not be possible alone. In contrast, Matthews (2003) commented that the idea of the importance of context for learning to occur is “overstated and reject the huge body of research on the importance of decontextualised learning” (p.58). This suggests that there is no consensus on context as an important ingredient of learning as put forward by constructivist.

The role of the teacher in the social constructivist perspective is to create situations in which learners can exchange ideas and collaborate in solving problems (Anderson, Rourke, Garrison, & Archer, 2001; Meter & Stevens, 2000). Further, Cross (2009) described the role of the teacher within the concept of social constructivism as being, to design tasks and activities, integrate appropriate assessment, provide relevant feedback and act as facilitators of dialogue during the learning process. Feedback is an essential part of the process, as it provides the learners with the opportunity to filter out and obtain additional information necessary to construct knowledge (Gensburg & Herman, 2009). These explanations of the role of the teacher in the social constructivist perspective as outlined by the different researchers is important to this study as it helps to clarify what teacher educators must do to create a social constructivist learning environment using the tools available in the BbCMS.

In terms of the learning process, Vygotsky (1978) distinguished between two developmental levels. The first is the level of actual development, which is the level of development that the learner has already reached, and is the level at which the learner is capable of solving problems independently. The second is the level of potential development (the ‘zone of proximal development’), which is the level of development that the learner is capable of reaching under the guidance of a knowledgeable other, such as a teacher or in collaboration with peers. Scaffolding is the process that supports individual efforts through the planned interactions and the breakdown of instruction into steps that are manageable by the student in response to their level of performance (Brown & Green, 2006). The issue of scaffolding is an important issue for this thesis as it describes the role the teacher has to play in assisting students in achieving their level of potential development.

It is interesting to note that Kirschner, Sweller and Clark (2006) while agreeing with the constructivist description of learning, disagreed with the instructional consequences suggested by constructivist. These researchers argued that most learners are able to construct knowledge when given adequate information but contend there is no evidence to suggest that giving learners partial information enhances their ability to construct knowledge. These findings are supported by several researchers (Estes & Clark, 1999; Kirchner, Martens, & Strijbos, 2004) who argued that although the description of constructivism is accurate it does not lead to a prescriptive instructional design theory or to effective pedagogical techniques. This point is of interest to this study as it suggests that teacher educators do not have a set of prescribed constructivist pedagogical techniques they can use as a framework for the integration of technology into their courses.

Notwithstanding these criticisms researchers such as D’Angelo, Touchman and Clark, (n.d) argued that constructivist approaches have “great potential but require authentic implementation in order to achieve that potential.” In addition, Abbot and Fouts (2003) found a significant correlation between constructivist teaching and higher levels of achievement. As such the following section discusses the relationship between teachers’ pedagogical beliefs and ICT integration.

### 3.6.3 Relationship between teachers’ pedagogical beliefs and ICT integration

In the previous section I focused on the differences between the philosophical perspectives of objectivism and constructivism in order to clarify the philosophical basis of teacher-centred beliefs and student-centred beliefs. In this section I expand on the concept of teachers’ pedagogical beliefs by focusing on its relationship with ICT integration in the classroom.

Drenoyianni and Selwood (1998) argued that teachers are likely to plan and implement practices with ICT that reflect their pedagogical beliefs. The importance of considering the relationship between teachers’ educational beliefs and the integration of CMSs can be found in a statement made by Ertmer (2005) who stated that, “without a clear understanding of this relationship [between teacher beliefs and technology] practitioners and researchers may continue to advocate for specific uses of technology that they are unable to facilitate or support, because of these underlying fundamental beliefs” (p.35). In this regard an understanding of teachers’ pedagogical beliefs and the relationship between those beliefs and practices in the classroom is important for this study as it may clarify how teacher educators make decisions about their CMS integration.

Sang, Valcke, van Braak & Tondeur (2010) conducted a study which used a survey to understand ICT integration among 727 Chinese student teachers. Their analysis revealed that teachers who have strong constructivist pedagogical beliefs are more likely to use technology in the classroom than teachers who have traditional teacher-centred pedagogical beliefs. Similarly, Lim and Chai’s (2008) qualitative study using interviews and observations focused on how six Singaporean teachers’ pedagogical beliefs impacted on the implementation of computer–mediated instruction. Their study revealed that there was a significant difference in the level of online communication between students and teachers who held constructivist pedagogical beliefs as oppose to those who held traditional teacher-centred pedagogical beliefs. These researchers also found that teachers who held constructivist pedagogical beliefs had more interaction with their students online. For example, the study found that the teachers with constructivist pedagogical beliefs conducted group discussions using students’ laptops and also allowed students to work together by giving students small research projects to complete using assigned websites. In contrast, the researchers found that teachers who held traditional pedagogical beliefs had very little interaction with their students online.

Additionally, Palak and Walls (2009) conducted a study to determine the relationship between teachers’ beliefs and their use of technology at a technology rich school, where teachers were trained to integrate technology into the classroom. In contrast to the findings from the studies conducted by Sang, Valcke, van Braak and Tondeur (2010) and Lim and Chai (2008), Palak and Walls’ (2009) study revealed the following: a) teachers’ use of technology to support student-centred practice is rare even among those who work at technology rich schools and hold student-centred beliefs and b) teachers in technology rich schools continue to use technology in ways that support their already existing teacher-centred beliefs.

Several studies demonstrate that teachers’ pedagogical beliefs and teaching activities were inconsistent (Harris & Grandgenett, 1999; Zhao & Cziko, 2001). Chen (2008) cited three categories of factors which contribute to the inconsistency between teachers’ pedagogical beliefs and teachers’ pedagogical practices in the classroom. These are: “(a) the influence of external factors, (b) teachers’ limited or incorrect understanding of constructivist instruction, and (c) teachers’ other beliefs conflicting with the teachers’ expressed pedagogical beliefs” (p. 73). Therefore, teacher educators may find the integration of CMSs problematic as they have to reconcile their personal constructivist pedagogies with a teaching resource they are unaccustomed to or intimidated by.

Further, Norton, Richardson, Hartley, Newstead, and Mayes (2005) in their investigation of the variation between teachers’ beliefs and practices across four universities in the UK using questionnaires and yielding 638 complete sets of responses concluded that teachers’ intentions are more oriented towards knowledge transmission than are their beliefs which advocate the facilitation of learning through problem solving and a focus on learning. In addition, several researchers (e.g., Sandholtz & Reilly, 2004; Ertmer, 2005; Norris, Sullivan, Poirot, & Soloway, 2003) also indicated that teachers who hold constructivist-oriented beliefs may not necessarily teach using constructivist principles because these teachers may be incompetent when using technology or lack sufficient class time. Support for these findings comes from Ertmer (2005) who argued that the majority of teachers – regardless of their years of teaching experience have inadequate understanding and experience about how to integrate technology into their instruction. She also found that teachers operating from teacher-centred beliefs are more unlikely to use technology for student-centred purposes.

Other researchers (e.g., Jang, 2006; Yen & Lee, 2011) expressed the view that due to teachers’ insufficient understanding of how to use technology effectively, using ICT in teaching may remain experimental and limited by traditional values and expectations. These researchers argued that for such teachers, technology is only a tool for skills practice or presenting material; that is, the classroom remains a teacher-centred environment. For example, Barone (2005) found that although academics may use the web to provide resources to their students, they still maintain the traditional face-to-face teaching as they see this as ensuring that students are “learning the ‘right’ things the ‘right’ way”(p. 14). Similarly, Steel and Levy (2009) noted that “even if a teacher holds more student-centred beliefs, if they do not believe that the technologies on offer help to translate their pedagogical model and vision, then the teacher may use the technology minimally, with reservation or not at all” (p. 1015). This is important for this study as it suggests that teacher educators with student-centred beliefs use of a CMS may be dependent on their perspectives of the value of its affordances.

In addition, Fang (1996) explained that inconsistency between beliefs and practice may be due to contextual factors which can prevent teachers from consistently applying their beliefs in practice. Contextual factors that may influence teachers’ technology integration include school policy, availability of appropriate equipment, training, school culture and integration examples (e.g. Bitner & Bitner, 2002; Bullock, 2004). Another explanation for this situation was given by Munby (1982) who argued that this inconsistency may be due to “different and weightier” beliefs (p. 216). For example, if a teacher educator states that a CMS can be used to enhance student teachers learning but continue to use a CMS in transmissive modes where the teacher educator simply provide student teachers with course material, it may be that contextual factors are preventing them from using the software in constructivist ways or it may be due to their beliefs about how teaching and learning should take place in teacher education.

Further, Zhao and Cziko (2001) explained that teachers may be unwilling to integrate technology into their classes if the affordances are inconsistent with their existing pedagogical beliefs or teaching practices. Teachers’ beliefs serve as a filter through which they determine the significance of different issues. Certain issues can be regarded as closer to the teachers’ core beliefs. Therefore, what types of applications and to what degree the technological applications will be integrated into a classroom depend on each teacher’s beliefs (Zhao & Frank, 2003).

Although many researchers have identified teacher beliefs as an important factor in technology integration, research findings (e.g., Judson, 2006; Levin & Wadmany, 2006) have shown that teachers’ use of technology in classrooms may not necessarily be aligned with their reported beliefs and that teachers could hold conflicting pedagogical beliefs about how to integrate technology into instruction.

Ertmer (2005) suggested that contextual factors may be one of the reasons for the inconsistency between expressed teachers’ technology-related pedagogical beliefs and their application of those practices. In agreement with this assertion Richardson (1996) also argued that contextual factors in schools and classrooms can significantly affect the process by which teachers’ beliefs and knowledge change.Therefore, the decisions a teacher takes in a classroom is a result of a trade-off between the supports and constraints within the school (Tabachnick & Zeichner, 2003). As such, teachers do not base each decision solely on their pedagogical beliefs.

### 3.6.4 Summary

In this section I have described the concept of pedagogical beliefs by describing two main philosophical perspectives; objectivism and constructivism that inform such beliefs. The objectivist philosophy which informs teacher-centred beliefs is diametrically opposite to the constructivist philosophy which informs student-centred beliefs. The arguments presented suggest that teachers’ pedagogical beliefs play an important role in the process of technology integration in the classroom. The research also suggests that teachers with constructivist pedagogical beliefs are more likely to use technology in the classroom in student-centred ways than teachers who hold traditional teacher-centred beliefs. However, there appears to be an inconsistency between teachers’ pedagogical beliefs and the integration of ICT in the classroom. This is because many teachers who hold constructivist beliefs are using ICT in ways that contradict their beliefs. Some reasons for this situation include teachers’ inability to use the technology, lack of knowledge of using technology in constructivist ways, insufficient class time and other beliefs that conflict with teachers’ constructivist beliefs. In the next section, I look at the affordances of a CMS with a view to understanding what the package offers teacher educators.

## 3.7 Course Management Systems (CMS)

In the previous section I discussed the relationship between teachers’ pedagogical beliefs and the integration of ICT. In this section I outline the affordances of a course management system (CMS). I firstly clarify the term CMS, followed by a discussion on the affordances it offers a teacher for teaching and course administration.

Course Management Systems (CMS) also commonly referred to as Learning Management Systems (LMS) or Virtual Learning Environments (VLE) (Coates, James, & Baldwin, 2005), or the broader term ICT (Information and Communication Technologies) as it may include CMS as a component (Bongalos, Bulaon, De Celedonio, De Guzman, & Ogarte, 2006; Dutton, Cheong, & Park, 2004) are becoming popular at universities around the world. A CMS is a “web-based course environment that allows instructors and students to deliver course materials, submit assignments and tests, view grades, create learning activities, and share documents, calendars, and sites” (NUIT, 2013). Some popular brands include: Canvas, Desire2Learn, Edmodo, Moodle, Sakai, SumTotal Systems, Skillsoft, Cornerstone and Blackboard (Dunn, 2012).

CMSs provide several tools for students and teacher educators to engage in learning and teaching. Teacher educators can use the tools provided to create online course content, communicate online with students and conduct assessments (Dabbagh, 2001). Some tools are static and allow teacher educators to transmit information such as soft copy versions of course outlines, lectures, assignments, course reading materials, and announcements to students (Malikowski et al., 2007). Teacher educators can also post external links to relevant web resources that can be useful in improving students’ understanding of content. The interactive tools, such as e-mail, announcements, virtual chat and discussion boards allow for synchronous or asynchronous communication.

CMSs also contain a number of administrative tools which teacher educators can use to perform some of their administrative duties. For example, teacher educators can create a single course group or multiple groups in which students can be enrolled manually, automatically, or by self-enrolment (Blackboard, 2013).The Grade Center in the BbCMS, allows teacher educators to manage students' grades for assignments, tests, discussion posts, journals, blogs, and wikis, and for ungraded items, such as surveys or self-tests. The Grade Center also allows teacher educators to calculate final grades and export final grades to the student database instead of manually entering grades in the database. This saves time and the opportunity for data entry errors (Price, 2008). After submitting grades using this tool, teacher educators can simply post the grades for student viewing (Blackboard, 2012). While the Grade Center can provide teacher educators with an effective way of managing students’ grades, Morgan (2003) warned that the grade book available in the Grade Center is complex to use. Malikowski et al. (2007) found that the difficulty of using the software for grading students has resulted in many teachers using previous techniques they developed for recording grades.

In the following section I discuss the utilisation of CMSs in terms of the models of integration; fully online, blended and as a supplement to face-to-face sessions.

### 3.7.1 The utilisation of CMSs

In the previous section I discussed the affordances of a CMS in terms of teaching and course administration. In this section I outline the different models of integrating a CMS and how it can be utilised in teaching and learning.

The utilisation of CMSs in higher education is increasingly becoming an area of interest for researchers. Primarily seen as a technology for distance education or fully online courses, CMSs are also widely being used to support face-to-face courses as well as ‘hybrid’ or ‘blended courses’ (Chao-Hsiu, 2008; Simonson, 2007). Fully online courses which are taught exclusively using a CMS allow students to access all course materials (lectures, assignments, resources, etc.) online and communicate via email, discussion boards and/or online chat with the teacher educator and other students (Ioannou & Hannafin, 2008). When used in total face-to-face courses, a CMS can be used as a supplement to the traditional classroom curriculum; as an electronic storage medium for course materials (Vovides, Sanchez-Alonso, Mitropoulou, & Nickmans, 2007). This gives students more flexibility in accessing course materials as an exact soft copy of the paper version of the course syllabus, lecture notes and other resource material can be made available on the CMS for students to access.

Apart from providing resources for students, teacher educators who teach face-to-face courses may also choose to use a ‘blended’ approach. This teaching method is usually called ‘blended learning’ and the courses are called ‘hybrid’ courses (Garnham & Kaleta, 2002). A blended or hybrid course is a mixture of traditional teaching environments with elements of online learning (Nelson, 2003). According to Bonk and Graham (2006), a blended learning approach increases the level of active learning strategies, peer-to-peer learning strategies, and learner-centred strategies. For example, a blended approach in tertiary education may involve teacher educators using online content to help students acquire the tool-related skills and technical information and then use face-to-face class time to focus on development of skills (Bonk & Graham, 2006). This approach allows teacher educators to use an array of strategies and to offer students a more intellectually and engaging learning experience by combining in-class time with online components (Vovides et al., 2007). In addition, Owston, Wideman, Murphy and Lupshenyuk (2008) argued that blended learning allows student teacher learning to be situated in classrooms where student teachers learn best. It also provides access to an online learning community where collegial sharing and discussions can occur, and it offers face-to-face sessions that can strengthen community building.

However, despite the potential of CMSs to enhance student learning, most CMS tools are currently underexploited in teaching (Nelson, 2003). Morgan’s (2003) mixed method study which consisted of a quantitative survey given to 750 faculty, interviews of 140 faculty and examination of 140 CMS usage logs at the University of Wisconsin, found that although teachers claimed that they had adopted the CMS in order to meet pedagogical needs, the actual use of the system, was to meet class management needs instead. This inconsistency seems to exist because “some faculty members are simply unable to connect technology use to their teaching” (Nelson, 2003, p. 21). This situation may also exist because many teachers often view technology as a separate activity that does not require the same consideration as traditionally designed courses (Pierson, 2001). In addition, it may be because teachers approach using a CMS with a “pre-existing mental model of how to use technology and using it to reinforce traditional teaching styles” (Ullman & Rabinowita, 2004, p. 2). These findings are important to this study as it helps to bring to the fore some of the reasons for the underutilisation of CMSs. The following section continues the discussion of CMSs by reviewing the literature on the design of a CMS and its relationship to teachers’ pedagogical strategies.

### 3.7.2 CMS and pedagogy

In the previous section I discussed three ways course management systems are being used by educational institutions and also some of the reasons for its underutilisation. In this section I describe the design of CMSs and its relationship to teacher educators’ pedagogical strategies. This discussion is important to this study as it seeks to clarify whether the design of a CMS supports or inhibits the pedagogical strategies of teacher educators.

The ability of CMSs to cater to the diverse learning styles of students has been hailed as one of the important assets of the package (Morgan, 2003). For example, CMSs can offer learning opportunities for visual and verbally oriented learners through the use of multimedia (text, sound, graphics and video). Students can also become more engaged simply by having a large volume of course material at their convenience (Carmean & Haefner, 2002).

However, there are some theorists (Morgan, 2003; Lane, 2008; Siemens, 2004) who believe that the highly structured nature of CMSs actually impedes its ability to appeal to diverse learning styles. According to Morgan (2003) CMSs may actually “inhibit diverse learning styles because CM [CMS] essentially forces students to conform their learning to a specific set of technologically oriented standards” (p. 65). In addition, Siemens (2004) warned that learning is by nature multi-faceted and chaotic, and organisations that use systems such as CMSs will be able to do an excellent job of delivering courses, however they won't be positioning themselves well for informal learning and support in practical activities. This is because CMSs are designed as a course management tool, not a tool to create a learning environment.

In addition, Coates et al. (2005) argued that CMSs are not pedagogically neutral technologies, but rather, through their very design, they influence and guide teaching, imposing limitations on instructional creativity and approach. In support of this argument, Lane (2008) argued that CMSs are not designed to encourage innovative teaching because they are designed along the lines of inventory control. Morgan (2003) suggested that this may be so because the design of CMSs emerged more from entrepreneurship and technological affordances than from models of instructional design and as such, the spirit of entrepreneurship has continued.

Further, Siemens (2004, “Drawbacks to Learning Management Systems” section) also argued that current CMSs rely on “what do the designers/administrators want/need to do, [rather than on] what the end users want/need to do.” Similarly, Lane (2008) found that CMSs are purchased based on the recommendation of campus technologists and administrators rather than teacher educators. She argued that the job function of designers/administrators is to manage resources (content, class enrolments and assessments) as such the applications are based on managerial and administrative tasks and are centred on teacher educator efficiency. For example, despite the “dramatically changed Web environment”, the early model of CMS which placed heavy emphasis on course management and administration, through “online gradebook, posted syllabus, assignment tracking, and linked/uploaded course materials” have remained intact (Godwin-Jones, 2012, p. 4). This suggests the focus is on teacher efficiency and not on pedagogy.

Katz (2003) stated that CMSs “automate and standardize”, and although they do not “dictate a discipline or a pedagogy”, it does possess a structure that threatens teacher educators’ authority or power in the running of their courses (p. 54). For example, the pre-set organisation of a CMS encourages novice teachers to input their content under the appropriate menu options instead of effectively adapting their individual teaching styles into an online environment (Lane, 2008). In addition, Lane (2008) asserted that the built-in pedagogy which focuses on presentation (written document to read), complemented by basic discussion input from students, is based on traditional lecture, review, and test pedagogy. She argued that this design is very different from the development of knowledge through a constructivist, student-centred, or inquiry based approach, which a number of teachers use successfully in the classroom.

In contrast, other theorists argued that a CMS is a pedagogically neutral tool that do not provide a “pedagogical platform any more than chalk, chairs, and tables provide the classroom learning experience” (Carmean & Haefner, 2002, p. 28). In fact, Dabbagh (2004) also pointed out that the view that a CMS is inflexible and only allows for a teacher-centred approach may be based on the tendency of ‘early adopters’ to use only the most obvious and easily accessible tools that portrays the falsehood of ineffectiveness. In addition, Morgan (2003) suggested that this situation exists because many teachers adopt CMSs mainly to “manage the more mundane tasks associated with teaching” (p. 2). These tasks include dissemination of course material, information and grades.

Morgan (2003) also argued that although the traditional pedagogy of presentation of lessons in written documents followed by discussions is more common, constructivist pedagogy can also be achieved through the enhanced web environment which includes the use of various communication, portfolio and collaboration tools within CMSs. The range of pedagogical styles that can be implemented is however based on the skills a teacher educator has in using various tools of a CMS (Morgan, 2003; Kunnen, 2008). It is also dependent on the knowledge of the tools that a teacher educator has to be able to devise strategies in developing a pedagogical style for a course. However, to develop the skills necessary to use the various tools and features of a CMS depends upon continued use of the features and tools (Kilmon & Fagan, 2007). These issues are important to this study as we see that the knowledge of the tools and the ability to use the tools available in CMSs play an important role in its effective integration.

Dabbagh (2004) pointed out that careful assessment of the features of the tools in a CMS in accordance with the learning activities can be the most effective way in utilising the tools to generate better pedagogy and student learning. Therefore, the efficient use of the tools in CMSs and its incorporation into teaching is dependent on the way the teachers use the tool (Carmean & Haefner, 2002). According to Lopes (2008), while CMSs can enable new forms of teaching and learning they cannot of themselves, change educational practice. This statement is very fitting for this study as it places the emphasis on the teacher educators to use the system in ways that can maximise the learning potential of students. In this regard in the next section I discuss one of the main affordance of a CMS; storage and accessibility.

### 3.7.3 Storage and accessibility

In the previous section I discussed the suitability of the design of a CMS for teaching and learning. In this section I continue the discussion of a CMS by focusing on the affordance of storage and accessibility. This is important to this study as it gives examples of the benefits of this affordance for teaching and learning.

CMSs can provide increase availability of course content to students and teacher educators allowing them access, anytime and anywhere. The ability to access learning material and activities anytime-anywhere, allows students to come to the “learning table whenever and wherever they choose instead of only when the class schedule dictates” (Carmean & Haefner, 2002, p. 32). This extends the possibility of time on task and increases choice, both of which are important for learning. Using a CMS, teachers create relevant content, collect resources, section the information into lectures or tasks and pass the information on to students (Norton & Hathaway, 2008). Students can then download course materials and other information at their convenience. Furthermore, students can be more engaged as they can move at their own pace through the course materials, determining their personal needs (Zhang, Zhao, Zhou & Numamaker, 2004). The course material and information provided are usually in the form of documents, manuals and tutorials. These documents are kept on CMS servers which make it easier for teacher educators to access, archive and update when necessary (Caplan-Carbin, 2003).

While making course material easily available to students has been shown to enhance learning, a number of researchers (e.g. Norton & Hathaway, 2008; Malikowski et al, 2007) have found that teacher educators have used CMSs more for the delivery of information rather than teaching itself. Rogerson-Revell (2007) pointed out that when new technologies are used in this way it may help to perpetuate transmissive models of teaching rather than exploring more innovative pedagogic approaches to learning. Malikowski (2008) argued that this situation exists because teacher educators are more familiar with transmitting information and are less familiar with creating computer-based interactions such as synchronous and asynchronous discussions or creating quizzes with feedback for each answer. In the next section I discuss the affordance of assessment.

### 3.7.4 Assessment

In the previous section I discussed the use of CMSs as a storage medium for course content. This use which has been found to be the most popular by teacher educators has been frowned upon by some theorists who believe it perpetuates a transmissive model of teaching and learning. In this section I discuss the assessment features of a CMS with a view to showing how the system is being used for assessment and some of the issues related to this use.

It has been argued that CMSs can enhance learning by providing automated and adaptive formative assessment which can be individually initiated and administered (Coates et al., 2005). For example, assessment tools such as tests and quizzes allow students to interact with a computer. CMS quizzes can contain a variety of question types, including multiple-choice, multi-select, matching, ordering, arithmetic, long answer, short answer, fill in the blanks and true or false. These features can be helpful for drill and practice, which are “an excellent instructional method for learning lower-level procedures, skills, or concepts” (Hooper & Reinartz, 2002, p. 312). Quizzes can also be used to create adaptive instruction in some CMSs. In this way, quizzes can be used to control access to other CMSs content – such as text, graphics, video, or other media. When used in adaptive instructions students are not allowed to access any other content until a minimum score or number of attempts has been completed on a quiz (Hooper & Reinartz, 2002). In addition, the interactive assessment modules in CMSs allows for quick, meaningful feedback, answers can be evaluated, responses can be delivered, and students can be directed to outside sources for better understanding. Students can receive immediate response to misconceptions and errors in critical thinking, as well as obtaining new information, evaluation, and understanding.

However, Vovides et al. (2007) argued that while current CMSs do incorporate the ‘adaptive release’ function that allows teacher educators a certain amount of flexibility to customise and personalise the learning experience of students, its use is very limited. In addition, these researchers pointed out that teacher educators’ use CMSs as a ‘one size fits all’ service to learners, irrespective of their knowledge level, goals and interests. In this scenario, students have access to the same instructional material and the same web-based tools without personalised support (Brusilovksky, 2004). All students receive the same exercises irrespective of their pre-existing knowledge and experience (Vovides et al., 2007).

Lane (2008) argued that one of the most obvious limitations of CMSs is the reliance on forms of assessment which can be automatically “corrected”, such as multiple choice and short response test. She indicated that while there is obviously a place for multiple choice tests, and they can be designed to test reasonably complex understandings, she believes that it would be a matter of grave concern if this form of testing and feedback became dominant in higher education.

Here we see that while CMSs may have the ability to cater to specific forms of assessment, it appears that some researchers have concerns about its applicability as a major form of assessment in higher education. How teacher educators perceive the forms of assessment available in CMSs will contribute to their beliefs about the value of integrating these systems into their courses. In the next section I discuss the affordance of communication and collaboration.

### 3.7.5 Communication and collaboration

In the previous section I discussed the affordance of assessment in CMSs and noted how it is used and the advantages and disadvantages of these types of assessments. In this section I examine the affordance of communication and collaboration in CMSs with a view to discerning how it can contribute to the enhancement of student learning and support the constructivist view of teaching and learning.

Im and Lee (2003) argued that a community is a key element of the learning process, where the learning community is the environment for communication through the entire process of learning. Many researchers have noted that CMSs contain tools for the creation of a learning community. A CMS learning community allows students to participate in synchronous and asynchronous interaction with each other and the teacher educator for knowledge construction. Asynchronous discussions for example, e-mail and discussion boards give students time to thoughtfully compose their responses before submitting it to the class (Heirdsfield, Walker, Tambyah, & Beutel, 2011). However, the lack of immediacy in asynchronous discussions makes them unpopular with students who may want help instantaneously (Gorski, Caspi, & Trumper, 2004).

In contrast, synchronous discussions are conducted in real-time and have a stronger sense of social presence. For example, students can use the discussion boards for group collaboration on assignments. Unfortunately, messages in a synchronous discussion can scroll off a window quickly, this presents a challenge for careful reading and responding (Malikowski et al., 2007).

Some researchers suggested that online discussions have a more positive impact on student learning than in person discussion. For example, Kramarski and Mizrachi (2006) found that students who participate in online discussion and problem solving outperform their face-to-face counterparts in math literacy and real-life tasks. Similarly, Rodriguez, Ortiz, & Dvorsky (2006) found that students in a biology course for non-majors who engaged more actively in online discussions also scored higher on the final test. Markel (2001) asserted that the advantage of online discussion lies in allowing students time for reflection, because the deepest learning occurs when students write and talk about content within a community of learners. In addition, Oren, Mioduser and Nachmias (2002) suggested that online discussion is a good way to promote social interaction, and motivate membership and participation in the electronic community.

In contrast, Davies and Graff (2005) pointed out that frequency of participation in online discussions did not lead to higher grades in a college business course. The authors qualified their findings, arguing that quality of interaction in online discussions, rather than quantity, may be the better predictor of student achievement. In addition, several researchers (Knowlton, 2001; Garrison & Cleveland-Innes, 2005; Dennen & Wieland, 2007) warned that interaction online alone does not necessarily imply that students are constructing knowledge or engaging in higher levels of thinking. This suggests that asynchronous online discussions should go beyond social interaction to include knowledge construction. To construct knowledge, learners must negotiate meaning or modify ideas in response to feedback from others in order to integrate their prior knowledge with other learners’ ideas (Staarman, Krol, & Van der Meijden, 2005; Osman & Herring, 2007).

West et al. (2007) qualitative study which consisted of an open-ended survey of 122 teachers and semi-structured interviews of 30 teachers to understand the experiences of teachers as they adopted and integrated a CMS into their courses revealed that understanding how to use the “discussion/collaboration features in a way that maximises student learning without requiring excessive amount of student or teacher time” (p. 17) is one of the most common difficulties experienced by teachers. These researchers found that this situation exist because most teachers do not know how to teach online, moderate online discussions, integrate this type of discussion into a typical face-to-face course, adapt their teaching strategies and styles to accommodate online discussions, or make appropriate decisions about when an online discussion can be an effective method (West et al., 2007, p. 17). The issue of teachers’ lack of knowledge of using and integrating the discussion features of the BbCMS as highlighted by West et al. (2007) is of significance to this study because of the limited use of the discussion tools at the CEPUTT. This study is also of significance to this research as the research methods used are the same used in this study.

### 3.7.6 Summary

Course management systems (CMSs) provide tools to support course management, teaching and learning activities. Three of the main affordances of CMSs are storage and accessibility, assessment and communication and collaboration. CMSs can be used in fully online courses, blended courses or as a supplement to face-to-face courses. However, despite the potential to scaffold learners and enhance learning, research has shown that CMSs are currently underutilised or are used in ways that support traditional teaching methods. One reason for this underutilisation may be the design and structure of CMSs which force teacher educators to use these systems in traditional teacher-centred ways. However, research has also shown that CMSs do contain the tools which can allow teachers to create a constructivist learning environment. The efficient use of the tools in CMSs therefore depends on the ability of teacher educators to use the tools in constructivist ways.

In the next section of this chapter I discuss the challenges teacher educators may face with the integration of a CMS. This discussion is important to this thesis as the barriers faced by teacher educators may be some of the reasons for the underutilisation of CMSs.

## 3.8 Barriers to integrating a CMS

In the previous section I looked at the utilisation of course management systems (CMSs) at tertiary institutions. I noted the strong relationship between the integration of a CMS, teacher educators’ pedagogical beliefs, knowledge of the tools available in the system and the design of the system. This section seeks to address the issues related to the challenges teacher educators face while integrating a CMS.

When people within any organisation plan for using new technology there are several barriers to their efforts that they are likely to encounter. Ertmer (1999) analysis of several studies distinguished between two types of barriers to technology integration: extrinsic (first order) and intrinsic (second order). Extrinsic barriers include “lack of resources, inadequate training, insufficient technical support, and lack of time, while intrinsic barriers include teachers’ beliefs, visions concerning technology integration, and views about teaching, learning, and knowledge” (p. 51–52). Prestridge (2012) argued that first-order barriers are being overcome as teachers are gaining access to ICT, professional development is available and digital curriculum resources are accessible and are continually being developed. However, Scrimshaw (2004) pointed out that teachers’ ability to use digital tools, that is, the digital pedagogies required for the effective implementation of ICT, have not been adopted by the majority of the teachers. Christie and Jurado (2009) argued that the barriers to the use of innovations are understandable because teachers need to be convinced of the value of CMSs if they are to realise their potential. Therefore, if teachers are required to implement CMSs a consideration of the challenges faced by teachers and institutions may help administrators find solutions to reduce or minimise these obstacles.

A major barrier facing the integration of ICT into classrooms are teachers’ beliefs about the integration of ICT in the different subject disciplines. For example, Veen (1993) found that teacher beliefs about the nature of a given subject, such as History or Science, and the associated pedagogical practices greatly influence their use of ICT. Goodson and Mangan (1995) used a mixed methods approach to examine the effects of the use of microcomputer networks in secondary schools across a broad range of subject areas and applications. This three year study found that the extent that teachers identify strongly with the teaching styles associated with their subject cultures they may be reluctant to adopt technology which seems incompatible with those cultures. They explained that subject culture refer to a “general set of institutionalised practices and expectations which has grown up around a particular school subject, and which shapes the definition of that subject as both a distinct area of study and as a social construct” (p. 615). In addition, Kofler (2005) argued that individuals from Mathematics and Science departments are more likely to embrace CMSs as opposed to their counterparts in Social Sciences. He suggested that this situation exists because Mathematics and Science teachers are more involved in using problem solving and quizzes and hence CMSs serve their disciplines more effectively.

Similarly, Hennessy, Kenneth and Brindley (2005) study which consisted of 18 focus group interviews with teachers from the Mathematics, Science and English departments of several English schools found that the Mathematics and Science teachers readily integrated ICT into their classes. In contrast, the study found that there was a general under use of ICT among English teachers. In addition, the findings showed that while some English teachers made attempts to use ICT an equal amount rejected it, fearing the erosion of the print culture. These findings support those of Sutherland, Armstrong, Barnes, Brawn, Breeze, & Gall (2004) who used case studies to show that beliefs about the integration of ICT vary not only between the cultures of different disciplines but even among faculty members within the same discipline. These issues have significance for this study as it shows that the use of CMSs can vary among different courses because of the culture associated with a particular course. Further, it is important to note that these differences may extend to teacher educators within the same course.

Another major barrier with the integration of CMSs by teacher educators is that of time. According to Ullman and Rabinowitz (2004), teacher educators have much to teach and explain to students, but there is never enough time during a semester to cover all of what they want to cover. For this reason they indicated that CMSs were developed to help faculty solve the time issue that they encountered during their lectures. From the faculty perspective, CMS software can be used to provide a way to teach basic skills so that class time can be used for more advanced instruction (Kraemer, 2003) thereby ensuring that class time is used more productively.

In contrast, Arabasz, Pirani, and Fawcett (2003) pointed out that one of the difficulties in using a CMS include the considerable amount of time and effort it takes to learn, set up and maintain course materials and create online assessment materials. This view is similar to Ansorge and Bendus (2003) who argued that traditional face-to-face courses require extensive preparation for lectures, assignments, assessments, and grading, but use of CMS features requires even more preparation and time. Faculty workload is increased due to the demands placed on them by the tool. For example, tasks such as developing online learning resources, assessing student postings and assignments, and providing timely and quality feedback to students take too much time (Papastergiou, 2006). In addition, Giannoni and Tesone (2003) study which consisted of five existing surveys on motivational factors for faculty teaching online, as well as results from a focus group found that there was a perception among teacher educators that online teaching takes more time. Further, West et al. (2007) pointed out that teacher educators are also afraid of the time it will take to change their teaching strategies to use the tool. Here we see conflicting findings concerning the issue of time, whereas some teachers believe that CMSs can reduce the time it takes to perform their duties others believe that CMSs can significantly increase that time.

In addition, Samarawickrema and Stacey (2007) contended that course maintenance, constant upgrades and improvements, sending and responding to student e-mails and the learning of new skills, all contribute to increased workload. Palloff and Pratt (1999) found that using a CMS can increase a teacher’s weekly workload from approximately seven hours to nearly twenty hours. These researchers argued that the significant increase in workload is a high-risk investment, as the added workload does not guarantee an increase in quality and quantity of student learning. In addition, the added time and effort required to use courseware does not guarantee the creation of authentic learning contexts-teaching that is grounded in students’ own lived experience and concern for the larger world of which they are a part (O’Hair, McLaughlin & Reitzug, 2000).

However, a quantitative study carried out by Hislop and Ellis (2004) which involved the logging of teacher time for seven comparable pairs of online and traditional course sections to support a comparison of effort expenditure between the two modes of delivery found that the total time expended by teacher was actually less for the online sections as compared with the traditional sections. In addition, when the data were normalized for class size, the amount of teacher effort expended per student was approximately equivalent for both modes of delivery. Interestingly, the study also found that when teachers teach an online course, their time is “more fragmented in nature as opposed to a traditional offering” and occurs over more days in comparison to those in a face-to-face class where the teacher interacts and responds to students’ questions within the boundaries of the class period (p. 27). Further, other proponents found that time commitment can decrease when teachers are well-versed in technology use and use redesigned coursework suited for technology (Xu & Meyer, 2007). In addition, Xu and Meyer (2007) argued that to measure teachers’ workload by time spent may not be adequate because work hours do not capture whether and to what extent teachers are productive with that time.

The belief that CMSs reduces their control of instruction and the instructional environment was another reason given by teachers for their reluctance to adopt a CMS. This view is supported by Brennan (2000) who argued that one factor for the lack of use of new delivery strategies and teachers’ resistance or reluctance to use technology in their teaching is based on their belief that it reduces their power and control in the classroom. According to Sellinger (2001, p. 42) when students engage in online learning, “teachers do not have the same opportunity as before – when all of them were in the classroom – to follow and control pupil work.” This shifts the “influence and power” (ibid, p. 43) from the teacher to the learner, which is something not all teachers are comfortable doing.

In addition, ICT use may be conceived as a threat to established ways of teaching (Oliver &Herrington, 2001). Chao-Hsiu (2008) qualitative study of the relations between teachers’ pedagogical beliefs and technology integration of twelve Taiwanese high school teachers found that teachers attach great importance to being able to control classroom processes. Chao-Hsiu (2008) study found that most teachers who believed that giving up authority in the classroom could prevent student learning, “assumed substantial control of their classrooms and attended to details of student learning” (p. 73). These teachers used presentation software to present instructional content because it enabled them to maintain control and improve classroom management. Marvin, Franklin, Chesser, Edleston, Edwards-Schafer, and Oberste (1999) also found from their research that faculty fear of becoming facilitators instead of teachers, losing control over the teaching process, an increased workload associated with adapting to a new teaching method also limit their use of technology. In this regard, Nisan-Nelson (2001) warned that the amount of control a teacher feels is necessary for instruction, may impact the degree to which he or she will integrate technology. Further, Nisan-Nelson contended that for teachers “To move beyond the integration level in the technology integration hierarchy, the teacher must be able to relinquish that control to students” (p. 91). This suggests the amount of classroom control a teacher educator believes he/she must have when teaching a class has a direct relationship on the extent a teacher educator may be willing to integrate a CMS.

Another key issue identified as a limitation with learning how to use the CMS has been the difficulty factor (Bradford et al., 2007). Morgan (2003) argued that although CMSs possess powerful tools and its uses have received praises from many teachers, there have also been numerous negative reactions to the use of CMS due to the complex nature of the system that requires “far greater skill, patience and dedication” to use that other types of ICT (p. 6). This view is supported by West et al. (2007, p. 15) who asserted that “Blackboard [BbCMS] can be highly intimidating to learn, and may seriously hinder the kinds of choices the teacher educator makes while using the tool.” These researchers also found that because many teachers do not have the motivation or time to become expert users of online systems they make limited use of the technology. These findings suggest that CMSs are not easy to use because there are too many tools within the system that are too complex to learn and this may be intimidating teacher educators.

The issue of the training of teacher educators and its relationship to the integration of CMSs has been well documented. For example, a body of literature suggests that training courses can be an efficient way to increase adoption of CMSs among academics (Mann, 2001). However, several researchers (e.g. Schrum, 1999; Zhao & Frank, 2003) indicated that attending technology integration training courses do not improve the technology integration skills of teacher educators. One reason for this situation was given by Georgina and Olson (2008) who asserted that the trainers may have different goals than the teacher educators, choosing to focus upon technology rather than pedagogy. Further, Zhao & Frank (2003) argued that this situation exist because constructivist technology integration methods are not necessarily adopted by those who are providing professional development or who are using technology in their classrooms. According to McKenny (2005), this may be because professional development models are largely based on a behaviourist perspective. Using this model participants are taken through a sequential mapping of the software or technological innovation’s features, and little or no time is spent modelling the ways the innovation could be implemented in the classroom, with little or no thought given to the changes that must occur in classroom routines. In this regard Cox, Preston, and Cox (1999) suggested that if teachers are to be convinced of the value of ICT in their teaching, their training should focus on pedagogical issues.

Samarawickrema and Stacey (2007) suggested that unstable technology was also a barrier to the integration of technology by teachers. These researchers argued that unstable and unreliable technology results in frustrating breakdowns, anxious students and stressful situations. In addition, a lack of adequate technical support can affect faculty satisfaction with an online environment (Arvan & Musumeci, 2000; Betts, 1998). Technical support services are important to assist teacher educators and students in troubleshooting issues with course management systems, computer hardware and software (Bolliger &Wasalik, 2009). Baron and Graham (2007) warned that regardless of the amount of training teacher educators receive, if they do not have technical support immediately available, then their confidence about the system and the process begins to wane.

However, according to Gibson, Harris, and Colaric (2008) the difficulty in using a CMS is not the primary reason teacher educators do not adopt a CMS. They argued that the reason for non-adoption is that faculty members do not believe that CMSs is an effective means of helping them do their job. Similarly, Al-Shboul and Alsmadi (2010) also noted that some teacher educators do not believe that CMSs fulfil their needs. In this regard, it seems that to adopt a CMS, faculty must perceive that using a CMS has a relative advantage over not using a CMS. Therefore, any adoption program should firstly make faculty aware of the many advantages of a CMS, such as enhanced teacher educator efficiency and effectiveness, flexibility and convenience.

### 3.8.1 Summary

It can be seen that teacher educators face many barriers in their efforts to integrate a CMS into their courses. Among the barriers teacher educators face are the beliefs of teacher educators, increased workload and the time required to learn, setup, maintain and conduct online sessions. Teacher educators’ belief that CMSs reduces their power and control in the classroom was also found to be a barrier. The difficulty in learning how to use the system and the lack of proper training which usually entails a behaviourist model was another barrier. In addition, issues such as unstable and unreliable technology and absence or delayed technical support services also pose barriers to the integration of CMSs.

## 3.9 Conclusion

CMSs can be used as an e-learning tool for fully online courses, blended courses or as a supplement to face-to-face courses. However, despite the potential to scaffold learners and enhance learning, research has shown that CMSs are currently underutilised or are used in ways that support traditional teaching methods. The most common use of CMSs is for the storage and distribution of course content. Other uses include communication, assessment and administrative tasks.

Critics argue that the design and structure of CMSs force teacher educators to use these systems in traditional teacher-centred ways thereby inhibiting the diverse learning styles of students. In addition, it is argued that CMSs restricts informal learning, performance support and knowledge management. On the other hand, theorists argue that CMSs are neutral tools and if teacher educators are well acquainted with the tools available in CMSs they will be better able to use the software to engage their students using constructivist strategies and personalise learning.

Teacher educators face several barriers in their attempt to integrate a CMS into their courses. These barriers include; teacher educators’ pedagogical beliefs, increase in time and workload, reduction in classroom power and control, lack of proper training, equality and equity issues, unstable and unreliable technology and the absence or delayed technical support.

The Theoretical Framework chapter which follows explores the theoretical tools that I draw on to analyse how teacher educators’ perspectives of the value of the affordances of course managements systems for course delivery and their pedagogical beliefs influenced their integration of the BbCMS into their courses.

# Chapter 4 Theoretical Framework

## 4.1 Introduction

In the previous Literature Review chapter, I discussed the writings on teacher’s beliefs and highlighted the role teacher’s beliefs play in teacher’s decision making processes and teaching practices within their classroom. I also suggested that teacher educators’ perspectives about the value of the affordances of ICT are one of the factors that determine their use of such systems. In addition, I outlined several contextual factors that may prevent teachers from integrating ICT in ways that are consistent with their pedagogical beliefs. This theoretical framework chapter emerges directly from the discussion of the issues and debates around teacher beliefs and pedagogy, with specific references to the ways teachers interpret and adapt the affordances of a course management system (CMS). This chapter can be considered as a culmination of the discussion and an articulation of the ways, the issues and debates discussed in the previous chapter are central to the research. It is for these reasons this chapter was included. In this regard the theoretical tools providedin the framework were used to analyse the data obtained via an open-ended questionnaire and interviews to provide answers to my four key research questions which are as follows:

1. What are teacher educators’ perspectives of the value of the affordances of the Blackboard Course Management Systems (BbCMS) as a teaching and learning resource for their courses at the CEPUTT?
2. How have teacher educators at the CEPUTT integrated the BbCMS into their courses?
3. What is the relationship between teacher educators’ pedagogical beliefs and the integration of the BbCMS for course delivery at the CEPUTT?
4. What challenges did teacher educators encounter as they integrated the BbCMS into their courses at the CEPUTT?

Firstly, I use a modified version of Pajares’ (1992) assumptions of teacher beliefs as the analytical lens that guided my understanding of teacher educators’ perspectives of the affordances of the BbCMS and the challenges they encountered as they integrated the BbCMS into their courses. In addition, I refer to Becker’s (2000) principles of teacher centred pedagogy and Savery and Duffy’s (1995) principles of constructivist instruction as a way of analysing teacher educators’ pedagogical beliefs and the practice of those beliefs.

## 4.2 Pajares’ assumptions of teachers’ beliefs

In the previous Literature Review chapter I defined teacher beliefs and I suggested that beliefs are more likely than knowledge to influence teachers' decisions and actions in a classroom. In this section I use a modified version of Parajes' (1992) assumptions of teacher beliefs as analytical lenses through which I analysed how teacher educators’ perspectives of the value of the affordances of course managements systems for course delivery and their pedagogical beliefs influenced their integration of the BbCMS into their courses.

According to Pajares (1992, p. 314) “All teachers hold beliefs, however defined and labelled, about their work, their students, their subject matter, and their roles and responsibilities.” How beliefs are formed, how they are stored and their relationship to teachers’ actions in the classroom have been the subject of study by many theorists. Based on the findings, inferences and generalizations of several theorists, Pajares (1992) put forward sixteen assumptions which he suggested may be reasonably made in any study of teachers' educational beliefs. According to Pajares (1992),

1. Knowledge and beliefs are inextricably intertwined, but the potent affective, evaluative, and episodic nature of beliefs makes them a filter through which new phenomena are interpreted. In other words the belief system teachers hold impacts the decisions they make about teaching and as a result the tools and strategies they use in the classroom. In terms of ICT use, beliefs are formed when a teacher uses ICT, observe other teachers use ICT or read about ICT use. In all cases the teacher will make assessments of the outcomes associated with ICT use. Any new innovation will be assessed based on the teacher’s previous experiences with ICT and this may impact on the teacher’s behaviour toward the new innovation. It would therefore seem that if CMSs are to be used effectively by teacher educators, efforts must be made to confront the belief systems of teacher educators through which new information about the benefits of using CMS in teaching and learning are filtered.
2. Individuals develop a belief system that houses all the beliefs acquired through the process of cultural transmission. Therefore, teachers every experience with ICT within the classroom and outside of the classroom will form part of a teacher’s belief system.
3. Beliefs are formed early and individuals tend to hold on to beliefs based on incorrect or incomplete knowledge, even after scientifically correct explanations are presented to them. These beliefs are difficult to change because they form the core beliefs of the teacher and are held with passionate conviction (Green, 1971). In addition, even if these beliefs are held consciously or unconsciously, it is always accepted as true by the individual. This suggests that beliefs can strongly influence perception, and can be an unreliable guide to what really exists.
4. Beliefs are instrumental in defining tasks and selecting the cognitive tools with which to interpret, plan, and make decisions regarding such tasks; hence, they play a critical role in defining behaviour and organising knowledge and information. (p. 326).

These assumptions suggest that teachers' beliefs affect their behaviour and play an important role in teachers’ action and decision making in the classroom.

## 4.3 Interpreting teacher educators’ pedagogical beliefs

In the previous chapter I discussed teachers’ pedagogical beliefs focusing on two philosophical perspectives from which they are founded; objectivism and constructivism. In this section I look firstly at Becker’s (2000) principles of teacher-centred pedagogy which are based on the objectivist perspective. I then discuss Savery and Duffy’s (1995) principles of constructivist instruction. These two sets of principles summarise much of the discussion on objectivism and constructivism in the Literature Review chapter.

### 4.3.1 Teacher-centred pedagogy

Becker’s (2000) primary principles of teacher-centred pedagogy provide a valuable analytical lens to explore whether teacher educators’ beliefs, classroom decisions and strategies in the classrooms as narrated to me during the interviews and expressed through the open-ended questionnaire align with those principles. According to Becker (2000) the main principles of a teacher-centred pedagogy are as follows:

1. The use of externally recommended curriculum of distinct skills and factual knowledge. In this situation, teachers are given a fixed body of skills and information that students are required to master. In the case of the BbCMS the teacher assigns readings, post lectures, post assignments based on the course outline for students to access and learn.
2. Direct presentation and explanation to students of that procedural and factual knowledge. Using a lecture method the lessons are goal directed and the learning environment is tightly structured by the teacher. The teacher is always in control of all aspects of the teaching process.
3. Frequent assignments of written exercises to students aimed at their remembering factual knowledge and accurately performing skills. The use of drill and practice exercises are used to ensure students learn the basic facts. In addition the focus is on individual work.
4. Evaluation of students’ mastery of skills and knowledge by giving them written tests that prompt students to recognize factual statements and to apply learned algorithms and other skills to produce correct answers. Tests include quizzes, multiple choice, true or false and structured questions (p.9).

### 4.3.2 Student-centred pedagogy

In the last chapter I discussed teachers’ pedagogical beliefs by analysing relevant literature. I showed that pedagogical beliefs play an important role in teachers’ decision making and actions in the classroom. In this section I focus on the principles of student-centred pedagogy as espoused by Savery and Duffy (1995) as a tool to analyse the pedagogical beliefs of teacher educators.

Student-centred pedagogy has been heavily influenced by the theories of constructivism. According to Savery and Duffy (1995, p. 1), “constructivism is a philosophical view on how we come to understand or know.” Savery and Duffy (1995) put forward three primary propositions of the philosophical view of constructivism. The first proposition states that “understanding is in our interactions with the environment” (p. 31). This core concept of constructivism suggests that what we learn is a function of the content, the context and the activity and goals of the learner (ibid). The second proposition states that “cognitive conflict or puzzlement is the stimulus for learning and determines the organization and nature of what is learned” (p. 32). Savery and Duffy (1995) argued that puzzlement is the stimulus that drives the learning process, but it is the goal of the learner that determines what is learned. Piaget (1977) described this as the need for accommodation when the current experience cannot be assimilated into the existing schema. The last proposition states that “knowledge evolves through social negotiation and through the evaluation of the viability of individual understandings” (p. 32). This proposition suggests that the social environment and social interaction is necessary for learning to take place. Based on their propositions of constructivism, Savery and Duffy (1995) put forward a number of principles of constructivist instruction. They are:

1. **Anchor all learning activities to a larger task or problem.** The purpose of any learning activity should be clear to the learner. Tasks, activities and assignments should be part of a wider scope that brings together all the little tasks. For example, an organised discussion on the use of blogs in education will not simply ask students to identify the advantages and disadvantages of using blogs in education. The constructivist teacher will ask students to set up a blog, post comments on a relevant topic and, invite other students to comment on their posts. Students can work in teams to build arguments, debate advantages and disadvantages of blogs and discuss reasons for their choices.
2. **Support the learner in developing ownership for the overall problem or task.** This suggests that the teacher must try to make the instructional goals of the course consistent with the goals the learner brings to the course. This may be achieved by asking learners to suggest problems which will then be the stimulus for learning activities. Alternatively, the teacher can present a problem that the learners will adopt as their own.
3. **Design an authentic task.** An authentic learning environment is one in which the cognitive demands, i.e., the thinking required, are consistent with the cognitive demands in the environment for which we are preparing the learner (Honebein, Duffy, & Fishman, 1993).
4. **Design the task and the learning environment to reflect the complexity of the environment they should be able to function in at the end of learning.** The teacher must assume the roles of adviser and coach. The most critical teaching activity is in the questions the teacher asks the learner in that advising and coaching activity.
5. **Give the learner ownership of the process used to develop a solution.** Learners must have ownership of the learning or problem solving process as well as having ownership of the problem itself. The teacher's role should be to challenge the learner's thinking -- not to dictate or attempt to proceduralize that thinking.
6. **Design the learning environment to support and challenge the learner’s thinking.** To support the learners thinking the learning environment must be designed so that the learner feels safe in the environment. In addition, the learning environment must cater to the different learning styles of the students. Also teacher educators can provide feedback to learners to support learners thinking. They can also pose additional questions in an effort to challenge a learner’s thinking.
7. **Encourage testing ideas against alternative views and alternative contexts.** Knowledge is socially negotiated. The quality or depth of ones’ understanding can only be determined in a social environment where we can see if our understanding can accommodate the issues and views of others and to see if there are points of view which we could usefully incorporate into our understanding. The importance of a learning community where ideas are discussed and understanding enriched is critical to the design of an effective learning environment. Students can always reach a higher level of cognitive development when they interact with others that are already at a higher level of cognitive development. Therefore the role of the teacher is to create situations in which students can exchange ideas, critique each others work and collaborate in solving problems.
8. **Provide opportunity for support and reflection on both the content learned and the learning process.** Support can be afforded by students working collaboratively and assisting each other or through discussion and feedback from teachers. Feedback is an essential because it provides the learners with the opportunity to sift out and obtain added information required to construct knowledge (Gensburg & Herman, 2009). In addition, an important goal of instruction is for students to develop skills of self-regulation - to become independent learners (pp. 4-7).

These principles of constructivist teaching place the student at the centre of the learning process. In contrast to an objectivist approach, there is a shift in power from teacher to student. The role of the teacher in a constructivist classroom changes from authority figure to that of coach and partner in learning. The teacher within the concept of constructivism is required to design tasks and activities, integrate appropriate assessment, provide relevant feedback and act as facilitators of dialogue during the learning process (Cross, 2009).

These explanations of the role of the teacher in the constructivist perspective as outlined by the different researchers are important to this study as it helps to clarify what teacher educators must do to create a student-centred learning environment using the BbCMS. It is also important as it provides a guide to determine if the instructional strategies being used by teacher educators in their integration of the BbCMS are in keeping with the principles of student-centredpedagogy.

## 4.4 Conclusion

The elements of this theoretical framework build upon each other to provide a way for me as a researcher to interpret the perspectives and pedagogical beliefs of teacher educators’ integration of the BbCMS into their courses.

Parajes (1992) suggested that teacher beliefs are formed at an early age and are based on teachers’ experiences in and out of the classroom. These beliefs which may be consciously or unconsciously held are instrumental in defining tasks, selecting tools to accomplish the tasks and making decisions regarding the tasks. Teachers’ belief system therefore acts as a filter through which all new phenomenon and teachers’ actions are interpreted.

Becker’s (2000) principles of teacher centred beliefs provide me with a framework to interpret teacher educators’ integration of the BbCMS into their courses. These principles include the use of a fixed curriculum, a transmissive approach to teaching, focus on remembering factual knowledge and accurately performing skills and the use of written tests such as multiple choice, true or false and structured questions to evaluate students’ mastery of skills.

Savery and Duffy (1995) principles of constructivist instructionalso provided me with a framework for analysing how teacher educators integrated the BbCMS into their courses. Teachers with student-centred beliefs should ensure that they anchor all learning activities to a larger task or problem, support the learner in developing ownership for the problem or task, design the task and the learning environment to reflect the complexity of the environment they should be able to function in at the end of learning, design the learning environment to support and challenge the learner’s thinking, encourage testing ideas against alternative views and alternative contexts and provide opportunity for support and reflection on both the content learned and the learning process.

In this chapter I provided an overview of the theoretical tools that frame my approach to this thesis and that I used to interpret the relationship between teacher educators’ beliefs and the integration of an electronic course management system. The ideas of this theoretical framework support my choice of methodology and methods in this research which I describe in the next chapter.

# Chapter 5 Methodology and Methods

## 5.1 Introduction

In the previous theoretical framework chapter, I discussed the elements of the theoretical framework which I used to interpret teacher educators’ experiences and perspectives with the integration of information and communication technology (ICT) into their classes with emphasis on electronic course management systems. My objective in this chapter is to explain why my chosen methodology or research approach and my choice of methods are appropriate to this research project. The principal aim of this study is to understand the experiences and perspectives of teacher educators as they worked to integrate the Blackboard Course Management System (BbCMS) into their courses. More specifically, I am interested in how teacher educators’ perspectives of the value of the affordances of CMSs for course delivery and their pedagogical beliefs influenced their integration of the BbCMS into their courses. In this regard the study was designed to answer the following key research questions:

1. What are teacher educators’ perspectives of the value of the affordances of the Blackboard Course Management Systems (BbCMS) as a teaching and learning resource for their courses at the CEPUTT?
2. How have teacher educators at the CEPUTT integrated the BbCMS into their courses?
3. What is the relationship between teacher educators’ pedagogical beliefs and the integration of the BbCMS for course delivery at the CEPUTT?
4. What challenges did teacher educators encounter as they integrated the BbCMS into their courses at the CEPUTT?

The first section of this chapter discusses the methodology and the second section the methods. In the first section I outline the ontological and epistemological assumptions that led me to adopt an interpretative paradigm. According to Wellington (2000) methodology is “the activity or business of choosing, reflecting upon, evaluating and justifying the methods you use” (p. 22), whereas methods refer to the “range of approaches used in educational research to gather data which are to be used as a basis for inference and interpretation, for explanation and prediction” (Cohen, Manion, & Morrison, 2000, p. 44). In the second section of this chapter, I describe the research methods I used to collect data. I explain my rationale for using an open-ended questionnaire and semi-structured interviews. This is followed by a discussion of my data sampling strategy. I then explain my approach to data analysis by discussing the steps I took to analyse the open-ended questionnaire and the semi-structured interviews. In the third section I describe my efforts to be reflexive throughout the research process. I then outline the ethical procedures I adopted in conducting this research. Finally, I discuss some of the limitations of the study.

## 5.2 Methodology

According to Wellington (2000), when researchers are deciding on which research method to use they are usually influenced by their underlying ontological and epistemological positions. Ontology is defined as the “study or theory of ‘what is’, i.e. the characteristics of reality” (p. 199). Epistemology is defined as the “the study of nature and validity of human knowledge, e.g. the difference between knowledge and belief” (Wellington, 2000, p. 196).

I acknowledge that my ontological assumptions influenced my approach in obtaining and interpreting the information I received from the participants in my study. I believed that I could gain insight into the individual experiences of teacher educators’ integration of the BbCMS into their courses by obtaining the views of the participants through the use of an open-ended questionnaire and semi-structured interviews. My epistemological assumptions are that individuals learn from experience and this shapes their knowledge, therefore knowledge is “experiential, personal and subjective” (Opie & Sikes 2004, p. 21). In this regard, I assumed that teacher educators’ integration of the BbCMS into their courses is based on their experiences with ICT throughout their life from a student to their present position. As such, I was interested in how teacher educators’ perspectives of the value of the affordances of CMSs for course delivery and their pedagogical beliefs influenced their integration of the BbCMS into their courses. However, I was aware of how my own values influenced how I obtained and interpreted the information. Nonetheless, I made recommendations to enhance the integration of the BbCMS through analysis and interpretation of this information.

Hitchcock and Huges (1995) suggested that “ontological assumptions give rise to epistemological assumptions; these, in turn, give rise to issues of instrumentation and data collection” (p. 21). From an ontological perspective, two competing approaches may be identified within educational research; the positivist and the interpretative approaches (Wellington, 2000, pp. 15-19). A positivist approach to research mirrors the traditions of the hard sciences (physics, chemistry, biology, etc.) (Wellington & Szczerbinski, 2007). In the positivist perspective, social reality is perceived as external, independent and ultimately observable. In epistemological terms, this means that knowledge obtained through research is perceived as “objective, value-free, generalizable, replicable”, and detached from the researcher (Wellington, 2000, p.15). Researchers within this perspective normally use ‘scientific’ research methods or quantitative techniques such as large-scale surveys, experiments and randomized trials (Cohen et al., 2000). The emphasis is on obtaining statistics and numerical evidence from a large research sample in order to make generalisations about the findings.

The interpretative approach argues that “human behaviour can only be explained by referring to the subjective states of the people acting in it (Wellington & Szczerbinski, 2007, p. 220). The researcher’s aim is to “explore perspectives and shared meanings and to develop insights into situations” (Wellington, 2000, p. 16). The interpretative paradigm suggests that a value-neutral approach to research is not possible in the social sciences where people are at the centre of the research process as is the case in this study. It argues that social research can never be an objective activity carried out by detached scientists. Blaxter, Hughes, and Tight (1997, p.15) supported this view by suggesting that research is strongly affected by the researcher’s motivations and values. The emphasis in this perspective is on obtaining detailed accounts of individuals’ experiences from their perspective rather than searching for universal laws (Guba & Lincoln, 1994, p.114). This approach typically use qualitative research methods, such as interviews, observations, open-ended questionnaires, documents and audio-visual materials (Creswell, 2008).

My ontological perspective is based on the interpretative paradigm; as such this is a qualitative study, drawing on an interpretative paradigm based on ethnographic traditions. As previously described, this paradigm offers a detailed description of how one perceives, creates, and interprets one’s world. In this research, teacher educators are at the centre of my research process and my findings are grounded in their writings and narrations of their experiences and perspectives of the integration of the BbCMS into their courses. This was important to my study because it allowed me to understand the deeper issues involved in teacher educators’ integration of the BbCMS into their courses at the CEPUTT.

In this study I used an open-ended questionnaire and semi-structured interviews as my data collection methods. Creswell (2008) pointed out that, “open-ended questions are asked so that the participant can best voice their experiences unconstrained by any perspectives of the researcher or past research findings” (p. 225). Semi-structured interviews were also used because it allowed me to probe teacher educators “thoughts, values, prejudices, perceptions, views, feelings and perspectives” (Wellington & Szczerbinski, 2007, p. 81) about the integration of the BbCMS into their courses. As such both the open-ended questionnaire and semi-structured interview are suitable methods for naturalistic inquiry as they focus the researcher on understanding ideas from the participant’s perspective.

## 5.3 Methods

In researching the familiar to ‘make the familiar strange’, I have chosen methods which I believe allowed me to explore and dig deeper to find out what lies beneath the familiar. Method is important because it is regarded as the way in which knowledge about a research problem is produced. In terms of this research, the use of multiple qualitative methods was the most effective way of gaining answers to the key research questions. It could be argued that the current research would be compromised if I was not able to glean a subjective, qualitative response from a wide cross-section of participants, especially given the subjective nature of teacher educators’ beliefs. In this way, multiple qualitative methods were used for this research; an open-ended questionnaire and semi-structured interviews. The open-ended questionnaire is shown in Appendix 1 and the items used in the semi-structured interviews are shown in Appendix 2.

### 5.3.1 Secondary data collection

In an effort to improve my understanding of teacher educators’ perspectives and experiences with the integration of CMSs, I carried out secondary research to better understand what has already been researched and to identify key issues pertaining to my interest as I outlined in my Literature Review. I reviewed a number of journal articles, books and papers on teacher beliefs and the integration of ICT and CMSs. This deep engagement with the theories, concepts, issues and debates in the literature informed my understanding of the experiences and perspectives of teacher educators as they worked to integrate the BbCMS into their courses. More specifically, it helped to clarify how teacher educators’ perspectives of the value of the affordances of CMSs for course delivery and their pedagogical beliefs influenced their integration of the BbCMS into their courses. As such it helped me to formulate my aims, aims statement and research questions.

### 5.3.2 Primary data collection

In this thesis I used two primary data collection methods; open-ended questionnaires and semi-structured interviews. The following two sub-sections provide details of the reasons for adopting these methods.

#### 5.3.2.1 Rationale for the open-ended questionnaire

The aim of using an open-ended questionnaire in this study was to give all 112 teacher educators at the CEPUTT the opportunity to give their views using their own words to explain their perspectives and experiences with the integration of the BbCMS into their courses at the CEPUTT. In addition to getting a deeper response from the teacher educators and varied views of the issues involved, this data collection method was used to provide me (the researcher) with a list of possible participants from which I was able to choose eight teacher educators to each participate in an interview.

The advice for the use of the open-ended questionnaire came from Miles and Huberman (1994, p. 254) who argued that “the inclusion of a wide variety of voices in a dataset best informs the construction of a conceptual framework.” In addition, Cohen et al.(2000) wrote,

It is the open-ended response that might contain the ‘gems’ of information that otherwise might not have been caught in the questionnaire. Further, it puts the responsibility of the data much more firmly into the respondents’ hands (Cohen et al., 2000, p. 255).

Further, Wellington (2000) suggested that data from open-ended questions in questionnaires “may even be richer, perhaps more truthful, than data collected in a face-to-face interview” (p. 106). In this regard the open-ended questionnaire was seen as an appropriate method to use to collect data in this study, because it allowed responses from a wide cross-section of teacher educators and also because it enabled respondents to express their views without being influenced by my perspectives. In addition, participants were also free to express themselves with the knowledge that they could remain anonymous if they wished.

As part of the study, the open-ended questionnaire items were developed and fine-tuned many times before it was piloted. During the piloting phase, five participants were asked to criticise any bad wording, misleading, complex or irritating items. After making some suggested changes the final open-ended questionnaire consisted of ten questions as shown in Appendix 1. The questions were focused on establishing how teacher educators integrate the BbCMS into their courses, their perspectives about the affordances of the BbCMS to achieve their instructional goals, their pedagogical beliefs and its relationship with the integration of the BbCMS and the challenges they experienced while integrating the BbCMS into their courses.

Open-ended questionnaires were sent to all 112 teacher educators at the CEPUTT. Providing contact details was optional, for example, after completing the open-ended questionnaire a respondent had the option of submitting the completed open-ended questionnaire with or without contact details. Providing contact details was an indication that the participant was willing to participate in an interview.

However, while providing a range of views, in a faster time and in a more economical way, (Cohen et al., 2000) the use of open-ended questionnaires has many disadvantages. For example, open-ended questionnaires does not allow for the clarification of issues reported, has a low percentage of returns and incomplete answers (Cohen et al., 2000) all of which prevent researchers from gaining in-depth insights into the issues under study. Although these disadvantages all manifested in my use of the open-ended questionnaire, the data collected was used in three ways; firstly to provide answers to the key research questions, as a way of selecting the best participants who volunteered to participate in an interview and also as a way of providing data to support the data collected in the interviews.

#### 5.3.2.2 Rationale for using semi-structured interviews

Semi-structured interviews were the second method used to collect data. Interviews of this nature are likened to a casual conversation with an explicit agenda (Rubin & Rubin, 1995). My decision to use the semi-structured interview was informed by Wellington (2000, p. 71), who argued that an interview allows the interviewer to “Probe into the interviewee’s thoughts, values, prejudices, views, feelings and perspectives.” and can “elicit their versions…of situations which they may have…lived through”. For the purposes of this research project, I was specifically interested in interviewees “thoughts, values, prejudices, perceptions, views, feelings and perspectives” about their experiences with the integration of the BbCMS into their courses.

Semi-structured interviews in the second stage of data collection consisted of some of the same questions used in the open-ended questionnaire. While these questions served as the main questions in each interview, additional probe questions were included to dig deeper and to also clarify some responses. The questions were focused on establishing how teacher educators integrated the BbCMS into their courses, their perspectives and experiences regarding the use of the BbCMS to achieve their instructional goals, their pedagogical beliefs and its relationship with the integration of the BbCMS and the challenges they experienced while integrating the BbCMS into their courses.

However, Tuckman (1972) cautioned that researchers should consider certain criteria that affect the validity of the interviews when developing questions. According to Tuckman the researcher needs to consider whether the question influences the respondent to show himself or herself in a good light or whether the question influences the respondent to anticipate what a researcher might want to hear. Being an insider researcher I dealt with these issues by firstly gaining the trust of my participants, making my intentions clear, using an informal approach and establishing common ground by identifying common interests and purposes. An insider researcher which will be discussed below is described by Sikes and Potts (2008), as having “an a priori attachment to and involvement with, the institutions or social groups in, or on, which investigations are based” (p. 2).As such my personal experience in interviewing my participants is that as colleagues working in the same faculty and acquainted with each other for a number of years I found myself engaged in an exchange of views about their experiences with the integration of the BbCMS. This exchange was guided by the questions I had developed and others which arose out of the conversation. In this regard the interviews took the form of frank discussions between colleagues. This resulted in valuable data as most participants felt very relaxed. While this scenario holds true for the majority of participants, in one of the interview sessions the participant seemed a bit uncomfortable as I started to probe deeply to find out her “real” reasons for her limited use of the BbCMS. The participant became defensive and visibly upset. In an effort to continue the interview I explained my motive for asking the probing questions and I moved on to another item in the interview protocol.

#### 5.3.3 Profile of informants

Informants were recruited from the two campuses that make up the CEPUTT; Valsayn and Corinth. The administrative department at the Corinth CEPUTT campus provided me with a list of the names of all teacher educators at both campuses. I used this list to send out my package containing the cover letter (see Appendix 3), open-ended questionnaire, participant consent form (see Appendix 4) and participant information sheetfor the open-ended questionnaire (see Appendix 5). Teacher educators at both campuses are classified as Instructor I, Instructor II, Senior Instructor, Assistant Professor and Professor. These designations are based on years of teaching experience at the tertiary level and qualifications. For this study two of the participants were Assistant Professors, two were Senior Instructors and four were Instructor IIs. An assistant professor would usually be someone with a doctorate in education or a specific field of study. Instructor IIs and Senior Instructors usually possess a Masters’ degree in education or a specific field of study. The difference between the two titles is usually the number of years of teaching experience at the tertiary level.

### 5.3.3 Sample

In deciding the best approach to take when dealing with sampling issues, Cohen et al. (2000) outlined four factors; the size of the sample; the representative and parameters of the sample; access to the sample and the sampling strategy to be used. Purposive sampling was used to select all 112 teacher educators at the CEPUTT. These 112 teacher educators were each sent a package via the internal CEPUTT courier system containing a letter explaining the aims and objectives of the study, the open-ended questionnaire, Participant Information Sheet and the Participation Consent Form.

Purposive sampling was also adopted to select the eight teacher educators who were interviewed using semi-structured interviews. Purposive sampling has been described as sampling “done with deliberate aims in mind as opposed to a random sample or one chosen purely for its convenience and accessibility” (Wellington, 2000, p. 199). This method “increases the scope or range of data exposed as well as the likelihood that the full array of multiple realities will be uncovered” (Lincoln & Guba, 1985, p. 40). I chose to use purposive sampling as I was seeking to get in-depth information from the experiences of my informants.

Based on the analysis of the open-ended questionnaires and teacher educators stated willingness to participate, eight teacher educators were selected to each participate in a semi-structured interview. These eight teacher educators were selected to represent a broad cross-section of the teacher educators in terms of teaching philosophy, total teaching experience, curriculum areas and their use of the BbCMS. For example, I choose two teacher educators from four of the largest departments; Mathematics, Educational Technology, Language Arts and Special Education. I chose these departments firstly because there was a greater chance of getting two teacher educators who satisfied the requirements of the study and also because of the differences in the subject content and culture.In addition, each teacher educator had to have an espoused constructivist philosophy, student-centred beliefs, must have used the BbCMS for two or more years and had to be teaching for more than five years at the tertiary level. I wanted teacher educators with a constructivist philosophy and student–centred beliefs to understand how they were integrating the BbCMS into their courses, what challenges they were experiencing and what were their perspectives of the affordances of the BbCMS as a resource for course delivery. To further assist in achieving my aim I selected one teacher educator who was making extensive use of the package and the other making minimal use of the package in each of the selected departments. I selected participants with two or more years of experience with the package as I felt that these teacher educators would have had enough time to get acquainted with the software. I also chose teacher educators with over five years tertiary teaching experience as this meant the teacher educators had a fair amount of experience in the subject area at the tertiary level.

#### 5.4 Analysis of open-ended questionnaire

Data analysis is the “process of systematically searching and arranging the interview transcripts, filed notes, and other materials accumulated to increase understanding of them to enable the presentation of what was discovered” (Bogdan & Biklen, 1998, p. 157). The open-ended questionnaire was sent out at the beginning of September 2011. As I received the returned questionnaires I assigned each an identifier starting with R1 then R2 and so on. I followed the advice of Wellington and Szczerbinski (2007, p. 101) and immersed myself in the data to get an “overall sense or feel of the data.” I began by reading through the responses of each returned open-ended questionnaire a few times. I did this every evening or as soon as possible without making any notes or considering any interpretation. I then followed Wellington and Szczerbinski’s second stage of data analysis; reflecting on the data. I did this by asking myself different types of questions. For example, I asked myself sensitizing questions (e.g. What is going on here? How are teacher educators using the BbCMS?), theoretical questions (e.g. Was subject matter an important variable in deciding whether to use or not use the BbCMS?) and practical/structural questions (e.g. Where can I find material to help me understand what is happening here?, Am I analysing this data correctly?) (Strauss & Corbin, 1998). With these questions in mind, I began the third stage of the data analysis process as outlined by Wellington and Szczerbinski. I circled the important segments and wrote in my reflections in the clear areas of the sheet. After reading and making my notes on one open-ended questionnaire, I would move on to another. I compared the new data with the data collected before and wrote down my reflections. After a while the whole system became confusing and after I had collected about twelve open-ended questionnaires I found it was difficult to keep a check of all the notes I was making. I found this system inefficient and I eventually abandoned this method.

I then decided to use the “matrix based method for ordering and synthesizing data” (Ritchie, Spencer, & O’Connor, 2003, p. 219), which is a variation of the framework approach developed at the National Centre for Social Research in the United Kingdom (UK). I created a spreadsheet workbook with 10 worksheets one for each item in the open-ended questionnaire. An example is included in Appendix 7. In each worksheet I created a matrix with the headings: Identifier (the unique identifier assigned to each returned questionnaire), Response, Codes and Categories. I then filled in the open-ended questionnaire identifier and the responses of each respondent. Although this was a long and tedious process, it allowed me to look at all the responses for each item at once. I continued with Wellington and Szczerbinski’s third stage of data analysis by reading the responses many times and highlighting the important segments with different font colours. Similar codes that represented the important segments were highlighted with the same font colours.

Although I kept working on data reduction during my data collection, I was intimidated by the amount of data when I was about to code the data. As a novice researcher, I had very little experience in conducting small-scale qualitative research. Glesne (1998) characterized coding as “progressive process of sorting and defining and defining and sorting those scraps of collective data (i.e. observation notes, interview transcripts, memos, documents, and notes from relevant literature) that are applicable to your research purpose” (p. 135). I had never really comprehended the complexity of coding until I faced my raw data for the first time and I did not really know where to begin.

Fortunately, discussions with my supervisor and the many books he recommended for me to read provided me with more concrete concepts and steps for the coding process. Based on the constant comparative strategies, Merriam (2001) specified steps to analyse the messy qualitative data. Referring to these steps and concepts put forward by Wellington and Szczerbinski (2007) I began the open coding or categorising of the data; the process of defining codes and their related properties.

I read the notes on the computer line by line. As I read the notes I typed in the codes I created in the codes column. Each time I read the data I would add, modify, or delete the names of codes on the list during the process. After I repeated the coding process several times and felt satisfied with the temporary coding of that item I would use the codes generated to create categories. Generally, some categories were subsumed into broader categories. Some categories were discarded because they were less relevant to my research questions. As suggested by Wellington and Szczerbinski (2007) in the fourth stage of their data analysis process relevant categories were integrated and refined to support responses to my research questions. I repeated the process over and over until I finished coding all the data from my returned open-ended questionnaires. An example of the codes generated can be seen in Appendix 8.

## 5.5 Conducting the interview: venue, timing and challenges

The semi-structured interviews were held during the period December 5th to December 30th, 2013. I interviewed each teacher educator at their designated campus and at a time convenient to them. Each interview was held in the office of the participant. This made the participant feel more at ease. I carded each interview to last between forty-five minutes to one hour long. This supports the view of Robson (2002, p. 273) who warned that interviews can be time consuming, and that anything under half of an hour is unlikely to yield any valuable information, while an interview that is over an hour may reduce the number of individuals willing to participate. In this regard interviews that went beyond the one hour time limit were continued based on the participant’s willingness and approval. At the start of each interview I explained the purpose of the interview and gave the participant a copy of the ‘Participant information sheet’ (see Appendix 6). I addressed any concerns and answered any questions posed by the participant. I then asked the participant to sign the ‘Participant consent form’.

In this research I used recordings to “improve accuracy and quality of data evidence” (Wellington, 2000, p. 128). I recorded the interviews directly to my laptop computer using the computer’s built-in microphone and the audacity program (a free audio editing program available on the internet). I created a folder in my portable hard drive and stored each interview into the folder using the participant’s pseudonym.

Although the interviewing phase went quite well it was not without incidents. According to Wellington (2000, p. 3) research can be “messy, frustrating and unpredictable.” I faced a number of challenges carrying out my interviews in terms of time. The period I chose to conduct my interviews was the end of the semester. Many teacher educators were busy marking course work scripts and entering marks. This situation caused a number of postponements from teacher educators. In one incident the teacher educator was called into an impromptu meeting. After waiting for about an hour I left. As such, on a few occasions I had to reschedule interviews because of the busy schedules of the teacher educators.

### 5.5.1 Analysis of interview data

Each time I conducted an interview I transcribed the data that same day. This was a long and tedious process, taking up to three hours in some instances. To help with my transcribing of the data I used two laptops, I played and listened to the interview on one laptop and I typed on the other. This allowed me to move back and forth with the recorded data to ensure a more accurate transcription of the data. It also allowed me to become much more familiar with the data.

After completing the transcription for one interview I would start a preliminary analysis before conducting the next interview. This allowed me to focus on issues that were raised in the previous interviews. To begin a more in-depth analysis of the data gathered from all the respondents I created another workbook with four worksheets; one for each key research question. I entered the headings; Participant, Responses, Codes and categories. I then entered the responses from each participant to the questions from interview protocol (See Appendix 9).

Having entered the data in that format I followed the same process outlined above for analysing the qualitative data obtained from the open-ended questionnaires. This method allowed me to keep the original text from each participant together, thereby reducing fragmentation. To get a clearer understanding of the data I created a spread sheet with the codes and the data supporting each code from each participant. This allowed me to generate the categories from the codes (see Appendix 9).I then used these to organise my thoughts and writings. Therefore, consistent with the qualitative, interpretative methodological framework adopted in this study, categories emerged from the data rather than being pre-specified.

As a reflexive researcher I am aware that these categories represent only one of many possible ‘truths’ of these teacher educators’ experience. I am also aware that emphasis on the teacher educators’ pedagogical beliefs and its relationship with the use of the BbCMS as a resource to achieve the goals of their courses blinded me to equally valid categories within their narrations.

In an effort to improve the trustworthiness of the research; which are steps taken to ensure the quality of the research or the extent to which the data and data analysis are believable (Guba & Lincoln, 1981), I used two strategies; peer debriefing and member checking. Lincoln and Guba (1985) defined peer debriefing as “a process of exposing oneself to a disinterested peer in a manner paralleling an analytic session and for the purpose of exploring aspects of the inquiry that might otherwise remain only implicit within the inquirer’s mind” (p. 308). The peer debriefer for this study was a PhD candidate in the Faculty of Education at the University of West Indies.

In addition, I made every effort to have all eight interview participants proof read all my drafts to ensure the participants’ voices were the ones coming through the experiences. To ensure this happened each participant received a copy of their interview transcript for review, clarification and suggestions via electronic mail or hand delivered hard copy. Suggested changes were made, and transcripts were re-sent for verification. All data were verified through this process.

I also recognised that issues could change in different situations and that the same factors could be interpreted differently by researchers. Indeed, “ … as people, as social beings, located in space, time, cultural milieu, researchers have been influenced by the particular understandings about, and interpretations of the world to which they have been exposed” (Sikes & Goodson, 2003, p. 34). Therefore, it is not possible for the researcher to be isolated from the research process. In this regard I engaged in reflexivity, again acknowledging that “we are part of the social world we are studying and that the researchers’ own interpretation processes and authorial position need to be taken account of” (Golbart & Hustler, 2005, p. 17). In the next section I discuss the steps I took to ensure reflexivity.

## 5.6 A reflexive researcher

Reflexivity is a fundamental part of qualitative research. From a socio-cultural perspective, the process of reflexivity is an acknowledgement by the researcher that “all findings are constructions, personal views of reality, open to change and reconstruction” (Tindall, 1994, p. 151). Pillow (2003) defined reflexivity as “involving on-going self-awareness during the research process which aids in making visible the practice and construction of knowledge within research in order to produce more accurate analyses of our research” (p. 178). McCormick and James (1988, p. 191) suggested that reflexivity requires researchers to monitor closely and continually their own interactions with participants, their own reaction, roles, biases, and other matters that might bias the research.

I therefore address my positionality in an attempt to be frank about the biases I brought to this research process. I acknowledge my subjectivity and affirm my purpose to contribute to improvement in the approach to addressing the integration of CMSs in teacher education. For example, my background in ICT and being an educational technology teacher educator which involves teaching students how to integrate technology may have coloured my perceptions about the use of CMSs in tertiary education. In this regard, I recognize that as Van Maanen (1988) stated, there can never be “immaculate perception”, and no text or research may be closed to further interpretations (Van Maanen, 1988 cited in Hammersley, 1995, p. 86). My research would certainly provide for different interpretations if it involved different researchers and participants and was carried out in another place or at a different time. I have approached this research with the belief that there is no single ‘truth’ to be discovered and articulated through research writing; rather there are many truths, multiple realities and multiple interpretations of the same events (Cohen et al., 2000, pp. 21-22; Pring, 2000, p. 253). In this regard I have been reflexive in my choice of study as highlighted in chapter 1, having always had a special interest in ICT in education both in my academic and professional lives as I believe that the appropriate use of ICT can play an important role in enhancing education for all. The location of my study at the CEPUTT and my interview participants were also influenced by my reflexive practice. For example, during the interviewing process I was very careful to let the participants tell their story, even if it meant moving away from my interview schedule.

As a teacher educator at the CEPUTT I am considered an ‘insider’ in this research since I have an “a priori attachment to and involvement with, the institutions or social groups in, or on, which [my] investigations are based” (Sikes & Potts, 2008, p. 2). While this may be an advantage in my being able to easily access my informants, there may be disadvantages if my familiarity leads to bias. For example, I was mindful not to prompt participants to add or correct bits of information they gave of situations to which I had also experienced and had a different view. According to Hockey (1993) while insider researchers may enjoy easier access and greater rapport, they also have to contend with the fact that their informants have known them that much longer, and have had that much more time to form preconceptions about them and their research. I was therefore aware that my informants may have given answers they thought I wanted to hear because of my involvement with the initial implementation of the BbCMS at the CEPUTT. However, my belief was that the input from my informants was a critical contribution to developing new knowledge. I also made the assumption that my informants have been both honest and sincere, and as experienced professionals who also have “social power” (Opie & Sikes 2004, p. 21), they are interested in lending their voices to the discussion and did not say what they thought I wanted to hear.

Being an insider I was also guided by Mercer (2007, p. 5) who warned that conducting insider research is like “wielding a double-edged sword.” What insider researchers gain in terms of “their extensive and intimate knowledge of the culture and taken-for-granted understandings of the actors’ may be lost in terms of their myopia and their inability to make the familiar strange” (Hawkins, 1990, p. 417).

In this section, I have described my efforts to be a reflexive researcher throughout the research process. In the next section, I continue this discussion by addressing the ethical considerations and procedures I adopted to conduct this research.

## 5.7 Ethical considerations and procedures

In this research, I followed the University of Sheffield’s School of Education ethical procedures. I obtained ethical clearance to carry out my research from the Ethics committee. A copy of this email is included in Appendix 10. I also obtained permission from the UTT to conduct research at the university (see Appendix 11). In addition, each teacher educator received a package containing a copy of a ‘Participant Information Sheet’ which sets out the objectives of the research, the ‘Participant Consent form’ and the open-ended questionnaire.

All efforts were made to achieve a desired level of confidentiality for the study participants. Specific organisational details were masked in an attempt to ensure anonymity of the faculty participants, yet not detract from the contextual importance of the study. For example, while I mentioned that I interviewed two participants from the Mathematics department I did not indicate whether they were involved in the teaching of primary mathematics or secondary mathematics. In addition, I did not reveal the campus at which the participants are based. Further, pseudonyms were utilised in all identifying instances. Interview procedures tried to ensure that no information concerning other participants was revealed to other interviewees both in the interviews and references to them in the data chapters throughout the text.

In approaching my interview participants I enquired of their willingness to participate as teacher educators and users of the BbCMS. I shared with them the information sheet and I assured each interviewee that they were free to withdraw from the research at any time. I also assured each interviewee that their statements will be confidential and that their identities would be anonymised in my writing by the use of pseudonyms.As such the audio recordings of all interviews were password protected and stored in an external harddrive. However, as Burgess (1984, p. 206) pointed out, “It is evident that whatever precautions are taken to protect those involved in a field of study, nothing is fool proof.” There is the possibility that research subjects may be able to identify each other in the final publication of the research. To deal with this issue I followed the advice of Tolich (2004) who suggested that researchers need to take time to “learn from insiders what information is potentially damaging if read by another insider, and which information is innocuous” (p. 105). For example, if participants believe that revealing their limited use of the BbCMS or their dislike for how the system was acquired and implemented could jeopardise their job I would not publish that piece of data. Therefore in an effort to prevent harm or loss to the interviewees I guaranteed all teacher educators that any damaging information revealed will not published.

## 5.8 Limitations of the methodology

One limitation of this methodology included the small number of participants that responded to the open-ended questionnaire and those that I selected to participate in the interview. In addition, the eight participants that took part in the interview came from only four different departments. Perhaps if I had chosen more participants from a wider range of departments the results would have been different because I may have gotten a wider range of views.

## 5.9 Conclusion

In this chapter, I have described how my ontological and epistemological assumptions influenced the methodology I adopted for this thesis. I justified my methods of primary and secondary research. I introduced my research participants and described how I carried out my field research using open-ended questionnaires and semi-structured interviews with teacher educators. I discussed how I selected my sample and my approach to data analysis. I also explained my efforts to be a reflexive researcher at all stages of the research process and I reflected on the ethical considerations and procedures I adopted in conducting this research. Finally, I outlined two limitations of the methodology.

This chapter serves as an introduction to the next two data reporting chapters, where I describe participants’ perspectives about the affordances of the BbCMS, how participants used the BbCMS, the relationship between participants’ pedagogical beliefs and the integration of the BbCMS and the challenges participants faced as the integrated the BbCMS into their courses.

# Chapter 6 Data Presentation and Analysis I

## 6.1 Introduction

In the last chapter, I outlined the research methodology and methods used in this thesis to understand how teacher educators’ perspectives of the value of the affordances of course managements systems for course delivery and their pedagogical beliefs influenced their integration of the BbCMS into their courses. I explained that my analysis of teacher educators’ integration of the BbCMS is based on their responses to an open-ended questionnaire and semi-structured interviews. I outlined my approach to interpreting the responses to the items in the open-ended questionnaire and the narrations of the interviewed participants. This chapter analyses the data from the open-ended questionnaire to answer the following key research questions:

1. What are teacher educators’ perspectives of the value of the affordances of the Blackboard Course Management Systems (BbCMS) as a teaching and learning resource for their courses at the CEPUTT?
2. How have teacher educators at the CEPUTT integrated the BbCMS into their courses?
3. What is the relationship between teacher educators’ pedagogical beliefs and the integration of the BbCMS for course delivery at the CEPUTT?
4. What challenges did teacher educators encounter as they integrated the BbCMS into their courses at the CEPUTT?

This first data reporting chapter examines the views of 53 out of 112 teacher educators who responded to the open-ended questionnaire. The open-ended questionnaire consisted of 10 questions. The first three questions focused on collecting demographic data to assist in the selection of eight teacher educators who were interviewed. These questions focused on teacher educators’ subject area expertise, years of tertiary teaching experience and the length of time they had been using the BbCMS. Samples of data for these items can be found in Appendix 12. The remaining questions focused on teacher educators’ perspectives of the value of the affordances of the BbCMS, establishing how teacher educators integrated the BbCMS into their courses, the relationship between teacher educators’ pedagogical beliefs and their integration of the BbCMS and the challenges they experienced while integrating the BbCMS into their courses. The second data reporting chapter will examine the issues raised in this chapter in greater depth and other issues that arose during the interviews.

This chapter will draw on the theoretical resource in using teachers’ beliefs as lenses for understanding how teacher educators integrated the BbCMS into their courses. First, my use of Pajares’(1992) assumptions of teachers’ beliefs has thus far focused on the ways educators come to develop their perceptions about technology and its integration in the classroom. Pedagogical beliefs are teachers’ “personalised theories [that] lie at the heart of teaching and learning” (Burns, 1992, p. 64) and are formed from teachers’ experiences during their entire life (Keys, 2007; Richardson, 2003). For example, teachers’ experiences as student themselves and their interactions with peers and administration may add to their pedagogical beliefs. In addition, teachers’ life experiences with technology, the difficulty in using it in situations outside the classroom all have an impact on teachers’ beliefs.

Secondly, I use Savery and Duffy (1995) principles of constructivist instruction. Constructivism is a view of learning whereby learners construct their knowledge of the topics they study through personal experience rather than having that knowledge transmitted to them by some other source (Bransford, Brown, & Cocking, 2000; Bruning, Schraw, Norby, & Ronning, 2004). It emphasises the active involvement of students in the learning process. Lastly, I use Becker’s (2000) principles of teacher centred pedagogy which is based on the objectivist philosophy.

The written comments of teacher educators’ beliefs about teaching and learning are important in the present discussion because research has shown that teacher’s perspectives of the value of the affordances of ICT and teachers’ pedagogical beliefs play a significant role in the integration of ICT into courses. During the analysis of the open-ended questionnaires, I identified four categories that were prominent in the responses given by teacher educators. These are: value of the BbCMS for enhancing teaching and learning, resource to supplement face-to-face sessions, alignment of pedagogical beliefs and the integration of the BbCMS and challenges with the integration of the BbCMS. These categories can be interpreted as echoing the discourse of the integration of CMSs described in the Literature Review chapter.

The succeeding sections of this chapter will present supporting data for each item in the open-ended questionnaire according to the category which it supports. Firstly, data supporting the category ‘value of the BbCMS for enhancing teaching and learning’ will be presented under the sub-categories; accessibility, communication and collaboration, diversity and the contrasting view – need for face-to-face interaction. The next section presents the data which supports the category ‘resource to supplement face-to-face sessions’, under the sub-categories ‘technology teaching resource’ and ‘technology course management resource’. The third section presents data supporting the category ‘alignment of pedagogical beliefs and the integration of the BbCMS’ under the sub-categories; constructivism and Eclectic. The fourth section presents data based on the category ‘challenges with the integration of the BbCMS’ supported by the sub-categories technical issues and teacher issues.

## 6.2Value of the BbCMS for enhancing teaching and learning

The first key research question pertains to teacher educators’ perspectives of the value of the affordances of the BbCMS as a teaching resource for course delivery. This question which was addressed in item five of the open-ended questionnaire asks respondents to give their views on the use of the BbCMS for course delivery. During my analysis of this item from the open-ended questionnaires, I identified one main category that was prominent in the writings of teacher educators, this was: value of the affordances of the BbCMS for enhancing teaching and learning. Three sub-categories which supported this category were: value of accessibility, value of communication and collaboration and value of diversity for enhancing teaching and learning. I argue that the BbCMS affordances of accessibility, communication and collaboration and diversity can be interpreted as valuable for enhancing teaching effectiveness and student learning and I draw on the writings of Savery and Duffy (1995) and Pajares (1992) in making this analysis.

All respondents (53 out of 112) gave responses to this question. The data showed that while the majority (39 out of 53) of the respondents suggested that the affordances of the BbCMS enhanced the delivery of their courses, the other 14 respondents held the opposite view. As we will see, teacher educators based their perspective about the value of the BbCMS on two critical areas of course delivery; teaching effectiveness and student learning. The 39 respondents, who found that the affordances of the BbCMS enhanced the delivery of their courses, described how the affordances of accessibility, diversity and communication and collaboration contributed to this perspective.

### 6.2.1 The BbCMS affordance of accessibility

The ICT affordance of accessibility which enables fast access to vast amounts of information (Conole & Dyke, 2004) was reported by the majority (39 out of 53) of respondents as one of the ways the BbCMS helped them to enhance teaching effectiveness and student learning. Respondents indicated that enabling easier access to course material helped students to be more prepared for classroom sessions resulting in classroom time being better spent in discussion, clarification of material and other activities. For example, R2 wrote, “posting course material on Bb [BbCMS] allows my students to read ahead in preparation for class. Class discussions are more meaningful. I am able to do a lot more in classroom sessions.” Similarly, R12 claimed, “students can easily access course outlines and required readings instantly, so it helps that all students can do pre-readings so they are informed and able to contribute meaningfully during class.” According to R30, “class time can be better utilised because students have already interacted with the material.” From these comments it would seem that teacher educators value the affordance of accessibility because it better prepares students for classroom discussions and provides support for students in the learning process.

Teacher educators also suggested that the affordance of accessibility can assist students in becoming self-directed learners. R10 wrote, “Students can take greater responsibility for their own learning and structuring of their study time. They can attend to material at their own pace.” While R1 said it allowed students to “practice self-directed learning (SDL) which is a method we encourage in science teaching.” In addition, R29 felt that “students have more control over their learning.” Further, R9 wrote, “student learning can be enhanced because course outlines, rubrics, worksheets, feedback and evaluations are all available to them.” Similarly, R11 said, “I can post lectures and other things up for reading so that students can have access to it outside of class sessions to review as often as they wish.” These responses from teacher educators suggest that providing course material for students to access gives students the opportunity to become self-directed learners.

The responses also suggest that teacher educators value the affordance of accessibility because it allows students to interact with material before class sessions. This fits in with Savery and Duffy’s (1995) eighth principle which suggests that teachers need to provide opportunities for support and reflection on both the content learned and the learning process. Providing course content in advance gives students the opportunity to review the material as many times as they wish, prepare students for classroom discussions and allow students to develop self-regulation skills which are necessary for self-directed learning.

### 6.2.2Communication and Collaboration

The multiple communication and collaborative tools of the BbCMS was another key affordance identified by less than one-half (21 out of 53) of the respondents as a means of enhancing teaching and learning. These respondents reported that the BbCMS enabled greater interaction between teacher educators and students and also among students thereby enhancing teaching effectiveness and student learning. According to R26, the BbCMS is “Useful for course delivery. I can communicate with students in multiple ways. It is also easier for students to communicate with each other.” R34 wrote, that “the use of the BbCMS has many benefits for teaching and learning. It provides opportunities for interaction with students who may be absent from class.” R39 indicated that the BbCMS is “A beneficial tool for course delivery. I can have students work on projects together online. I can provide assistance to my students outside of classroom sessions.” Here we see that teacher educators value the affordance of communication and collaboration because it allows for greater interaction and discussion among students. This supports Savery and Duffy (1995) principle of providing opportunity for support and reflection on both the content learned and the learning process. These comments suggest that support is provided through the interactions among students and assistance from the teacher educator.

In addition, the ability to communicate with students outside of classroom sessions and also to give timely and more personal feedback was suggested as a way of enhancing teaching effectiveness and student learning. According to R36, “Classroom time is no longer limited to what is on the timetable. I can continue my discussions online outside the classroom.” R8 wrote “I do not have to be physically present for learning to occur or for material to be presented. I can engage students in thinking being out of the classroom.” The use of the BbCMS to provide timely feedback to students was also made by R42 who wrote, “It enhances the way I can provide feedback to my students. Students get feedback on their work almost instantly when they submit on Bb [BbCMS], as oppose to waiting until the next class session.” This view was similar to R37 who said that, “it allows for interaction with the students and content can be shared with feedback continuously. This can enhance learning.” Providing feedback to students is an important aspect of constructivism as it can challenge and support students’ thinking. This fits in with Savery and Duffy (1995) sixth principle which suggest that teachers should design the learning environment to support and challenge learners’ thinking. This view is also supported by Gensburg and Herman (2009) who argued that feedback provides learners with the opportunity to sift out and obtain added information required to construct knowledge.

A small number (4 out of 53) of respondents reported that the multiple methods of communication available via the BbCMS can facilitate a non-threatening environment where students can express their views and collaborate with their colleagues. R44 wrote that, “students who may be shy or unwilling to speak in the class sometimes feel more at ease with the BbCMS and sometimes make valuable contributions online.” R47 wrote that the students “feel comfortable to express ideas/thoughts which they may not readily do in the face-to-face classroom.” This comment was similar to that of R21 who said, “I feel that the BbCMS provides the opportunity for those who are more reserved to work in an environment that's non-threatening. This makes it easier for them to get involved in class discussions.” R51 also reported that “students who are shy and do not have the confidence to ask or respond to questions in the face-to-face sessions can benefit from this type of environment.” These comments which suggest that the BbCMS can allow teacher educators to create an environment in which students feel safe to make comments and answer questions is also supported by Savery and Duffy (1995) sixth principle which suggest that teachers should design the learning environment to support and challenge the learner’s thinking. Teacher educators can support students thinking by providing an environment that students feel safe to express their views.

### 6.2.3 Diversity

The affordance of diversity offers access to a vast range of diverse and different experiences which can cater to the different learning styles of students and can enhance learning (Conole & Dyke, 2004). The data showed that only a small number of respondents (10 out of 53) reported using this affordance. For example, R13 reported that the BbCMS can provide the opportunity to “individualise instruction and cater to the more diverse needs of the students.” Similarly R24 wrote “it may be reaching some students who prefer this mode.” In addition, R19 indicated that the BbCMS “provides assistance for teaching with an alternative medium to meet other learning styles.” R34 said that “it is another method of teaching, it allows me to cater to those students who respond to visual, textual and auditory methods of teaching.” R32 said, “It helps the learning process. Students who have this technical/visual preference will be more satisfied as a result.” R41 stated that “it is a medium popular with students. They feel comfortable to express ideas/thoughts in many ways that may not be available in the face-to-face classroom.” These sentiments were similar for R49 who stated quite clearly that “it caters for the multiple intelligences that are present in our classes.”

These responses suggest that the affordance of diversity available through the use of the BbCMS can allow teacher educators to design a learning environment that caters to the different learning styles of their students. This supports the view of Morgan (2003) who found that CMSs ability to cater to the diverse learning styles of students has been hailed as one of the important assets of the package. For example, CMSs can offer learning opportunities for visual and verbally oriented learners through the use of multimedia (text, sound, graphics and video).Their belief that catering to the different learning styles of students is important to enhance teaching and learning is consistent with Savery and Duffy (1995) principle of designing the learning environment to support and challenge the learner’s thinking. Teacher educators supported their students thinking by providing course material that supports the different learning styles of their students.

### 6.2.4 Contrasting view - Need for face-to-face interaction

Responses from the open-ended questionnaire suggested that fourteen (14 out of 53) respondents expressed the view that the affordances of the BbCMS did not enhance course delivery. The main reason for this perspective was the belief that face-to-face interaction is necessary for teacher education. R4 who clearly articulated this point said, “Not useful. I need to interact with my students. I am teaching teachers activity and performance, demonstration and discussion, physical presence is necessary.” R20 indicated that the system was useful “only in so far as the provision of material goes. I do however value above all else the face-to-face human interaction.” This view was similar to R40 who said “Not useful for teacher education. To develop a teacher requires hands on face-to-face interaction. Physical presence is necessary to develop a well-rounded teacher.” R33 wrote “Limited usefulness. I believe you learn by doing, hands on activity with teacher supervising and monitoring.” This view was similar to that of R49 who wrote, “Very limited use in teacher education. Cannot replace the human element in teaching and learning.” R13 also had similar beliefs, stating that “while it is useful to communicate my presentation in advance so students can come to class more prepared. It [BbCMS] cannot substitute for face-to-face interaction which is an important part of teacher education.”

From the responses it would seem that teacher educators’ perspective about the inadequacy of the affordances provided by the BbCMS for course delivery are based on their beliefs about teaching and learning and the use of ICT in teaching and learning. According to Pajares (1992) the beliefs of an individual are formed early and individuals tend to hold on to beliefs based on incorrect or incomplete knowledge, even after scientifically correct explanations are presented to them. These beliefs are difficult to change because they form the core beliefs of the teacher and are held with passionate conviction (Green, 1971). In addition, even if these beliefs are held consciously or unconsciously, it is always accepted as true by the individual. This may explain why teacher educators believe that physical presence is necessary for student teacher development. These teacher educators perspective that the affordances of the BbCMS is not suitable for teaching and learning may be based on their core belief that learning can only happen if the teacher is present in the classroom.

### 6.2.5Summary

The majority of the respondents gave responses that suggested that the affordances of accessibility, communication and collaboration, and diversity afforded by the properties of the BbCMS enhanced their teaching effectiveness and student learning. On the other hand a smaller number of respondents did not believe that the BbCMS is a useful tool for course delivery. The main reason given by these respondents was the belief that face-to-face interaction is necessary to develop the competencies required for student teacher development.

## 6.3 Resource to supplement face-to-face sessions

The second key research question asked respondents to describe how they integrated the BbCMS into their courses. Item 4 of the open-ended questionnaire addressed this issue. All (53) respondents provided responses to this item. My analysis of this item identified one prominent category: resource to supplement face-to-face sessions. The two sub-categories: BbCMS as a technology teaching resource and technology course management resource were also revealed and served to support the main category. In this section, I argue that teacher educators integrated the BbCMS as a supplement to their traditional face-to-face classroom sessions, and I draw on the writings of Savery and Duffy (1995) and Pajares (1992) in making this analysis.

### 6.3.1 Technology teaching resource

The analysis of the data revealed that the BbCMS was integrated into the courses of respondents as a technology teaching resource in three ways: for storage and access of course material, for communication and collaboration and as an assessment tool.

#### 6.3.1.1 Storage and access of course material

The integration of the BbCMS for the storage and access of course material was reported by all respondents (53) to be the main method of integrating the BbCMS into their courses. Respondents wrote that they use the BbCMS to store course outlines, PowerPoint lectures, videos, additional notes and external links to online resources. For example, R20 indicated that he or she use the BbCMS to “Store information for students: course outlines, reminders (assignment dates), students queries and concerns and lectures.” R19 wrote, “To store documents for students, videos, powerpoint lectures, access to external sites and documents.” Similarly, R9 wrote, “Store course documents for all students, provide links to sites and resources and for audio tools.”

The material stored on the BbCMS can be accessed by students at their convenience and as many times as they want. The ability to access learning material and activities anytime-anywhere, allows students to come to the “learning table whenever and wherever they choose instead of only when the class schedule dictates” (Carmean & Haefner, 2002, p. 32). This extends the possibility of time on task and increases students’ options, both of which are important for learning. What this implies is that teacher educators assume that students will retrieve the contents and make use of it. While the use of the system to store material for access by students is suggestive of the transmissive approach to teaching as described by Becker (2000), it may not in reality be such. For example, providing students with information so that they can prepare themselves to contribute to discussions with their peers as well as with their teacher educators can also be considered a necessary pre-condition for the constructivist use of material. In addition, providing course material can also assist in self-directed learning, which is one of the ways teachers can assist students in the construction of knowledge (Savery & Duffy, 1995).

#### 6.3.1.2 Communication and collaboration

About two-thirds (32 out of 53) of the respondents reported that communicating with students was another way they integrated the BbCMS in their courses. The largest number of these respondents (29 out of 32) indicated that they use the email feature to send emails to their students. This was followed by a slightly smaller number (23 out of 53) of respondents who said they post announcements such as reminders about deadline dates for the submission of assignments, clarification of assignments and readings that students should cover before coming to class.

Further analysis also revealed that about one third (16 out of 53) of the respondents use the discussion board in their courses. These respondents reported that they post questions on the discussion board for students to discuss and collaborate. An even smaller number (7 out of 53) of respondents reported the use of the Blog and Wiki tools for students to collaborate with each other and to complete assignments.

An illustrative response was given by R25 who wrote, “Posted notes and readings, set up blog, administered assessment, sent messages/announcements, sent block emails - especially useful in my class of 69 students.” In addition, R26 wrote, “To communicate with students. Post due date reminders, questions to be considered for past and present classes.” R34 use the BbCMS to, “provide an avenue for students to collaborate with one another outside of normal class sessions.” In addition, R46 use the BbCMS “to give students feedback on their assignments.” While, R32 wrote that he or she use the BbCMS “as a platform to provide opportunities for all students to contribute to issues discussed in class.”

These comments suggest that respondents use the BbCMS to facilitate communication between themselves and students and among students. It also suggests that students are actively engaged in their learning. In addition, the use of the discussion board suggests the possibility of creating a community of learners. These responses are consistent with the ideas of social constructivism as described by Vygotsky (1978), in that social interaction and community play a fundamental role in the development of cognition and the process of “making meaning”. They also provide evidence of Savery and Duffy (1995) seventh principle which suggest that “teachers should encourage testing ideas against alternative views and alternative contexts” (p. 140). The use of the discussion board for students to collaborate allows for students to interact with their peers to check if their understanding can accommodate the issues and views of others and see if there are points of views which they can incorporate into their understanding. This has the possibility of leading students to a higher level of understanding.

#### 6.3.1.3 Assessment

The Create Assessment menu provides the following options: Test, Survey, Assignment, Self- and Peer-Assessment and SafeAssigment. It allows users to create and edit assessments such as quizzes, self-tests and surveys, with questions stored in a question database. The analysis of the data showed that about one quarter (13 out of 53) of the respondents use the Create Assessment menu option to create and post assignments for students. A much smaller proportion (6 out of 13) of these respondents wrote that they also use the Test option to create online tests for their students.

For example, R12 wrote that he or she use the BbCMS “to provide online course assessments, to communicate with students, to post assignments.” Similarly, R29 also wrote, “Post information, resources, post assignments and course outlines, online assessment.” In addition, R52 wrote, “To create and conduct online assessment and post and collect assignments.”

These responses suggest that respondents use the BbCMS as a tool to create and administer assessments. It is important to note that the assessment options such as quizzes, fill in the blanks provided by the BbCMS is consistent with the objectivist mode of assessment as outlined by Becker (2000). However, the interactive assessment modules in CMSs allow for quick, meaningful feedback; answers can be evaluated, responses can be delivered, and students can be directed to outside sources for better understanding. Students can receive immediate response to misconceptions and errors in critical thinking, as well as obtaining new information, evaluation, and understanding (Carmean & Haefner, 2002). This suggests that the assessment tool are being used to support learners’ construction of knowledge by providing feedback on gaps in their knowledge.

### 6.3.2 Technology course management resource

The analysis of the data for item four also revealed that respondents use the course management tools; Grade Center and SafeAssign. Grade Center is used to manage the collection and grading of students’ assignments and provide feedback while the SafeAssign tool is used to check for plagiarism.

#### 6.3.2.1 Grade Center

The Grade Center allows for the collection of assignments in soft copy by means of an electronic drop box which teacher educators can create. This gives students the ability to submit soft copy assignments anywhere and anytime they have access to the internet during the date and time set by the teacher educator. Less than one half (21 out of 53) of the respondents who answered this question indicated that they use the Grade Center for the collection and grading of assignments. A typical response was given by R18 who use the BbCMS, “To store documents for students, to send announcements to all, to provide access to external sites and documents, for submission of assignments, feedback on assignments.” Similarly R34 wrote “to easily collect assignments and post grades for assignments collected.” R23 also indicated that he or she use the Grade Center to “collect soft copy assignments and provide feedback on assignments by posting their [students] grades.” Respondents’ use of the Grade Center to provide feedback to students is another example of respondents using the BbCMS to support learners in their construction of knowledge as outlined by Savery and Duffy (1995).

#### 6.3.2.2 SafeAssignments

About one-quarter (13 out of 53) of the total respondents reported that they use the SafeAssign tool to check for plagiarism in assignments submitted by students. To check for plagiarism teacher educators set up SafeAssignments in their Blackboard courses through which students can submit their work. As students submit papers, they are checked against SafeAssign's comprehensive databases of source material. The papers are then delivered to teacher educators through the BbCMS together with the originality reports, with the results of the matching process, attached to them.

For example, R43 wrote “SafeAssign makes it easier for me to detect plagiarism.” R51 indicated that he or she use the tool to “check for plagiarism to ensure students are in fact doing their own work.” The use of the BbCMS to easily check for plagiarism fits in with a constructivist philosophy as teacher educators try to ensure that students are not reproducing knowledge from online sources but constructing their own knowledge.

### 6.3.3 Summary

In summary, an analysis of the data revealed that teacher educators integrated the BbCMS as a resource for the teaching and management of their courses. The most popular method of integration as a teaching resource is the use of the BbCMS to store, organise and access course content. This was followed by the communication and collaboration tools which are used for communication between students and teacher educators and among students. The use of emails was reported to be the most common form of communication between teacher educators and students, followed by the use of the discussion board. The assessment tools are also used to create assignments for students and in a few instances to create online tests for students. The BbCMS is also used as a technology management tool to grade assignments, post grades and also to check that students’ assignments are not plagiarised.

## 6.4 Alignment of pedagogical beliefs and the integration of the BbCMS

The third key research question addressed the relationship between teacher educators’ pedagogical beliefs and the integration of the BbCMS into their courses. Items six to nine of the open-ended questionnaire, addressed this issue. My analysis of these items revealed the category; alignment of pedagogical beliefs and the integration of the BbCMS. I argue that there is an inconsistency with teacher educators’ pedagogical beliefs and their integration of the BbCMS into their courses and I draw on the writings of Savery and Duffy (1995) and Pajares (1992) in making this analysis.

Item six asked respondents to state their philosophy of teaching and describe essential principles of that philosophy. All respondents (53) gave answers to this item. The responses were placed into two categories: constructivist and Eclectic. The word “Eclectic” was used as a category for any respondent who did not indicate a constructivist philosophy or described the principles of that philosophy as espoused by Savery and Duffy (1995).

### 6.4.1 Constructivist

About two-thirds (32 out of 53) of the respondents stated that their philosophy of teaching was based on constructivism and gave their view of the philosophy. One response which best illustrates the responses from the other teacher educators was written by R9 who said, “students must be provided with opportunities to construct and conceptualize their knowledge. They should be allowed to develop their skills by interacting with others and participating in activities.” Here we see R9 espousing three important concepts of constructivism; students construction of their knowledge, the use of social interaction and students’ active involvement in the learning process. These concepts were also reflected in the comments of R21 who also wrote that “students are responsible for their learning. The role of the teacher educator is to facilitate that learning by organising the learning environment so that learning can in fact take place.” This response by R21 identifies the role of the teacher as the one who facilitates the learning process by constructing the learning environment. Most of the other respondents spoke of students constructing their knowledge while being assisted by the teacher educator. For example, R20 said, “I believe that students should be guided, individually and collectively to construct their knowledge and to become the best that they can be while developing a consciousness of their responsibility to contribute to the common good.”

A few teacher educators did not elaborate on their constructivist practices. For example, R51 wrote, “Constructivist. The teachers’ role is to guide students to construct their knowledge.” R1 wrote, “Constructivism. I believe in inquiry and discovery learning.” R2 also wrote, “Constructivist. Create the appropriate learning environment, create opportunities for students to construct deep, personal understanding of the target content.” In addition, R36 wrote “Constructivism, create the right social environment so that students can construct their knowledge through guidance and social interaction.” These responses all recognise the role of the teacher in constructivism as creating a learning environment where students are guided by the teacher to construct their knowledge.

These responses which all speak about learners constructing knowledge with the teacher as a guide, fits in with the constructivist principles of learning as outlined Savery and Duffy (1995) in the Theoretical Framework chapter. These teacher educators have stated many of the concepts of constructivism which suggest that they are well versed in the theoretical principles of constructivism. As we shall see later in responses to questions based on their integration of the BbCMS, many of the teacher educators did not integrate the BbCMS in the ways they articulated in their philosophies.

### 6.4.2 Eclectic

It was clearly noted that no respondent indicated that their philosophy of teaching and learning fitted in with the objectivist philosophy. However, a little more than one third (21 out of 53) of the respondents stated that their philosophy was a combination of constructivism and objectivism and was categorised as eclectic. For example, R22 stated, “Eclectic. I use the lecture method when necessary and discussion and discovery when the need arises.” Here we see that R22 uses the lecture method which is aligned with the principles of objectivism as it suggests the transmissive approach (Becker, 2000) and also discussion and discovery which aligns with the constructivist philosophy as it suggests students actively taking part in the construction of their knowledge (Savery & Duffy, 1995). Another example of this philosophy was stated by R18 who said, “A combination of philosophies. Teaching is an opportunity to present information and perspectives to learners. It also entails providing students with the tools that they may construct knowledge for themselves.” R47 stated, “A combination of constructivism and behaviourism. It depends on what I am trying to accomplish and the time available.” These comments suggest that these teacher educators hold a philosophy that contains aspects of both objectivist and constructivist perspectives.

### 6.4.3 Teaching Style

Item seven of the open-ended questionnaire asked respondents to state their teaching style and describe essential aspects of their teaching style. All respondents (53) gave responses to this question. The responses were placed into two groups: student-centred and other (combination of student-centred and teacher-centred approaches). It is important to note that the 32 teacher educators who indicated they held a constructivist philosophy also indicated that their teaching style was student-centred and described essential characteristics of such a style. This view was put forward by R2 who said “Student-centred. My teaching style is one that is democratic in nature, demonstrating both firmness and fairness. The learner is an active participant in the learning process.” R6 also reported, “Student-centred. Very relaxed student friendly environment in which the student is gently guided to discover the knowledge I intend to have them acquire.” While R9 wrote, “My teaching style is student-centred and while I try to elicit as much as possible from students, I engage in demonstrations, guided practice and the use of manipulative to ensure conceptual understanding.” Similarly, R12 reported a teaching style that was “student-centred - students must be actively engaged and be allowed to participate in learning activities - students learn more by doing.”

The respondents (21 out of 53) who reported that they held a philosophy other than constructivism also indicated that their teaching style was eclectic; a mix of a student-centred approach and a teacher-centred approach. An example that best represents this teaching style was given by R13 who said

At times I could be teacher-centred. Sometimes I adopt a demonstrator style where I guide students to apply their knowledge. I sometimes act as facilitator where I have students work in groups performing hands on activities. Sometimes I may delegate authority to the students where students take control over activities which best help them to learn.

Another respondent, R17 stated, “I use strategies from behaviourism, cognitivism and constructivism; it depends on my learning objectives/outcomes.” This suggests that these teacher educators use strategies that best suit their needs.

Item eight of the open-ended questionnaire asked respondents if the BbCMS fitted into their philosophy of teaching. Item nine asked respondents if the BbCMS fitted in with their teaching style. Respondents were also asked to explain their answers if they responded ‘Yes’ or ‘No’. A large number of respondents (48 out of 53) answered this question. The data showed that slightly more than one half of the respondents (26 out of 48) indicated that the BbCMS fitted in with their philosophy of teaching and teaching style, while the remainder (22 out of 48) said it did not.

An analysis of the data of those respondents who reported that the BbCMS fitted into their philosophy of teaching and their teaching style revealed three reasons; access to course material, communication and collaboration, facilitates self-directed learning.

#### 6.4.3.1 Access to course material

A number (13 out of 26) of teacher educators who indicated that they held a constructivist philosophy and student-centred beliefs reported that they use the BbCMS to provide course material for their students. These teacher educators did not indicate any other way they integrated the BbCMS into their courses. For example, R2 simply wrote “To store course material for students.” R15 also wrote “Makes course material available so students can be prepared for class discussions.” Similarly, R33 wrote, “Provide lectures, videos, additional links for students. Work as advance organisers” These samples suggest that teacher educators use the BbCMS to provide course material to prepare students for class discussions.

#### 6.4.3.2 Communication and collaboration

About one half (11 out of 26) of respondents with constructivist beliefs stated that the BbCMS fitted into their philosophy of teaching because the communication tools allow students to collaborate with their colleagues using the multiple modes of social interaction available in the BbCMS. This view was well represented by R2 who said, “Yes! The BbCMS fits into my philosophy of teaching. The use of tools such as discussion boards, wikis and journals provide powerful platforms for students to collaborate with their colleagues.” Another similar response was given by R23 who said, “Because CMS allows a content-oriented as well as a social, highly interactive way of teaching. Students are free to express themselves in blogs forum etc. and to share ideas re content via discussion, also to explore many sources (online).” The ability to interact outside of regular classroom sessions was the reason given by R7, who wrote, “The BbCMS allows me to interact with my students outside of the classroom providing further opportunities for me to meet their needs while assessing their competencies.” The use of the discussion board for discussions and the use of wikis and blogs for collaborative work suggest that teacher educators are capable of using the BbCMS in constructivist ways that aligns with their pedagogical philosophy and their student-centred beliefs.

#### 6.4.3.3 Self-Directed Learning

About one third (10 out of 26) of the respondents who indicated that the BbCMS fits in with their philosophy and teaching style suggested that the system allows students to take charge of their own learning and to build their knowledge using materials, links, questions and feedback from teacher educators. R19 sums it up in this way, “it assist students in being responsible for their learning, by offering opportunities to pose questions, the answers to which will clarify misunderstandings.” R3 explained that “students could practice weak areas to develop skills. Read added information, be aware of their weakness and work on it.” While R5 wrote, “It can be a tool that students use to help them in planning their self-directed study programme. It can keep all students in the loop.” These narrations show that teacher educators are incorporating different aspects of self-directed learning which fits in with the constructivist view of teaching and learning.

It was clearly noted that a substantial number of respondents (22 out of 53) indicated that the BbCMS did not fit into their philosophy of teaching and their teaching style. This is an interesting point as many of these respondents’ espoused a constructivist philosophy. The responses which can be found in Appendix 13give examples of the subject area, teaching philosophy, description of teaching style and reasons why respondents with constructivist philosophy suggested that the BbCMS did not fit into their teaching philosophy and teaching style. A table was used to present the responses of these respondents because it allows for easier cross-referencing of the data. One interesting finding that was revealed as I cross-referenced the data was the differences in beliefs about the use of the BbCMS within departments. In the Mathematics department I found that while respondents R18, R41 and R51 all reported that the BbCMS did not fit in with their pedagogical beliefs and teaching style their colleagues R2, R29 and R39 all indicated that the BbCMS fits in with their pedagogical beliefs and teaching style. This finding is consistent with the finding of Sutherland et al. (2004)who found that beliefs about the integration of ICT vary among faculty members within the same discipline. Respondents’ brief responses suggested two reasons: Need for face-to-face interaction in the delivery of their courses; and difficulty in using the BbCMS.

The responses in Appendix 13 indicate that teacher educators believe that face-to-face interaction is an important aspect of teacher education. They suggested that face-to-face classroom sessions allow student teachers to develop the tacit competencies that are required to become a teacher. The data also revealed that many teacher educators suggested that the BbCMS does not allow for the level and type of interaction that is necessary for developing teachers. Respondents see the lack of face-to-face interaction in the use of the BbCMS as a limitation of the system. They seem to suggest that face-to-face interaction is necessary in the teaching and learning process of student teachers. The belief that face-to-face sessions are more beneficial to students than the use of the BbCMS may be a core belief that is held by these respondents. According to Pajares (1992) an individual’s belief system consist of a number of core beliefs that are formed early in the life of the individual and are difficult to change even if the individual are presented with scientifically correct information that contradicts the belief.

Appendix 14 show examples of respondents who hold an eclectic philosophy and do not believe that the BbCMS fits in with their philosophy of teaching and their teaching style. The reasons given were need for face-to-face interaction, unsuitability for teacher education and difficulties with the BbCMS. These reasons were similar to those respondents with constructivist beliefs.

### 6.4.4 Summary

This third key research question sought to determine the relationship between teacher educators’ pedagogical beliefs and the integration of the BbCMS. The data revealed that the majority of respondents espouse a constructivist philosophy and student-centred teaching style. A smaller number of respondents indicated they held an eclectic philosophy and in many instances an eclectic teaching style. The results revealed that while many respondents with constructivist and eclectic philosophies found the BbCMS fitted into their philosophy and teaching style, there were a significant number who felt the opposite. Respondents who indicated that their pedagogical beliefs did not align with the integration of the BbCMS cited two reasons, these are: the need for face-to-face interaction in the delivery of their courses and the difficulty in using the BbCMS.

## 6.5 Challenges experienced with the integration of the BbCMS

The fourth key research question focused on the challenges teacher educators experienced as they integrated the BbCMS into their courses. This issue which was addressed by item 10 of the questionnaire asked respondents to state the difficulties they faced while integrating the BbCMS into their courses. A large number (42out of 53) of respondents gave responses to this item. The analysis of the data revealed the category: challenges experienced with the integration of the BbCMS. Two sub-categories which support this main category are: technical issues and teacher issues. I argue that contextual factors presented challenges for the integration of the BbCMS in ways that are consistent with their constructivist beliefs and I draw on the writings of Pajares (1992) and Savery and Duffy (1995) in making this analysis.

According to Chen (2008) a variety of contextual factors may affect teachers’ beliefs and technology integration. In addition, Ertmer (2005) suggested that teachers may not integrate technology in ways that are consistent with their espoused pedagogical beliefs because of existing contextual factors.

### 6.5.1 Technical Issues

The main difficulty teacher educators faced in integrating the BbCMS into their courses were technical issues. The majority (29 out of 42) of these respondents reported that their major difficulty was the affordance of risk, fragility and uncertainty with the use of the BbCMS. This they identified as the poor internet service available at the CEPUTT and at the homes of students. This prevented students from uploading and downloading content and engaging in online activities. R18 wrote, “Poor internet service. Many students still cannot access the system at home. This makes it difficult to have any online activities.” R35 also indicated that “unreliable internet access at UTT [CEPUTT] makes it difficult to use Blackboard in some classrooms.” This point was also made by R41 who said “poor internet service both at students’ homes and UTT [CEPUTT], students unable to upload and download content at times and participate in online discussions.” Here we see the contextual issue of poor internet service prevented teacher educators from engaging their students in online activities such as discussions. The remaining thirteen respondents wrote technical problems but did not give any examples.

The technical issues faced by teacher educators are examples of first order barriers outlined by Ertmer (2005). The poor internet service at the CEPUTT and the homes of some students seem to be preventing teacher educators from integrating the BbCMS in ways that might be consistent with their beliefs. According to Samarawickrema and Stacey (2007) unstable and unreliable technology results in frustrating breakdowns, anxious students and stressful situations which ultimately prevents the integration of a CMS.

### 6.5.2 Teacher issues

Teacher issues relate to those issues that the teacher may have control over. Some of the teacher issues revealed were: lack of competence in the use of the BbCMS and insufficient time.

#### 6.5.2.1 Lack of competence

Approximately one-quarter (13 out of 53) of the respondents reported that their inability to adequately use the BbCMS was one of the challenges they encountered in integrating the BbCMS into their courses. Respondents reported that they had difficulties in both the technical aspects and the pedagogical aspects of using the BbCMS. For example, R28 reported that “It [BbCMS] is difficult and cumbersome to grasp.” R26 said, “Learning all the features and possibilities is a work in progress, so I'm attending workshops to develop my own skills.” R29 wrote, “Having difficulties learning how to perform some of the more complex tasks.” While R34 wrote, “Steep learning curve, too much to learn to get simple things done.” Similarly, R13 reported a “Lack of the technological knowledge in using Bb [BbCMS]. I am only able to post content and announcements.” R16 reported that one challenge he or she encountered was “Learning how to effectively use it [BbCMS] for adding videos.” Here we see that R16’s lack of technical ability prevents him or her from using the medium of video to present material to cater to students with different learning styles. Similarly, R25 said “My own incompetence e.g. Not being sure how to use the discussion board and where to post assignments.” R25 is unable to engage students in discussions because he or she is unable to use the discussion board. These comments suggest that teacher educators may be willing to use the BbCMS to cater to the different learning styles of students and engage them in discussion all of which are recommended by Savery and Duffy (1995) to create a constructivist learning environment but are limited by their lack of technical knowledge of the system. These comments fit in with the findings of Bradford et al. (2007) who found that the difficulty associated with learning how to use a CMS has been identified as a key limitation of these systems.

Understanding how to use the BbCMS as a pedagogical tool to assist in the delivery of their courses also posed a challenge for a small number (7 out of 53) of respondents. For example, R39 reported “having difficulties aligning the tools in Bb [BbCMS] with aspects of my courses.” Besides technical difficulties R27 also indicated having the problem of “deciding what to post and what to discuss.” This problem was the same for R41 who wrote that the problem faced was deciding “how to use this tool in my courses besides posting content.” These comments suggest that these teacher educators seem to be willing to use the system in ways other than to post content. However, they seem to lack the competence to integrate the BbCMS in ways consistent with the principles of constructivist instruction put forward by Savery and Duffy (1995)

#### 6.5.2.2 Insufficient time to integrate the BbCMS

Insufficient time to use the BbCMS was another major difficulty reported by approximately one-third (17 out of 53) of the respondents. These respondents reported that their workloads do not allow them to spend the time required to adequately respond to students and manage their content on the BbCMS. According to R21, “having been saddled with eighteen hours of lectures which included two field practicum classes, it is virtually impossible to use the BbCMS. I barely have time or energy to respond to students online.” Similar sentiments were expressed by R7 who reported “difficulty finding time for online discussions that are convenient for most students.” R4 also reported that “It is too time consuming.” R25 said “Do not have enough time to monitor students on Bb [BbCMS] everyday and engage in online activities.” R31 wrote, “Cannot find the time to hold online discussions with students or provide feedback to students.” While R34 reported, “My biggest challenge is finding the time to use Bb [BbCMS].” It is interesting to note that these comments suggest that lack of time is preventing respondents from using the BbCMS in constructivist ways; engaging students in discussions and providing feedback as outlined by Savery and Duffy (1995). In addition, the challenges experienced by respondents were similar to those reported by Arabasz, Pirani, and Fawcett (2003) who found that CMS requires a considerable amount of time and effort to learn, set up and maintain course materials and create online assessment materials. The findings also mirror those of Papastergiou (2006) who found that assessing student postings and assignments, and providing timely and quality feedback to students takes too much time.

### 6.5.3 Summary

The data revealed that respondents experienced a number of challenges as they integrated the BbCMS into their courses. These challenges which included both technical issues and teacher issues prevented a number of teacher educators from integrating the BbCMS in ways that supported their pedagogical beliefs.

## 6.6 Conclusion

The analysis of the data suggested that the BbCMS is a valuable resource to enhance teaching effectiveness and student learning. The data also suggested that teacher educators integrated the BbCMS as a supplement to face-to-face sessions using it both as a teaching resource and a course management resource. The results of the third key research question revealed that there is an inconsistency between teacher educators with constructivist beliefs and their reported use of the BbCMS. The analysis of the data for the fourth key research question revealed that the challenges teacher educators experienced were based on contextual factors as well as the inability of the affordances of the BbCMS to satisfy their beliefs.

The second data reporting chapter which follows analyses the data from the interviews of eight teacher educators to delve deeper into the issues raised in this first data analysis chapter and also to provide further insight into the four key research questions of this thesis.

# Chapter 7 Data Analysis II

## 7.1 Introduction

In the previous chapter I analysed the experiences and perspectives of 53 out of 112 teacher educators as they integrated the Blackboard Course Management System (BbCMS) into their courses using data collected via an open-ended questionnaire. While this method of data collection provided valuable insights, I also used semi-structured interviews to get a deeper understanding of the experiences and perspectives of teacher educators as they worked to integrate the Blackboard Course Management System (BbCMS) into their courses. More specifically, I also used semi-structured interviews to get a deeper understanding of how teacher educators’ perspectives of the value of the affordances of course managements systems for course delivery and their pedagogical beliefs influenced their integration of the BbCMS into their courses. The semi-structured interviews provided rich descriptions of participants’ experiences and perspectives of the integration of the BbCMS and provided further answers to the following key research questions which were set out at the start of the study:

1. What are teacher educators’ perspectives of the value of the affordances of the Blackboard Course Management Systems (BbCMS) as a teaching and learning resource for their courses at the CEPUTT?
2. How have teacher educators at the CEPUTT integrated the BbCMS into their courses?
3. What is the relationship between teacher educators’ pedagogical beliefs and the integration of the BbCMS for course delivery?
4. What difficulties did teacher educators encounter as they integrated the BbCMS into their courses at the CEPUTT?

From the last data reporting chapter respondents reported that the BbCMS is a valuable resource to enhance teaching effectiveness and student learning. The data also suggested that teacher educators integrated the BbCMS as a supplement to face-to-face sessions using it both as a technology teaching resource and a technology course management resource. The results of the third key research question revealed that there was an inconsistency between teacher educators with constructivist beliefs and their reported use of the BbCMS. The data for the fourth key research question revealed that the challenges teacher educators experienced were based on contextual factors as well as the inability of the affordances of the BbCMS to satisfy their beliefs.

This chapter will draw on theoretical resources in using the assumptions of teacher’s beliefs by Pajares (1992), Becker’s (2000) principles of teacher centred pedagogy and Savery and Duffy’s (1995) instructional principles of constructivism as lenses for understanding of how teacher educators’ perspectives of the value of the affordances of the BbCMS and their pedagogical beliefs influenced their integration of the system into their courses. The profiles of each participant for the interview can be found in Appendix 15.

This chapter presents the data according to the four main categories that evolved during the analysis of the data. The first section presents that data for the category: value of the BbCMS for teaching and learning, according to the sub-categories; enhances teaching effectiveness and student learning. The second section presents the data for the category: resource to supplement face-to-face classroom sessions, based on the two sub-categories which supports the main category; technology teaching resource and technology course management resource. The third section presents the data for the category: alignment of teacher educators’ beliefs and the integration of the BbCMS. The final section presents the data for the category: challenges experienced by teacher educators, based on the three sub-categories; administrative issues, teacher issues and technical issues.

## 7.2 Value of the BbCMS for teaching and learning

The first key research question focused on teacher educators’ perspectives of the value of the affordances of the BbCMS as a teaching and learning resource for course delivery. Similar to the findings of the open-ended questionnaire the data from the interviews revealed the category: value of the BbCMS for teaching and learning. This main category is supported by the two sub-categories: the BbCMS enhances teaching effectiveness and student learning. I argue that of the affordances of the BbCMS can be interpreted as a valuable resource for enhancing teaching effectiveness and student learning when used to support face-to-face classroom sessions and I draw on the writings of Savery and Duffy (1995) and Pajares (1992) in making this analysis.

### 7.2.1 Teaching effectiveness

Similar to the responses from the open-ended questionnaire, interview participants gave their perspective of several affordances of the BbCMS which they suggested enhanced their teaching effectiveness. These affordances which include accessibility, diversity, reflection and communication and collaboration are consistent with the affordances of ICT put forward by Conole and Dyke (2004). From the narrations of the eight participants, six suggested that the affordances of the BbCMS can enhance teaching effectiveness while two did not agree. The following interview excerpts are from participants’ responses to the question “What are your views on the use of the BbCMS for course delivery?”

Blackboard [BbCMS] is a valuable tool for teacher education. I can engage my students in activities because they have already been exposed to materials that support the objectives for the session. The pre-engagement with material also allows for greater participation and discussion in the classroom. It provides a lot of stimulation for students beyond the classroom. It allows them to explore beyond what you provide as basic resources for students for any particular topic. It allows them to comment, post blogs etc. (Jim).

Blackboard [BbCMS] can be a useful tool. I can post material for my students to read before they come to class, so when they come to class they are more prepared. Also, I don’t have to wait until the next week or next class if I want to engage them in some individual or group activity. For example, I can post a comment on the discussion board or blog and ask them to respond. They have time to think about the questions before answering. They also have the benefit of reading other comments. Staying in touch, engaging them outside the classroom, directing them to resources through links I post, all these help in enhancing my teaching. (Sally).

Extremely useful. Students always have access to the material and they have access to me. I could see it helping in that it freed up the classroom time for more meaningful activities. They can also discuss things among themselves. Another important point, students are not hustled into answering questions as often happens in classroom sessions. With Blackboard they can respond to questions on their own time. They can also post questions for me when they have difficulties outside of classroom sessions. (Jenny)

Can be helpful. Although I believe in face-to-face sessions I believe Blackboard does enhance student leaning. Students have all the material required for a lecture before class sessions. If they read it [the lectures] classroom discussions could be a lot more meaningful and engaging. However, it depends on the students. There is also the fear factor. Many students don’t like to speak in class because of fear or other reasons. Sometimes I see contributions from these students on Blackboard. In that way it is helping in the communication process. (Simon).

Blackboard [BbCMS] has a lot of benefits. For example, students have material to engage themselves with before they come to class. If they do, classroom sessions can be more rewarding. You can also use different mediums in which to engage students. You can use journals, blogs and wikis. In that way it caters to students with different learning styles.(Cindy).

While I believe that Blackboard have the tools to cater to the needs of most of my students in terms of ability to access information, get feedback and join discussions online, which can enhance my teaching, there are issues of student involvement and accessibility. If students cannot access what is on Blackboard then it makes no sense. Also if students can access what is on Blackboard but do not, I cannot say that it improves my teaching. (Tara).

From these narrations it seems that these six teacher educators value the affordance of accessibility because it allows students to interact with material before they attend classes thereby enhancing participation and discussions in class. In this way students become active learners in the learning process which Cross (2009) suggests is a core concept of constructivism. In addition, Jim, Sally, Jenny and Simon value the affordance of communication and collaboration because it allows students to engage in discussion and collaboration. The affordance of diversity which caters to the different learning styles of students was mentioned by Cindy, Jim and Sally. These teacher educators suggested that students can be engaged in a variety of ways; blogs, journals and wikis. The BbCMS affordance of diversity allows teacher educators to create a learning environment that supports learners thinking which is an important aspect of Savery and Duffy’s (1995) principles of constructivist teaching. The affordance of reflection which was not reported in the open-ended questionnaire was mentioned by two participants; Sally and Jenny.For example Sally suggested that “students are not hustled into giving responses as happens in the classroom.” Here we see that Savery and Duffy (1995) eighth principle which suggests that teachers provide the opportunity for reflection on the content learned and the learning process is seen as valuable for enhancing teaching.

Two participants reported that the BbCMS did not enhance their teaching effectiveness. For example, Kate described the use of the system in teacher education as a “technical rational approach to education” which is not what she believes teaching should be. Kate stated that the affordances of the BbCMS system are good for “delivering instruction about a subject” however she saw this as a “very limited form of teaching.”

Kate was also very critical of the impact of using the BbCMS in a teacher education programme. She related to me an incident where a student asked that she post all her lectures on the BbCMS so that the student could stop attending classes. Kate cautioned that the more the BbCMS is used in teacher education the possibility of producing a “total teacher” is being quickly lost. According to Kate,

We are moving away from what we ought to be. They [Students] are more deeply concreted in passing the exams. Because we are using the Blackboard [BbCMS] more and more, the avenues for really developing them [student teachers] as human beings, as being an educated person is becoming more and more slim for me. I don’t believe you can develop a total teacher using Blackboard [BbCMS]. Not that you can’t have it, but for this profession you need to have face-to-face interaction to develop a total teacher.

Kate explained that a

Total teacher is one who is not only competent in the subject matter but one who is able to develop their students to be better human beings, better citizens. That cannot be taught using Blackboard, it has to be taught through the interactions that take place in the physical classroom with their teachers. You might say it is part of the hidden curriculum.

She also argued that the impersonal nature of the system prevents the development of many of the qualities that are necessary to develop a total teacher.

Similarly, Verna was also very passionate about the need for face-to-face sessions in her courses. She stated,

In my subject area you need to interact with your students face-to-face. I have to engage my students in discussion. I need them to perform and demonstrate. I need to bring the topic alive. That cannot be done on Blackboard. I have to teach students how to do these by modelling and getting them involved in activities. They have to do it for themselves. They have to experience it.

Like Kate, Verna also believes that the BbCMS can deliver content knowledge about a subject which is only part of the requirements of teacher education. She explained,

For me it is not only about passing the course. It is about developing a teacher to function in the classroom. You see, knowing the content is one thing. You might be able to pass the exam with that, but how to deliver the content and interact with students are equally important. Developing pedagogical skills, teacher competencies are also very important. These things have to be developed in the classroom, face-to-face with the teacher.

These participants’ perspectives which suggest that the BbCMS does not enhance their teaching effectiveness because the affordances of the BbCMS cannot replace what happens in face-to-face sessions may be explained using Pajares (1992) assumptions of teacher beliefs. According to Pajares (1992) individuals tend to hold on to beliefs based on incorrect and incomplete knowledge even after scientifically correct explanations are presented to them. The perspective that the competencies necessary to become a teacher can only be developed in face-to-face situations seems to play a role in these participants’ perspectives of the affordances of the BbCMS. It may also be explained in terms of power relationships in the classroom. These teacher educators although espousing constructivist beliefs seem to still want to hold on to power in the classroom. This contradicts the philosophy of constructivism which proposes a shift in power from teacher to student. The student has to take charge of their learning with the teacher providing support (Cross, 2009). It also contradicts Savery and Duffy (1995) principle which suggest that teachers should give the learner ownership of the process used to develop a solution. This principle suggests that in a constructivist mode of teaching the learner must have ownership of the learning or problem solving process as well as having ownership of the problem itself.

### 7.2.2 Enhances student learning

The perspective that the affordances of the BbCMS can enhance student learning was reported by six participants during the interviews. The other two participants gave comments that suggested that the BbCMS does not allow learning in all aspects of teacher education. When asked if the use of the BbCMS for course delivery can enhance student learning, Jim was quick to add “only if used in conjunction with face-to-face sessions.” He continued,

The system has the tools to allow teacher educators to do a lot of things. These tools can cater to the different learning styles of students. It does allow you to use it in student-centred ways. For example, students can communicate and work together on tasks outside the normal classroom sessions.

We see here that Jim’s perspectives of the affordances of the BbCMS as a resource that can enhance learning by catering to different learning styles and enabling communication and collaboration are based on constructivist principles espoused by Savery and Duffy (1995).

Similarly, Sally also believes the BbCMS can enhance students learning as it provides additional opportunities for students to “discuss, collaborate and share” with each other and herself. However, she believes that the “onus is on the students to make the effort and also pay attention so they can benefit from what is being done on the system.” She insisted that students “can use the material placed on Blackboard for independent learning. They can also get support from their teacher and classmates.” Here we see Sally suggesting that the BbCMS can provide an environment for students to engage in self-directed learning. According to Savery and Duffy (1995, p. 31) “understanding is in our interactions with the environment.” This suggests that the context, the environment and the goals of the learner are important for learning to take place.

Cindy also suggested that the affordances of the BbCMS are “helping students to deeply process information” and is helpful in improving student learning. With respect to using the BbCMS as a resource to supplement her face-to-face session Jenny believes that the affordances of the BbCMS are able to support what she does in the classroom in terms of delivering course content. However, with respect to the pedagogical aspects of her course, Jenny argued that her ability to model best practice cannot be done with the BbCMS alone. She stated,

Blackboard helps in delivering the content. I can post things for my students, have discussions etc. But when it comes to modelling how things should be done in the classroom I believe it is not possible with Blackboard [BbCMS]. These things have to be done face-to-face in a classroom.

Jenny also stated that the affordances of the BbCMS can help students to enhance their learning because it allows them to “construct, analyze and synthesize knowledge, thereby making them independent learners.” This belief is consistent with the findings of DeSieno (1995) who found from his research that integrating technology into teaching encourages student to become more responsible for their own learning. Like her colleagues, Jenny was also very clear about the BbCMS being used to supplement face-to-face sessions. She stated, “Education Technology is a very dynamic subject, although I believe that Blackboard [BbCMS] can do a lot of things I still feel that we need a certain amount of face-to-face sessions if we are to do a good job in developing competent teachers.” Jenny was not able to give the number of face-to-face sessions that might be required in her courses but insisted that they are necessary in her courses.

Similarly, Tara also agreed that the BbCMS can enhance student learning. However, she insisted the students must access what is placed on the system and get involve in online activities. She said, “Blackboard has many tools to enhance learning. Tools like the discussion board, blogs and wikis can all enhance learning if students do their part. Students have to access the material posted and read it. They also have to contribute to the discussions on Blackboard for it to be beneficial. Other than that it makes no sense.” Tara comments suggest that the onus is on the student to be motivated enough to access what is placed on the BbCMS as well as participate in online activities.

Simon also believes that the affordances of the BbCMS can enhance student learning because it can foster independent learning. According to Simon the system can allow students to “access course material, get support from peers and the teacher.” However, he added that this can only happen if the BbCMS works efficiently and all students have access to it. Simon also argued that a blended approach would satisfy the requirements of both the content and practical aspects of the courses and would certainly be more beneficial than using the system as an appendage.

In terms of enhancing student learning, Kate indicated that the BbCMS can help students learn about the subject. This she argued is a “technical, rational, behaviourist and instrumental” approach to teaching. In her opinion this approach allows students to get all the “stuff they want to pass an exam” but it does not enhance true learning which entails the “practical and critical approaches to education” which are necessary for teacher education.

Similarly, Verna does not believe that the BbCMS can enhance student learning. She believes that students “learn best by doing, hands on activity with teacher supervision monitoring, commentary and re-direction of task performance” which Verna believes can only be done in face-to-face sessions. Here we see that Verna’s beliefs about how her course should be taught has a direct link to her beliefs about how the BbCMS should be used. In fact two beliefs are at work, Verna’s belief about how her course should be taught and her beliefs about the BbCMS. Her beliefs about the need to teach her course using face-to-face sessions is a more deep seated central belief and therefore becomes her dominant or core belief and is difficult to change (Pajares, 1992). According to Green (1971) core beliefs are difficult to change because they are held with passionate conviction. As such Verna’s perspective of the affordances of the BbCMS is superseded by her core belief that student learning can only be enhanced if the students are taught using face-to-face classroom sessions.

### 7.2.3 Summary

The majority of the participants suggested that the BbCMS affordances of accessibility, communication and collaboration, diversity and reflection can play an important role in enhancing teaching effectiveness and student learning. The narrations of participants also suggested that face-to-face sessions are necessary for preparing student teachers with all the skills necessary to become a teacher.

## 7.3 Resource to supplement face-to-face classroom sessions

In the previous section I analysed participants’ perspectives of the affordances of the BbCMS for achieving the instructional goals of their courses. In this section I analyse how participants integrated the BbCMS system into their courses. The analysis of the narrations of participants obtained via the semi-structured interviews revealed the category: resource to supplement face-to-face classroom sessions. The two sub-categories: technology teaching resource and technology course management resource were also revealed and served to support the main category. The main category and the two sub-categories are consistent with the findings of the open-ended questionnaire. In this section I argue that participants integrated the BbCMS as a supplement to support their face-to-face classroom sessions and I use the writings of Savery and Duffy (1995), Pajares (1992) and Becker (2000) in making this analysis.

### 7.3.1 Technology teaching resource

During the interviews participants spoke about the different ways they integrated the BbCMS to assist in the delivery of their courses. One of the most salient sub-categories based on participants’ responses was emphasis on the use of the BbCMS as a technology teaching resource to store course material and for communication and collaboration.

#### 7.3.1.1 Storage medium

All eight interview participants reported using the BbCMS as a storage medium for the storage of their course material and course information for easy access by students and themselves. The participants indicated that they use the BbCMS to store course outlines, PowerPoint lectures, announcements and additional notes. This view was clearly expressed by Sally who reported,

I use Blackboard [BbCMS] for storing course material such as course outlines, announcements, any additional notes and all of my lectures. This saves me a lot of time. This also allows me to provide greater assistance to my students in the classroom.

Here we see Sally using the BbCMS to store course material to support her class sessions. Participants Jim, Jenny, Sally and Tara also used the BbCMS to store videos, podcasts, animations and links to online resources. Jim reported,

I have used Blackboard [BbCMS] to provide multimedia material for my students. For example I provide videos, animation and links for my students. Students with different learning styles can benefit from this. It also allows my students to come to class more prepared.

In addition Jenny said,

Things can be placed on it [BbCMS] at short notice for students to access. I would usually post announcements, videos, podcasts and links to certain sites. These resources allow students to have a range of material available to them. This aids in their learning.

The use of the BbCMS to store material that caters to the different learning styles of students supports Savery and Duffy (1995) sixth principle which suggest that teachers should develop the learning environment to support and challenge the learners thinking. These findings are also consistent with those of Weaver (2006) and Bradford et al. (2007) who found that CMS can be used to store different types of documents for easy access by students and teacher educators. This allows students to review the material as many times they wish before coming to class. In addition, it improves time on task and choice all of which are important for learning to take place.

#### 7.3.1.2 Resource for communication and collaboration

The BbCMS was also used as a communication and collaboration resource by all eight participants. The system offers both synchronous and asynchronous communication. For example, the online chat tool can allow synchronous discussion whereby both teacher educator and student(s) can communicate online at the same time. Asynchronous communication does not require individuals to be online at the same time. Asynchronous discussions for example, e-mail and discussion boards give students time to thoughtfully compose their responses before submitting it to the class (Heirdsfield et al., 2011).

Participants Jim, Jenny, Sally and Simon use the discussion board as a way of engaging their students in open collaboration outside the classroom thereby creating a community of learners through interaction and networking. Networking is a way of sharing and supporting; in this way, it serves to link individuals to each other. As Sally reported,

There was a discussion using the discussion board on the topic of dyslexia. At the end of the discussion a document was created on teaching strategies for dyslexic students. They [students] all contributed. Students have that for their use.

In this scenario Sally created a learning environment in which students were able to exchange ideas, communicate and collaborate, construct knowledge based on a problem presented to them by their teacher educator. In addition, the teacher was part of the discussion and provided guidance. This example of how Sally integrated the BbCMS into her course closely aligns with Savery and Duffy’s (1995) principle of giving the learner ownership of the process used to develop a solution. It is also supports Vygotsky (1978) theory of social constructivism which suggests that social interaction and context is necessary for learning to take place. In this scenario Sally created a situation in which learners were able to exchange ideas and collaborate in solving a problem. This supports Cross (2009) who described the role of the teacher within the concept of social constructivism as being able to design tasks and activities, provide relevant feedback and act as facilitators of dialogue during the learning process.

Another example of networking and sharing with the use of the discussion board was given by Jenny who said,

You could put up for example a video on Blackboard [BbCMS] and then after they have viewed it, they can ask questions and discuss it from different perspectives. At the end they can all put their discussions together and everybody can share it.

Here we see that the questions on the discussion board were posted not only by teacher educators but also by the students. When this happens, not only do teacher educators answer students’ queries, but students also answer each other, which is what teacher educators like to see, as communication and collaboration of this nature can lead to learning. In this way the BbCMS facilitates student-student interaction as well as teacher-student interaction. These examples provide evidence that suggest that the BbCMS are being used in ways that are consistent with Vygotsky’s (1978) theory of social constructivism. In addition, the implication here is that knowledge is not confined to the classroom, and the BbCMS can be used to put people in contact with each other “because the BbCMS can extend the classroom beyond the boundaries of the classroom” (Jim).

The discussion board also allows teacher educators to receive feedback from students pertaining to their level of understanding, as in the case of Jim who reported that,

Powerful learning must provide opportunities for feedback. So I am able to get feedback from students in different ways in terms of the activities I ask them to do on Blackboard. I get a better sense of their understanding when they provide feedback in terms of the comments they give on my sessions.

The ability to receive feedback from students is seen by teacher educators as a way to check students understanding and fit in with the constructivist view of teaching. Jim, Jenny, Sally and Simon also indicated that they use the BbCMS to provide timely feedback to their students. Jenny said,

I like the idea of being able to communicate with my students at a distance so they can be in touch with me to clarify their understanding at any point and I can respond to them almost immediately.

In addition, the following interview excerpts from both Sally and Simon provide evidence of their use of the BbCMS to provide feedback to their students.

It allows me to get feedback from my students on what they have learnt and to what extent they have benefitted from my instruction. It also allows me to provide feedback to my students in terms of their performance in coursework, timely feedback. (Sally).

I like the ability to help my students even out of class sessions. Sometimes after discussing something in class there may still be some gaps in the students’ understanding. I can deal with this before they come to class via the discussion board or if they email me. (Simon).

Timely feedback is seen by constructivists as an important way to help students clarify important concepts to bring about greater understanding (Gensburg & Herman, 2009). In addition, the findings suggest that these participants use of the BbCMS is consistent with the ideas of social constructivism (Vygotsky, 1978) as they all made efforts to create a collaborative learning environment where students were able to construct their knowledge by discussing and sharing ideas and information.

### 7.3.2 Technology course management resource

Analysis of the data from the interviews also revealed that some teacher educators use the BbCMS as a technology course management tool to collect assignments and create student groups.

#### 7.3.2.1 Collection of Assignments

Participants Jim, Jenny, Sally, Tara and Simon all reported that they use the BbCMS to create drop off boxes for students to submit assignments. According to Simon,

I use the grade book and assignment because it allows me to collect assignments without the hassle of being there physically. Also when I am ready to grade I can mark the scripts and give students feedback at the same time. It is so convenient.

Five teacher educators reported that the drop off box feature allow them to set cut-off dates and times outside the normal teaching hours for students to submit assignments. They also indicated that they use this feature because it allows students’ assignments to be stored in one location thereby facilitating easier access for grading and feedback.

#### 7.3.2.2 Creation of Groups

When course shells are created for teacher educators by the university’s Learning Centre, teacher educators have to determine how they will manage and post content for students. Teacher educators have to also work out how they will manage discussions and the submission of assignments. At the CEPUTT one teacher educator may have up to three class groups doing the same course in a given semester. When teacher educators are given a course shell for a course they can create separate class groups for the course. Participants Jim and Tara reported that they use the BbCMS to create class groups to better manage the way discussions are conducted and assignments are submitted. For example, Tara reported,

As soon as I get my class list and my course shells I create groups and then I ask my students to self-enrol. This makes it easier for collection of assignments, announcements and giving feedback to students. Previously I kept everybody together and that created problems for me especially when I had to assign marks at the end of the semester and even when I had to post announcements.

Here we see that although Tara does not make extensive use of the BbCMS in her teaching she uses the software for classroom management purposes. This supports the findings of Morgan (2003) who found that teacher educators adopt CMSs mainly to “manage the more mundane tasks associated with teaching” (p. 2). In addition to placing the classes into groups Jim reported that he created project groups for his students to work together. These project groups allow students to share files and have online discussions. In addition, he was able to monitor the contributions made by individual students. The management features of the BbCMS assist teacher educators to create an environment where groups of students have their own space online to communicate and collaborate to accomplish tasks set by teacher educators. This suggests that teacher educators are using the management features of the BbCMS to assist in constructing a constructivist learning environment based on the principles suggested by Savery and Duffy (1995).

### 7.3.3 Summary

In this section I have described how participants integrated the BbCMS into their courses. Their narrations of the integration of the software revealed participants use the package both as a technology teaching resource and a technology course management resource to supplement their classroom sessions. While the data showed that all participants use the software, their level of use was different. The main method of integration was the use of the software to store course material and course information. As a technology teaching resource it allows students to have ready access to course material and as a technology management tool, participants were able to organise their course content for delivery allowing for easy updating and transfer to other course shells.

The use of the BbCMS as a communication and collaboration resource to place announcements for students was another way all participants integrated the BbCMS into their courses. However, only four of the participants used the discussion board to allow discussions and collaboration among students and between teacher educators and students. These discussions were meant to extend classroom discussions beyond the walls of the classroom and as a means of fostering collaboration among students. This method of integration fits in with the ideas of social constructivism as espoused by Vygotsky (1978).

Four of the participants used the software to create drop-off boxes to collect assignments beyond the normal working hours. These participants also used the Grade Center to access the assignments for grading and to provide feedback to students.

The creation of class groups was another way two participants integrated the software into their courses. However, only one participant went further to create project groups so that students can collaborate online and share files and at the same time be monitored by the teacher educator. The use of the BbCMS to allow groups to work together guided by the teacher educators to construct knowledge also strongly fits in with the constructivist view of teaching.

In the next section I analyse the data pertaining to teacher educators’ pedagogical beliefs and their use of the BbCMS for achieving the instructional goals of their courses. Their narrations of these beliefs will help to clarify some of the issues pertaining to the integration of the BbCMS.

## 7.4 Alignment of beliefs and the integration of the BbCMS

In the previous section I analysed how participants integrated the BbCMS in their courses. In this section I analyse how teacher educators’ integration of the BbCMS into their courses aligns with their espoused constructivist philosophy and student-centred teaching style. It responds to the third key research question of this thesis: What is the relationship between teacher educators’ pedagogical beliefs and the integration of the BbCMS for course delivery? The major category that was revealed was: alignment of teacher educators’ beliefs and the integration of the BbCMS. In this section I argue that there is an inconsistency between teacher educators espoused constructivist philosophy and their integration of the BbCMS into their courses and I use the writings of Savery and Duffy (1995) and Pajares (1992) in making this analysis.

Jim’s constructivist pedagogical beliefs about teaching and learning are consistent with his description of constructivism. According to Jim, the “learner must be able to construct their own understanding. They must be able to make sense of things for themselves.” Jim stated that the BbCMS fits into his philosophy of teaching because it “gives students opportunities to construct their own understanding of subject matter.” He believes that the tools available in the BbCMS can be used to create activities which can allow students to construct their own knowledge, interact among themselves and also learn from one another. He stated that the features of the BbCMS “create a kind of learning climate that transcends the classroom and transcends time.”

Jim’s student-centred teaching style is closely aligned to his philosophy of teaching as can be seen from this excerpt,

My teaching style is one that is open. I provide choices for students. I provide opportunities for them to make sense of things in different ways. I create activities for them where they are able to engage themselves in their own understanding.

Jim also indicated that the BbCMS fits in with his teaching style. According to Jim,

A lesson in the classroom is locked within time and space. When you get into technology tools like Blackboard, there are no boundaries in terms of learning. Blackboard allows you to engage your students in multiple levels and multiple ways. I am able to get students to work together to construct knowledge using tools like blogs, journals, wikis. I provide topics for them to discuss using the discussion board. I also use the discussion board to give them feedback.

These excerpts show that Jim’s use of the BbCMS to engage students in many ways to construct knowledge fits in with Savery and Duffy’s (1995) principles of constructivist instruction.

Like Jim, Sally also espoused a constructivist philosophy of teaching. Sally reported that the BbCMS fits into her philosophy of teaching because it contains a number of tools which can assist in developing both the social skills and academic knowledge that are required in today’s society. Sally remarked that the BbCMS has “a number of tools which teacher educators can use to engage their students to develop critical thinking skills and competencies in whatever subject.” She also claimed that students can use the number of communication tools available in the BbCMS to develop their communication skills. She cited the ability to develop independent learners as another way the system fits into her philosophy. According to Sally,

A teacher can place everything on the system to facilitate learning. Students can do a lot of things on their own. You don’t need to have the teacher there doing everything. For example, I sometimes place a question on the discussion board and ask students to write responses to the question. They [students] have to do their own research, before they can post an answer. They are also required to read the responses of the other students and give comments. This creates healthy discussion.

Sally also indicated that the BbCMS fits into her teaching style because it “facilitates student-centred learning.” She stated,

Teaching is interactive. For example I ask students to view a video or listen to a podcast I have provided links to or uploaded. Students are then asked to comment on the material. I respond via Blackboard and guide them so that they can arrive at an understanding of whichever topic we are doing. In addition, when they come to class I can get a lot more done. I can build on what they have already done.

Here we see Sally using the BbCMS to allow students to construct knowledge of a topic by researching the topic and then providing a response. In addition, Sally allows students to use resources she has uploaded to the system to create their own knowledge. She also stated the BbCMS fits into her teaching style because it allows students to interact with the teacher educator and each other to create material which can then be shared. This level of social interaction fits in with constructivist approaches to learning as described by Vygotsky (1978). The suggestion that students are researching topics given to them, commenting on other students work and also posting their own comments fits in with Savery and Duffy (1995) principles of giving students ownership of the problem and creating a learning environment which support and challenges learners thinking. It also supports Savery and Duffy (1995) principle of providing support and reflection on both the content learned and the learning process.

Jenny reported that her philosophy of teaching is based on constructivism and her teaching style is student-centred. She reported that the BbCMS fits into her philosophy of teaching to a certain extent. She said, “It allows for content to be delivered in many different ways, it also allows for students to communicate with each other and the teacher educator and it can develop independent learning.”

Jenny, like Jim believes that the BbCMS “opens up the classroom so that the classroom is no longer confined to the walls of one institution, learning can take place anywhere.” Although these features fit into her philosophy of teaching, Jenny was not sure it was sufficient for the effective delivery of her practicum course. She explained that while “posting content and communicating is possible, the skills required for developing pedagogical skills has to be done in the classroom with a teacher present.”

Verna espoused a constructivist philosophy and a student-centred teaching style. Verna does not believe that the BbCMS fits in with her philosophy of teaching. The following excerpt explains her reason for this position.

I believe in face-to-face interaction and immediacy. My subject matter is dynamic, not fixed. Shared live discussion on urgent matters, not necessarily pertaining to the subject but about education as a whole is an important part of my sessions. Aha! Moments are important to me.

Verna described her teaching style as one that entails “constant dialogue, demonstration, use of current information, creation of original resources, students’ expressiveness and creativity.” Verna does not believe that the BbCMS system fits her teaching style and as such she mostly uses the BbCMS to store course material and course information for access by students. She agrees that the discussion tools available on the BbCMS can facilitate “a certain level of discussion, follow up, feedback and advice.” However, she argued that these tools are limited and can sometimes add to the difficulties students have in expressing themselves in writing. She said, “There are many weak students who have difficulties expressing themselves in writing. These students can find [text based] discussions on Blackboard more challenging than face-to-face interaction.” Here we see that Verna suggesting that one limitation of the BbCMS is its heavy dependence on the written word, which may not be the preferred choice for some users.

Verna also added that the BbCMS does not fit in with her teaching style because it prevents her from using “the human touch in her classes.” She argued that face-to-face sessions allows her to read her students’ body language and facial expressions to get clues to their understanding of a topic. She reported,

In a class I can look at their faces, their body language and have an idea if they understand or not. I can easily ask a student a question if I believe she [he/she] does not understand. I don’t think that is possible in Blackboard.

Based on her responses Verna does not believe the BbCMS fits in with her philosophy and style of teaching although her pedagogical beliefs are similar to her colleague Simon in the Language Arts department.

Kate’s philosophy of teaching is based on a constructivist philosophy. Kate indicated that the BbCMS fits into her philosophy of teaching in a “very, very small way.” She argued that although the system is interactive it is very limited. She stated that the conversations that take place on the BbCMS is a “very limited form of human interaction and it cannot replace the human conversation when people physically sit together and talk.” Kate also pointed out that the BbCMS might be good for interaction about subject content but does not believe that is what education is about.

Kate described her teaching style as follows,

I try to reach each student in my own unique way, my language, my habits, my democratic approach, my open door approach. Real world connections. Connecting themselves and experiences. I always marry the theory with the practice so they can experience success.

She reported that her students must have “declarative knowledge” which is the ability to relate what they have learnt to their teacher. She argued that this involves a level of conversation that the BbCMS does not allow. Here we see that although both Jim and Kate are members of the Mathematics department and have similar constructivist beliefs they both have contrasting views of the integration of the BbCMS into their courses. While Kate does not use the system to any great extent because of her beliefs that the system is not suitable for the development of a total teacher, her colleague Jim uses the tools in constructivist ways that can enhance students learning. This supports the view that two teacher educators may have similar pedagogical beliefs but may have very contrasting beliefs about how technology can be used (Ertmer, 2005).

Cindy’s philosophy of teaching is also based on the constructivist belief which advocates that “students are responsible for their own learning and the role of the teacher educator is to facilitate that learning by creating the right environment, where students can collaborate, discuss and develop material.” She also believes that the teacher educator must create the right learning environment so that learning can take place. Cindy admitted that while she believes the BbCMS fits into her philosophy of teaching to a certain extent, she is not quite sure that it allows for the overall development of the student teacher.

Cindy pointed out that the BbCMS can fit into her teaching style, because “learners need to take responsibility for their own learning” and she believes the BbCMS can help in doing this. However, Cindy expressed doubts about the capability of the BbCMS to develop competencies in the teacher which she sees as important but may not be part of her subject course outline. According to Cindy,

Based on what I know and I have been to several of the [BbCMS] courses, I believe that Blackboard can help develop independent learners. I see it helping in terms of subject matter. However, in terms of some of the values we try to get across to our teachers I don’t know if this can be done on Blackboard.

Cindy added that “developing a teacher is much more than teaching content.” She argued that her role is not only to teach subject content but to also develop a teacher. She explained that, what she does in the classroom and how she does it are all lessons for her students. She said,

In all my classes I try to get over some of the characteristics of what I think a teacher should possess. How I respond to students, my interaction with them, how I deal with situations in the class are all lessons from which my students can learn. I don’t believe this can be done with Blackboard.

These excerpts seem to suggest that Cindy believes that the BbCMS can fit into her philosophy of teaching and her teaching style by providing content material for her students. However, while it may be useful in delivering subject content matter it may not be adequate for developing some of the qualities of a teacher which may not be part of the subject content but are essential for overall student teacher development and education.

Simon’s philosophy of teaching is based on his belief that “all learners have the capacity to benefit from instruction and there is no content that is impossible to deliver to students.” He also believes that the “greater the level of involvement of the students in constructing their knowledge the more likely the results will be beneficial to them.” Simon indicated that the BbCMS fits into his philosophy of teaching to some extent. One of the reasons given for this is the ability to have students online on the BbCMS at the same time outside of classroom sessions. He emphasised that “this [BbCMS] allows me to have my students engaged in discussion and activities outside of normal class sessions. I can extend or clarify what was done in the class.”

Simon’s teaching style matches his philosophy of teaching. He stated,

My teaching style comprises a number of different dynamics. It is a combination of lecture and discussion and group work. While I do my presentations I ask for their thoughts and feedback on whatever I present to them. Students are allowed an opportunity to raise any questions, any misconceptions they may have, any thoughts they may want to share with the class. I try to get them to work with their colleagues to respond to these.

Simon’s responses indicate that his philosophy of teaching and his teaching style supports the use of the BbCMS as a resource in the delivery of his courses.

Tara’s philosophy of teaching is constructivist. Like Jenny, Tara also believes that the BbCMS does not fit totally into her philosophy of teaching. She argued that although it allows her to provide resources for students outside lecture sessions thereby broadening their horizons, the level of interactivity the BbCMS provides is not sufficient for effective delivery of her courses.

Tara reported that she uses a very informal approach to teaching; a combination of lecture, questions and responses, group work, and practical work. She pointed out that the BbCMS does not fit her teaching style but it can assist with the face-to-face delivery of her course. She agrees that it does provide different tools that can complement what she does in the classroom, however she was very adamant that these tools cannot allow for the level of interaction and activities that is possible with face-to-face sessions.

### 7.4.1 Summary

In this section we saw that four participants believe that the BbCMS fits in with their constructivist philosophy of teaching and have integrated the system in ways that are compatible with their constructivist beliefs. However, the other four participants although espousing a constructivist philosophy did not use the BbCMS in ways that were compatible with a constructivist philosophy. These participants believe that the BbCMS only minimally fits in with their philosophy or did not fit at all. The main reason they gave for this inconsistency was the belief that the BbCMS is only capable of developing content knowledge. Another reason given was the belief that the collaboration tools does not allow for the level of discussion that is required and is possible in a face-to-face classroom session.

## 7.5 Challenges experienced by teacher educators

In the previous section I analysed the relationship between teacher educators’ pedagogical beliefs and the integration of the BbCMS for course delivery. This section analyses the challenges experienced by participants as they integrated the BbCMS into their courses as related to me during interviews. It responds to the fourth key research question of the thesis: What challenges did teacher educators encounter as they integrated the BbCMS into their courses at the CEPUTT. During my analysis of the interviews I identified one main category, which is: challenges experienced by teacher educators. A number of sub-categories which will be explored separately in this section can be viewed as supporting the main category as they reinforce the central idea. The sub-categories are: administrative issues, teacher issues and technical issues. Some of these issues were also revealed in the analysis of the open-ended questionnaires. In this regard, I argue that teacher educators experienced a number of challenges which presented barriers to their integration of the BbCMS into their courses in ways that are aligned with their espoused constructivist beliefs and I draw on the writings of Savery and Duffy (1995) and Pajares (1992) in making this analysis.

### 7.5.1 Administrative issues

Administrative issues were reported by all participants as one of the major challenges they faced with the integration of the BbCMS into their courses. The issues cited were: unsuitability of course designs for BbCMS integration and unsuitability of the BbCMS for teacher education. It is important to note that this issue was not reported in the open-ended questionnaire. This omission may be due to several reasons; an oversight on the part of the respondents, difficulty in articulating the challenge in the space provided or lack of will to spend time to complete the response to the item.

#### 7.5.1.1 Unsuitability of course design for Blackboard integration

The unsuitability of the course design for the integration of the BbCMS was one challenge three participants reported. These participants argued that their courses are not designed for the integration of the BbCMS in any significant way. Cindy reported that, “They [Administration] want to run a course which was designed totally for in-class sessions on Blackboard. That cannot work.” She added,

These courses were designed before the introduction of Blackboard. As it is, we cannot make any significant changes to the course outlines. I cannot say let us have an online session tonight and give students marks for it. The course outline simply does not cater for that. So students can choose to participate or not.

Similar sentiments were expressed by Verna who said,

You are trying to run a totally face-to-face programme and trying to fit Blackboard into it. That is impossible. Most of the courses we have that are designed for face-to-face really cannot fit. It does need a lot more work from a university perspective.

Although Jim and Kate had made no significant changes to their courses they indicated that they added a five percent course mark for use of the BbCMS for purposes other than accessing material and submitting course assignments in their course outlines in an effort to generate greater participation from students. Here we see that some teacher educators are trying to make adjustments to their courses to motivate students to use the BbCMS.

Simon also criticised the current approach of trying to use the BbCMS in courses that were designed for full face-to-face sessions. He described this as “unfair and unjust to both teacher educators and students” as they both have to struggle to find the time to engage with the system.

Cindy also argued that the system can be a very effective tool in the delivery of her courses if a course outline can be developed to specify what has to be done face-to-face and what has to be done using the BbCMS. She said, “What we have to do is sit down and workout what we can do on Blackboard and what has to be done face-to-face.” Cindy also argued that for the BbCMS to be useful in teacher education, “We need to have the right mix. Because part of our job is to model behaviour, demonstrate etc. So that students can learn delivery skills. If we get the right mix I think everyone can benefit.” She indicated that these issues have not been resolved thus far in her subject area and that more time is needed for those decisions to be made

### 7.5.2 Teacher issues

From the Literature Review it was shown that teacher issues play an important role in the integration of ICT. The analysis of the data revealed that participants’ experienced three teacher issues, these were; lack of time, lack of competence and inadequate training sessions.

#### 7.5.2.1 Lack of time

The time needed to integrate the BbCMS into courses presented a major difficulty for five of the eight teacher educators interviewed. These teacher educators reported that to use the system effectively require a significant amount of time. Verna indicated that one of the main difficulties she faced with the BbCMS was time constraints. She said,

It [BbCMS] is too time consuming. To use Blackboard effectively you need to spend a lot of time posting material and creating online activities for students. In addition you also have to spend time in discussion. All this is not catered for in the course outline.

Cindy’s sentiments also reflected the difficulties Verna experienced with respect to the integration of the BbCMS and time. She described her experiences as follows,

The most crucial thing is time. Time to prepare work, time to have discussions with your students outside the classroom and so on. I don’t have the time. You cannot give someone six courses to teach and then ask them to use a management tool like this.

Simon also explained that the BbCMS system may not be useful for course delivery because of the time demands it places on teacher educators. He said,

Remember I have to juggle time for grading assignments, time for my own reading and preparation and the time you want to give your students for that [BbCMS]. To me it is a challenge to see how you are going to factor that into your schedule. Remember you are teaching more than one course, you have to find time for more than one group of students. That to me seems very difficult.

These comments clearly show that the time required to effectively integrate the BbCMS into courses is a major difficulty faced by some teacher educators.

#### 7.5.2.2Lack of competence in using the BbCMS

Four teacher educators reported that they experienced difficulty in integrating the BbCMS because they do not have the skills necessary to use the more advanced features of the package adequately. Cindy admitted that she is not able to do some of the things she would like to do. She said,

I don’t quite understand the discussion board. I understand Blogging. I do not feel sufficiently comfortable with the design of the discussion board. I am a bit nervous about using it. I don’t feel sufficiently competent.

Kate views were similar’

Blackboard presents some difficulties because it is not as easy to use as the other types of technology I am accustom using. I still need to learn a number of things about the package. The more you become familiar with a piece of technology the easier it is to use it in different ways. I still have to learn all the capabilities of Blackboard for me to start using it confidently.

These views were similar to Simon’s who stated, “I guess if I was a little more familiar with it I might be able to integrate it more.” Verna also commented that “getting some of the features to work is not very easy and the instructions provided are not sufficiently facilitative.” These comments suggest that teacher educators face the challenge of technical competence with respect to the use of the BbCMS.

#### 7.5.2.3 Inadequate training sessions

Four participants reported that the training sessions provided by the university were inadequate and were unable to fulfil the needs of teacher educators. Jim indicated that he attended two of the initial sessions but it did not yield any significant benefits in terms of his ability to use the system for his purposes. Jim was critical of the way the sessions were taught. He explained that,

The training sessions were basically procedural where they showed you procedural stuff. How to add students, how to add content, things like that, basic things. They did not focus on how to use Blackboard as a pedagogical tool in teaching. I think that is the challenge.

Cindy, like Jim did not find the training sessions helpful. She said,

That [training session] was inadequate. I felt that every time they came they redid the introduction. They really needed to move on from there. People are still running around with bits and pieces of information. Bits and pieces of competencies but not from a holistic, confident, competent position. It is a little too piece meal.

Verna’ sentiments echoed that of Cindy. She commented,

The training was too procedural; steps to perform different tasks were the main method of teaching. They never showed examples of what an exemplary site contains or how teacher educators were using the system [BbCMS] to conduct discussions or provide feedback.

These comments suggest that participants did not benefit from the training sessions to any significant extent because it lacked the pedagogical content component required to prepare teacher educators with the skills to use the BbCMS to construct a constructive learning environment put forward by Savery and Duffy (1995).

### 7.5.3Technical Issues

The affordance of risk, fragility and uncertainty prevented a number participants from using the BbCMS. For example, infrastructural issues both at the university and in certain areas of the country presented a number of challenges for the integration of the BbCMS. Participants reported that the inability of some students to access computers and internet service both at the university and their homes prevented them from successfully integrating the BbCMS into their courses.

#### 7.5.3.1 Internet access

The numerous interruptions in internet access and the unavailability of internet access in some rooms at the CEPUTT also presented challenges for teacher educators integrating the BbCMS into their courses. Verna reported that there are frequent internet disruptions at the university, she added that while some may be due to the provider, she believes that the system itself is not very dependable.

Sometimes I may get internet access in one room but when I have to teach in another room there is no internet. The same thing happens with Blackboard. At the start of my class I try to show them what I have posted for them and recap what we may have discussed in a previous class. However many times I cannot access the internet. This frustrates the sessions.

The difficulties experienced by Verna in terms of internet access were very similar to those experienced by Tara. Tara admitted to being frustrated by the frequent internet disruptions and very slow internet speed at times.

Sometimes downloading material from my Blackboard site or from the internet is frustrating. On many occasions I have no internet access or very slow access. I cannot depend on the internet when I am teaching. I always need to have a backup plan.

These sentiments were also very similar to Jenny’s who has to use the internet very often in her courses.

Difficulties in integrating the BbCMS are also due to students’ inability to access the internet from their homes. Two participants reported that the unavailability of internet access or the slow speeds available at the homes of some students limited what they could do on the BbCMS. According to Sally, “Students always come with a story. I don’t have internet where I live or the computer lab was locked so I unable to get access. This limits what I can do on Blackboard.”

Simon also reported similar sentiments from students. He said, “Well it seems to me that they are saying they simply can’t get on. They try protocols that have been suggested to them but they are not getting on. Some people have weak signals where they live.”

Many rural communities on the island do not have high speed internet access which is necessary to use the BbCMS properly. Given the difficulties with internet access Simon believes that “it would be unfair to make student participation on Blackboard compulsory.”

#### 7.5.3.2 Summary

The analysis of the data revealed that teacher educators experienced many challenges while integrating the BbCMS into their courses. These challenges were: administrative issues, teacher issues and technical issues.

## 7.6 Conclusion

Participants reported that the BbCMS is a valuable resource to enhance teaching effectiveness and student learning. The data also suggested that teacher educators integrated the BbCMS as a supplement to face-to-face sessions using it both as a technology teaching resource and a technology course management resource. The analysis of the data also revealed that there is an inconsistency between teacher educators with constructivist beliefs and their reported use of the BbCMS. The data for the fourth key research question revealed that the challenges teacher educators experienced were based on contextual factors as well as the inability of the affordances of the BbCMS to satisfy their beliefs.

The Discussion chapter which follow draws on the theoretical resources outlined in the Theoretical Framework chapter and other research to provide reasons for the findings revealed in the two data presentation and analysis chapters.

# Chapter 8 Discussion

## 8.1 Introduction

In Chapter 6, I analysed the data from the responses of 53 out of 112 teacher educators obtained via an open-ended questionnaire. In Chapter 7 I analysed the data obtained from the interviews of eight teacher educators. This chapter attempts to provide reasons for the findings of this study by using the analytical framework discussed in Chapter 4 and other supporting studies. The analytic framework draws on Pajares’ (1992) assumptions of teacher beliefs, Becker’s (2000) principles of teacher-centred pedagogy and Savery and Duffy’s (1995) principles of constructivist teaching to help understand the experiences and perspectives of teacher educators as they worked to integrate the Blackboard Course Management System (BbCMS) into their courses. More specifically, it attempts to explain how teacher educators’ perspectives of the value of the affordances of course managements systems for course delivery and their pedagogical beliefs influenced their integration of the BbCMS into their courses. It responds to the following key research questions:

1. What are teacher educators’ perspectives of the value of the affordances of the Blackboard Course Management Systems (BbCMS) as a teaching and learning resource for their courses at the CEPUTT?
2. How have teacher educators at the CEPUTT integrated the BbCMS into their courses?
3. What is the relationship between teacher educators’ pedagogical beliefs and the integration of the BbCMS for course delivery at the CEPUTT?
4. What challenges did teacher educators encounter as they integrated the BbCMS into their courses at the CEPUTT?

The succeeding sections of this chapter will discuss the findings of this study based on the categories that were revealed during the analysis of the data from both the open-ended questionnaire and the semi-structured interviews. The first section discusses the category ‘value of the affordances of the BbCMS for teaching and learning’. This is followed by a discussion of the category ‘BbCMS as a resource to supplement face-to-face classroom sessions’. The third section discusses the category ‘alignment of teacher educators’ beliefs and the integration of the BbCMS and the last section discusses the category ‘challenges experienced by teacher educators’.

## 8.2 Affordances of the BbCMS can enhance teaching and learning

The perspective that the affordances of accessibility and communication and collaboration, can enhance teaching and learning was widespread among teacher educators. The majority of teacher educators who responded to the open-ended questionnaire (39 out of 53) and those who participated in the interviews (6 out of 8) held the perspective that the affordance of accessibility enhances teaching and learning. Using the BbCMS to provide course material was seen by teacher educators as a way of enhancing teaching and learning because it allows teacher educators to easily provide material for students. In addition, students are more prepared for classroom discussions and activities and also allow students to engage in self-directed learning. This strategy is supported by Savery and Duffy (1995) who suggested that constructivist teachers should provide support during the learning process and on the content learned. This finding is also supported by Robertson (2004) who indicated that university teachers use ICT tools if they are aligned with their beliefs about teaching and learning, and in the way that aligns with those beliefs.

The affordance of communication and collaboration which allows for communication and collaboration between students and teacher educators and among students was also seen as a way of enhancing teaching and learning by a smaller number (21 out of 53) of respondents from the open-ended questionnaire and four out of eight teacher educators who were interviewed. These teacher educators suggested that interaction between teacher educators and students such as providing feedback and being accessible to students outside of normal class sessions can assist in enhancing teaching and learning. In addition, the ability of the affordance to allow students to collaborate on projects fits in with the constructivist principle of supporting and challenging learners’ thinking as espoused by Savery and Duffy (1995). It also supports Vygotsky’s (1978) view that social interaction which involves talking, collaboration or teaching could enable learners to move through the ‘zone of proximal development’ where they are able to construct knowledge independently.

The affordance of diversity which was reported by a small number (10 out of 53)of respondents of the open-ended questionnaire and three teacher educators who were interviewed as a way of enhancing teaching and learning. For example, the ability to make video, sound, text and graphics available to students was seen by these teacher educators as a way of catering to the different learning styles of students. The small number of teacher educators making use of this affordance may be due to a lack of competence in the use of the tools.

In contrast, the belief that the affordances of the BbCMS does not enhance teaching and learning was put forward by 14 out of 53 respondents of the open-ended questionnaire and two out of the eight teacher educators who were interviewed. These teacher educators suggested that the lack of face-to-face interaction is one of the limitations of the BbCMS. For example, R41 wrote “to develop a teacher requires hands on face-to-face interaction. Physical presence is necessary to develop a well-rounded teacher.” Teacher educators’ belief that face-to-face sessions which entails the modelling of many of the competencies required for the development of student teachers tacit knowledge played a significant role in their valuing of the affordances of the BbCMS. These findings support those of Windschitl and Sahl (2002) who found that teachers evaluate the affordances and constraints of technology based on beliefs about students and their needs, about what appropriate teaching practices in certain subjects areas should be and about what levels of control their students should have. For example, teacher educators indicated that extensive use of the BbCMS for delivery of the curriculum cannot produce a ‘total teacher’. Kate said “I don’t believe you can develop a total teacher using Blackboard [BbCMS]. Not that you can’t have it, but for this profession you need to have face-to-face interaction to develop a total teacher.” Verna also espoused the same views when she said,

In my subject area you need to interact with your students face-to-face. I have to engage my students in discussion. I need to perform and demonstrate. I need to bring the topic alive. That cannot be done on Blackboard [BbCMS]. I have to teach students how to do these by modelling and getting them involved in activities.

These narrations suggest that these teacher educators believe that to achieve interactivity in course delivery, face-to-face interaction is necessary. It also suggests that these teacher educators believe that they have a central role to play in the learning process; which is to pass on their knowledge and skills to their students. As such a tension arises between the affordances of the BbCMS and teacher educators’ belief that teaching and learning can be best done in a face-to-face environment.

Another reason for teacher educators’ insistence on the need for face-to-face sessions was the belief that the BbCMS is only capable of developing the content knowledge of student teachers. A number (14 out of 53) of the open-ended questionnaire respondents and two of the interviewed participants indicated that the BbCMS can only be used as a tool to develop the content knowledge of students. These teacher educators suggested that because of the unique nature of teaching many of the practical skills of teaching that student teachers are required to develop cannot be done using the BbCMS. According to R35 “it can enhance student learning in content knowledge. That is only part of teacher education. It is limited in other aspects of developing a teacher.” Kate indicated that, “the more the BbCMS is used as the dominant method of teaching, students will only be able to acquire the content knowledge about a subject.” In her opinion the system allows students to get all the “stuff they want to pass an exam” but it will not enhance the teaching skills of student teachers which entails the “practical and critical approaches to education.” In addition, Verna also argued that students can pass a written examination with the content provided through the use of the BbCMS, however she pointed out that developing pedagogical skills and teacher competencies can only be done using face-to-face sessions. This view is supported by Siemens (2004) who argued that, CMSs are able to do an excellent job at delivering courses because they are designed as a learning management tool. However, CMSs are not designed as a learning environment creation tool and are therefore unable to cater for informal learning, performance support or knowledge management.

Teacher educators’ belief that only students’ content knowledge can be developed is linked to their pedagogical beliefs. According to Lopes (2008), while CMSs can enable new forms of teaching and learning they cannot of themselves, change educational practice. In this regard, Carmean and Haefner (2002, p.28) argued that a CMS does not provide a “pedagogical platform any more than chalk, chairs, and tables provide the classroom learning experience.” Therefore the efficient use of the tools in CMSs and its incorporation into teaching is dependent on the way the teacher educator uses the tool (Carmean & Haefner, 2002). This suggests that teacher educators are the ones who decide how they will use the system. Whether they use the system in constructivist ways or objectivist ways depends on their perspectives of the value of the affordances of the BbCMS and their beliefs about the integration of a CMS into their courses.

Another finding that was predominant among a number (14 out of 53) of theopen-ended questionnaire respondents and three interview participants was the belief that the BbCMS is not capable of allowing the level of discussions that can take place in a face-to-face classroom. For example, Kate said that the conversations that takes place using the BbCMS is a “very limited form of human interaction and it cannot replace the human conversation when people physically sit and talk together.” R18 also reported that the BbCMS is only capable of allowing “static, reasoned discussions.” The beliefs about the level of discussion that is possible using the BbCMS may be due to a lack of understanding of the technical capabilities of the BbCMS and the skills required to conduct online sessions. According to West et al. (2007) this situation exist because most teacher educators do not know how to

teach online, moderate online discussions, integrate this type of discussion into a typical face-to-face course, adapt their teaching strategies and styles to accommodate online discussions, or make appropriate decisions about when an online discussion can be an effective method (West et al., 2007, p.17).

The belief that face-to-face discussions can result in better construction of knowledge may also be due to teacher educators’ unwillingness to change to a different way of communicating with their students. In addition, the belief that the discussion via an electronic medium cannot replace a face-to-face conversation emphasises teacher educators’ belief that the human touch and presence is necessary for teacher education. This belief which seems to be a core belief is difficult to change (Pajares, 1992) and may be another reason for their reluctance to integrate the BbCMS in a significant way into their courses.

Teacher educators’ belief that the BbCMS cannot enhance teaching and learning because of the need for face-to-face interaction and the inadequacy of the communication tools can be explained in terms of their beliefs. According to Pajares (1992) beliefs are formed early and individuals tend to hold on to these beliefs based on incorrect or incomplete knowledge, even after scientifically correct explanations are presented to them. Teacher educators’ belief that face-to-face interaction is necessary would have been formed from the time the teacher educators were young students, through their years as student teachers. Their belief that learning can only take place in the classroom, face-to-face with the teacher educator demonstrating and guiding the process is supported by their belief system which they would have acquired through the process of cultural transmission. These teacher educators are unwilling to give up their face-to-face sessions because being in front of the class and delivering instruction is part of their identity as a teacher educator. As such teacher educators have grown comfortable with these beliefs, and these beliefs have become their “self” (Pajares, 1992, p. 317). Therefore replacing their presence in the classroom with the use of the BbCMS requires teacher educators to change their beliefs about teaching and learning. This is the same as changing who they are as individuals, something many teacher educators are unwilling to do.

### 8.2.1 The BbCMS reduces teacher educators’ power and control in the classroom

In a teacher-centred classroom the teacher is in control of all the activities (Becker, 2000) and therefore maintains a position of power and authority in the classroom. For example, using the lecture method keeps the teacher in control of the learning environment and all aspects of the teaching process. Although all teacher educators who were interviewed espoused a student-centred teaching style consistent with the constructivist perspective of teaching and learning, their belief that face-to-face sessions are necessary so that they can demonstrate the competencies necessary to develop a “total teacher” is suggestive of an unconscious, underlying teacher-centred belief which is consistent with having power and control over the activities in the classroom. For example, Kate suggested that student teachers must be “taught through the interactions that take place in the physical classroom with their teacher educator.” Kate’s narrations were even more obvious of her desire to be in control of her students learning.

She said,

“I have to engage my students in discussion. I need them to perform and demonstrate. I need to bring the topic alive. That cannot be done on Blackboard. I have to teach students how to do these by modelling and getting them involved in activities.”

However, when students engage in online learning, “teachers do not have the same opportunity as before – when all of them were in the classroom – to follow and control pupil work” Sellinger (2001, p. 42). This shifts the “influence and power” (ibid, p. 43) from the teacher to the learner, which is something not all teachers are comfortable doing. Brennan (2000) also suggested that one factor for the lack of use of new delivery strategies and teachers’ resistance or reluctance to use technology in their teaching is based on their belief that it reduces their power and control in the classroom. Therefore, the belief that face-to-face interaction is necessary for learning to take place may be an underlying core belief that teacher educators unconsciously hold (Pajares, 1992) which is tied to their belief that they must maintain power and control of the teaching and learning process. Having grown up with the teacher at the centre of the learning process, from primary school up to university level these teacher educators would have been taught in the face-to-face mode. These experiences would have impacted on the teacher educators beliefs and would have become part of their belief system. Thus, their beliefs about the role of the teacher as one who is in control of the learning process would have started to develop very early in their lives and as such became part of their core beliefs. Pajares (1992) suggested that these core beliefs even if they are consciously or unconsciously held are deemed to be true by the individuals who hold them. This results in teacher educators having a false perception of what really exists and as such continues to advocate for what they believe is true.

## 8.3 Resource to supplement face-to-face sessions

The category: resource to supplement face-to-face sessions generated two sub-categories; technology teaching resource and technology course management resource.

### 8.3.1 Technology teaching resource

The most common method of integration of the BbCMS was for the storage of course material and announcements to support face-to-face sessions. Rogerson-Revell (2007) suggested that this use of the BbCMS may help perpetuate the transmissive models of teaching and learning rather than exploring more constructivist approaches. However, Burbules (2000, p. 20) argued that “the way the material is taught may not be a determining factor in how it is learned.” Therefore, the use of the BbCMS for storage and access of course material, although allowing teacher educators to maintain their traditional roles and position of authority in the classroom can be used in constructivist activities in the classroom. The use of the BbCMS in this way is consistent with the findings of Cuban (1986) who asserted that the assumption that the introduction of new technologies into schools will transform educational practice may be misleading as teachers use of technology will be shaped by the same beliefs and practices that shape their face-to-face interactions. Therefore, simply providing new technology is unlikely to change teachers’ existing teaching practices.

The findings from both the open-ended questionnaire and the interviews revealed that there was varied use of the communication and collaboration tools available in the BbCMS. The most prevalent method of integration was communication via emails. A little more than one half (29 out of 53) of the open-ended questionnaire respondents and all eight interview participants use emails as a mean of communicating with their students. Email use involved responding to students’ personal issues and feedback based on work completed. The emails also gave teacher educators an avenue to keep in touch with students outside the normal classroom hours.

A small number (16 out of 53) of open-ended questionnaire respondents and four out of the eight interview participants reported using the discussion board in the BbCMS. The small number of teacher educators using this tool can be attributed to their lack of competence in both the technological and pedagogical skills required to use the tool and also to their beliefs.

Teacher educators who used the discussion board all espoused a constructivist perspective of teaching and were quite competent in the use of the BbCMS. Sally gave an example of how she used the discussion board as a collaboration tool for students to post comments and create a document after doing research about the concept of zero. A small number of questionnaire respondents (7 out of 53) and three interview participants reported using the Blog and Wiki tools to allow students to collaborate on projects. In this way students were able to enhance their learning by being part of the discussion and through collaboration. The use of the communication tools in the BbCMS to support communication and collaboration fits in with Vygotsky’s (1978) theory of social constructivism who argued that social interaction and community play a fundamental role in the development of cognition and the process of ‘making meaning’. In addition, it supports Savery and Duffy (1995) principle of constructivist teaching which suggest that teachers should design the learning environment to support and challenge students thinking. It also encourages students to test their ideas against alternative views put forward by other students.

### 8.3.2 Technology course management resource

The data from the open-ended questionnaire and interviews revealed that teacher educators used the BbCMS as a technology course management resource to collect assignments and store and calculate student marks

The BbCMS Grade Center can allow teacher educators to collect students’ assignments and manage students’ grades which can save time and reduce data entry errors (Price, 2008). However, the study found that less than one half (19 out of 53) of the open-ended questionnaire respondents and four interview participants used the BbCMS Grade Center for the collection and grading of assignments. One reason for this low usage may be due to the complex nature of the Grade Center (Morgan, 2003). It may also be due to teacher educators’ unwillingness to change to a new method of collecting and grading assignments as they believe that the method they are using is suitable. This supports Pajares (1992) assumption that teachers tend to hold on to beliefs based on incorrect or incomplete knowledge. As such beliefs can influence perception and can be an unreliable guide to what really exists.

### 8.4 Inconsistency between pedagogical beliefs and the integration of the BbCMS

The findings of the study indicated several inconsistencies between teacher educators stated pedagogical beliefs and their integration of the BbCMS into their courses. The present study showed that although the majority of teacher educators espoused student-centred beliefs in line with their constructivist view of teaching and learning, their integration of the BbCMS into their courses was quite the opposite.

The analysis of the data from the open-ended questionnaire showed that almost one-half of the respondents (22 out of 53) indicated that the BbCMS did not fit into their philosophy of teaching and teaching style. In addition, four of the interviewed participants either indicated that the BbCMS does not fit into their philosophy and teaching style or did not use the system in a way that demonstrated constructivist principles as espoused by Savery and Duffy (1995). During the interview all eight teacher educators explained in detail the type of activities they used in their classroom to assist their students in constructing their knowledge. For example, Verna indicated that her approach to teaching entails “constant dialogue, group work, demonstration, use of authentic activities, creation of original resources, modelling, interactivity, hands on activities and problem solving approaches.” Similarly, Cindy revealed that “students are responsible for their own learning and the role of the teacher educator is to facilitate that learning by creating the right learning environment where students can collaborate, discuss and develop material.” However, both Verna and Cindy like many of their colleagues did not use these strategies in the BbCMS online environment. Here we see that although teacher educators gave teaching strategies similar to those suggested by Savery and Duffy (1995) they did not incorporate those strategies with the integration of the BbCMS. The analysis of the data showed that the majority of teacher educators integrated the BbCMS as a medium for storing course material and announcements for students to retrieve. This finding corroborates with researchers (Norton & Hathaway, 2008; Malikowski et al, 2007) who also found that teacher educators have used CMSs more for the delivery of information rather than teaching itself. The findings also support those of the British Educational Communications and Technology Agency (Becta, 2004) which found that only a small number of teachers use ICT for instructional purposes and even a smaller number are integrating ICT into subject teaching in ways that enhances teaching and learning and stimulates higher-level thinking and reasoning.

The implications of this finding suggest that while teacher educators may be quite knowledgeable in the theoretical principles of creating a constructivist learning environment in a face-to-face setting, they seem less able or reluctant to create a constructivist learning environment online. As Fang (1996) noted, inconsistencies can stem from varying psychological, social and environmental factors in schools and these prevent teachers from implementing their own personally held beliefs in their instructional decision making.

Additionally, while inconsistencies between beliefs are to some extent expected due to the interconnected nature and complexity of beliefs, constant inconsistencies may indicate a limited understanding of how to use the BbCMS in constructivist ways. According to West et al. (2007, p.15) “Blackboard can be highly intimidating to learn, and may seriously hinder the choices the teacher educator makes while using the tool.” Inconsistencies between espoused constructivist beliefs and the integration of the BbCMS by teacher educators may also be due to Nespor’s (1987) finding which suggested that teacher’s beliefs include conceptualisations of ideal situations that differ from reality. In fact teacher educators may have stated what they would actually like to be able to achieve in their courses even though they know it may not be possible because they don’t have the skills or the belief that the BbCMS can achieve their course goals.

Another inconsistency concerns the relationship between teacher educators’ perspectives of the value of the affordances of the BbCMS and their pedagogical beliefs. While many teacher educators suggested that the affordances of the BbCMS can be a valuable tool to enhance their course management efficiency and teaching and learning they also suggested that face-to-face is necessary to develop the tacit competencies required to develop a total teacher. According to Green (1971) people hold beliefs in clusters, with several belief clusters existing within a belief system of a person. He argued that incompatible beliefs can exist side by side as long as they are not examined for consistency. According to Basturkmen, Loewen and Ellis (2004), inconsistencies between beliefs may be explained by the fact that teachers draw on different sources of knowledge when talking about teaching in the abstract and when referring to a specific teaching episode.

Another possible explanation for inconsistency between beliefs and practice may be related to how these teacher educators were taught as students and the experiences they gained throughout their life as teachers. For example, teacher educators would have developed a cluster of beliefs as students, a different cluster would have developed based on their teaching experiences. All these teacher educators have not been taught with CMS technology which suggests their belief clusters may not contain any of experiences with a CMS. Since beliefs once formed are strongly held – often unconsciously – and are resistant to change (Kagan, 1992), these clusters of beliefs are likely to exist side by side, regardless of contradiction, with teacher educators drawing on their beliefs about the use of CMS as a teaching tool, their pedagogical beliefs and their beliefs as students and teachers. This supports Pajares (1992) view that stated beliefs are an unreliable indicator of actual practice.

### 8.4.1 Beliefs about the integration of the BbCMS vary among teacher educators teaching the same courses

The analysis of the data also revealed that the integration of the BbCMS varied considerably among teacher educators teaching the same courses, with similar ICT capabilities and holding constructivist beliefs. For example, in the Mathematics department I found that while respondents R18, R41 and R51 all reported that the BbCMS did not fit in with their pedagogical beliefs and teaching style their colleagues R2, R29 and R39 all indicated the opposite. Further evidence of the difference in beliefs about the integration of the BbCMS in the Mathematics department was revealed during the interviews. Jim and Kate are teacher educators in the Mathematics department but have very contrasting beliefs about the integration of the BbCMS into their courses. For example, Jim used the system to develop a constructivist learning environment where students actively constructed their knowledge through discussion and collaboration on project based work as recommended by Savery and Duffy (1995). Kate on the other hand mainly used the BbCMS for the storage of course material and announcements. Jim sees the BbCMS as a valuable tool to compliment his courses which can be used to enhance his teaching effectiveness and student learning. In contrast, Kate makes limited use of the system, believing that it can mainly be used as a tool to prepare a student teacher to pass an examination based on content knowledge. The findings were the same for Jenny and Tara. While Jenny and Tara both teach the same subject, their use of the BbCMS varied considerably. These two teacher educators have very good ICT skills and teach Educational Technology and Instructional Design. However, while Jenny makes extensive use of the software, Tara’s use was minimal. These findings support those of Sutherland et al. (2004) who found that teachers’ beliefs about the integration of ICT vary not only between the cultures of different disciplines but even among teachers within the same discipline. These findings are also supported by Watson (2001) who found that teachers’ use of ICT has a “particular resonance” with their pedagogical philosophy (p. 260). In this regard Ertmer (2005) argued that although two teachers may know the same things about technology they may believe different things about its integration (e.g. one seeing it as a way of enhancing instruction and the other as an obstacle to the delivery of instruction).

## 8.5 Challenges experienced by teacher educators

A review of the findings shows that besides teacher educators’ perspectives about the affordances of the BbCMS and their pedagogical beliefs, several contextual factors may have contributed to their limited use of the BbCMS. According to Lowyck (2003) contextual factors present in the environment in which teachers operate has a strong influence on the decisions teachers make in their classroom. For example contextual factors may prevent teachers from delivering their lessons in the manner in which they had previously planned. As such the challenges teacher educators faced did not fit into the framework and were analysed using the findings of other studies. In this study the analysis of the data revealed three types of challenges experienced by teacher educators as they integrated the BbCMS into their courses these are: administrative, teacher and technical.

### 8.5.1 Administrative Issues

Administrative challenges include those issues that the administration of the university is required to put in place for the successful delivery of the academic courses. The analysis of the data from the interviews revealed that three participants reported that one challenge they faced was the unsuitability of course design for the integration of the BbCMS. It is interesting to note that no respondent who completed the open-ended questionnaire reported this challenge.

Although not specifically identified by Ertmer (1999) as a first order barrier, the lack of proper administrative systems to support the integration of a CMS can also present challenges for teacher educators as they integrate this technology into their teaching. In addition, the absence of an official model of integration (blended approach, as a supplement to face-to-face or fully online) for integrating the BbCMS resulted in teacher educators being unsure of how they should integrate the system into their courses. This case was made by three teacher educators Cindy, Verna and Simon who all reported that there were no clear guidelines pertaining to the integration of the BbCMS into their courses. Teacher educators are required teach in physical spaces designed for teacher-centred instruction, they are also required to provide and manage online learning environments. The lack of an official pedagogical framework provided the avenue for teacher educators to use the BbCMS as they see fit. In many instances they simply used the tool to provide information for students thereby supplementing their face-to-face sessions. In this way teacher educators were able to use the BbCMS in ways that did not affect their established practice. This supports Ferneding (2003) view that many schools promote the use of technology without establishing an appropriate pedagogical framework to support its implementation, as such there is no substantial change in curriculum and teachers’ instruction.

Pajares (1992) asserted that teachers’ pedagogical beliefs are powerful forces that greatly influence the decision-making processes and teaching practices of teachers. For example, Robertson (2004) indicated that university teachers use ICT tools only if they are aligned with their beliefs about teaching and learning, and in the way that aligns with these beliefs. Thus, if a teacher believes in the information transmission approach, the teacher will use CMS tools to facilitate this mode of learning, and any aspects of the software that do not align with this approach will be either ignored or misused. However, the suggestion that there is no official pedagogical framework for teacher educators to follow does not prevent teachers from using the BbCMS in ways that support a more constructivist perspective.

Another challenge reported by teacher educators was the belief that their courses were not designed with the integration of the BbCMS in mind. Teacher educators felt that having full face-to-face classroom sessions while also providing online material, feedback and participating in online discussions require too much time and increased their workload considerably. This supports the findings of Arabasz et al. (2003) who also found that CMSs require considerable amount of time and effort to setup and maintain. Further, Papastergiou (2006) found that the system requires a significant amount of teacher educators’ time to provide timely and quality feedback. As such these teacher educators felt that using the BbCMS was an almost impossible task as they had to juggle their spare time to deal with the online environment. This suggests unless teacher educators consider using the BbCMS in the context of teaching and learning rather than as an add-on tool their usage of the BbCMS may not facilitate effective instruction (Pierson, 2001).

### 8.5.2 Teacher Issues

The teacher related issues reported by teacher educators included lack of time, lack of competence and inadequate training sessions. Several teacher educators reported that their limited use of the BbCMS was due to a lack of competence in the use the BbCMS. Three teacher educators who were interviewed and approximately one quarter (13 out of 53) of the teacher educators who responded to the open-ended questionnaires reported that one of the main reasons for their limited integration of the BbCMS was their lack of competence in using the BbCMS. For example, R25 wrote “steep learning curve, too much to learn to get simple things done.” Cindy reported that she was not able to some of the things she would like to do, she said, “I don’t quite understand the discussion board. I don’t feel sufficiently competent.” While Simon admitted that if he was a little more familiar with the features he “might have been able to integrate it more.” In addition, a small number (7 out of 53) of respondents reported that they did not know how to use the BbCMS as a pedagogical tool to assist in the delivery of courses. Several researchers (e.g. Sandholtz and Reilly, 2004; Ertmer, 2005; Norris, Sullivan, Poirot, & Soloway, 2003) have found that teachers who hold constructivist-oriented beliefs may not necessarily teach actively because these teachers may be incompetent when using technology or lack sufficient class time. Morgan (2003) also indicated that the ability to use the tools available in a CMS is dependent on the teachers’ knowledge of the tools. Ertmer (2005) also pointed out that most teachers – regardless of whether they are experienced or beginners – have limited understanding and experience about how to integrate technology into their instruction. Therefore their lack of use of the BbCMS may be due to their lack of understanding of both the capabilities of the software and how to use many of the tools in the package.

The suitability of the BbCMS training sessions offered by the CEPUTT was also regarded as insufficient in providing teacher educators with the skills required to successfully integrate the system. Four teacher educators generally agreed that the training sessions were too procedural; simply taking teacher educators through the different menu options of the software. Therefore, despite their understanding of constructivist teaching, teacher educators experienced difficulties operationalising this ideal using the BbCMS. According to Verna “The training was too procedural, steps to perform different tasks were the main method of teaching. They never showed examples of what an exemplary site contains or how teacher educators were using the system [BbCMS] to conduct discussions or provide feedback.” According to Elmore, Peterson, and McCarthey, 1996, p.241) “teachers’ practices are unlikely to change without some exposure to what teaching actually looks like when it’s being done differently.” In addition, Schunk, Pintrich, and Meece (2008) indicated that exemplars of ‘good practice’ may prove useful because observing peers teach successfully online may provide a readily understood disciplinary context and information in addition to being motivational. It also supports the views of Schunk and Zimmerman (2007, p.11) who argued that, “observing competent models perform actions that result in success conveys information to observers about the sequence of actions to use to be successful.” The implication here is that by looking at successful uses of the BbCMS, rather than being told about it or taken through steps to accomplish specific functions may assist teacher educators to successfully integrate the system.

### 8.5.3 Technical Issues

Infrastructural issues included poor or lack of internet access at the CEPUTT and within some areas of the country also presented problems for teacher educators. More than one half (29 out of 53) of the open-ended questionnaire respondents and three interview participants reported that technical issues prevented them from using the BbCMS in some ways. One teacher educator did not believe he should use the system in any significant way because many students from rural areas are not able to access the BbCMS because of poor internet access. The majority of these issues are similar to Ertmer’s (1999) extrinsic (first order) barriers that teachers face when integrating technology. According to Ertmer (1999), extrinsic barriers include “lack of resources, inadequate training, insufficient technical support, and lack of time” (pp. 51–52). The unavailability of proper internet access to all students due to infrastructural problems within the CEPUTT and in several areas on the island highlights the digital divide that exists on the island in terms of access to resources. The issue of inequity in access among students was cited as a reason for the limited use of the BbCMS by one teacher educator. Lack of proper internet access may be a deterrent for teacher educators to use the BbCMS in ways that support their pedagogical beliefs because engaging in discussions or collaborative projects online requires a reliable high speed internet access. However, this is not always possible as many rural areas on the island are still using slow dial up connections.

## 8.6 Summary

Six main findings were clearly revealed from the study, these were as follows: Affordances of the BbCMS can enhance teaching and learning when used with face-to-face sessions, the BbCMS reduces teachers’ power and control in the classroom, teacher educators integrated the BbCMS to supplement their face-to-face sessions, inconsistency between teacher educators’ pedagogical beliefs and the integration of the BbCMS, teacher educators’ pedagogical beliefs and beliefs about the integration of the BbCMS vary among teacher educators teaching the same courses. In addition, teacher educators experienced challenges which may have prevented them from integrating the BbCMS in ways that were consistent with their beliefs. These challenges can be grouped into three types: administrative, teacher and technical issues.

# Chapter 9 Conclusions

## 9.1 Introduction

In this, the final chapter of this thesis, I review the findings of my research on understanding the experiences and perspectives of teacher educators as they worked to integrate the Blackboard Course Management System (BbCMS) into their courses. More specifically, I review the findings on how teacher educators’ perspectives of the value of the affordances of course managements systems for course delivery and their pedagogical beliefs influenced their integration of the BbCMS into their courses. I revisit my research questions and I reflect on how I have addressed these. I then discuss the possible impact of my research findings on policy and integration of electronic course management systems in tertiary education in general and I make recommendations that might have direct relevance to the integration of the BbCMS at the CEPUTT. I then review the research process and discuss aspects of my research I would do differently if I were to begin this research study again. Finally, I suggest further areas for investigation prompted by my research findings.

## 9.2 Revisiting research questions and findings

Although electronic CMSs are being widely used in many tertiary institutions, many teacher educators at the CEPUTT have made little use of this technology in their teaching. This underutilisation has been attributed to teacher educators’ pedagogical beliefs, teacher educators’ perspectives of the value of the affordances of the BbCMS as a resource for teaching and learning and contextual factors.

In the Literature Review chapter, I established the relationship between teachers’ pedagogical beliefs, perspectives of the value of technology in education and the integration of ICT with emphasis on electronic course management systems. I referred to literature that critiqued both the objectivist and constructivist perspectives of teaching and learning. I argued that teachers with a constructivist perspective are more likely to integrate technology in student-centred ways, while teachers with an objectivist perspective are more likely to integrate technology in teacher-centred ways. I also suggested that the BbCMS is a pedagogically neutral teaching resource and the way it is integrated into courses is to a large extent dependent on the teacher and his or her beliefs and competence.

Using the interpretative paradigm and a multi-method approach this study sought to understand how teacher educators’ perspectives of the value of the affordances of course managements systems for course delivery and their pedagogical beliefs influenced their integration of the BbCMS into their courses. The results from both the open-ended questionnaire and the interviews suggest that there is a significant relationship between teacher educators’ perspectives of the value of the affordances of the BbCMS and the integration of the system into their courses. The study also suggested that there is an inconsistency between teachers’ espoused pedagogical beliefs and their integration of the BbCMS.

I now return to my key research questions.

* What are teacher educators’ perspectives of the value of the affordances of the Blackboard Course Management Systems (BbCMS) as a teaching and learning resource for their courses at the CEPUTT?

The results from both the open-ended questionnaire and the interviews suggested that the majority of teacher educators hold the perspective that the affordances of the BbCMS can enhance their teaching and learning when used in conjunction with face-to-face classroom sessions. Teacher educators indicated that the affordance of accessibility which enables students to have easy and convenient access to course material better prepared students for discussions in face-to-face classroom sessions as well as constructing knowledge independently. The affordances of communication and collaboration enable teacher educators to communicate with students and also allow communication and collaboration among students. The BbCMS affordance of diversity although only used by a small number of participants was used to cater to the different learning styles of students and assisted in enhancing teaching and learning.

The findings also suggested that most teacher educators believe that teacher education courses cannot be successfully delivered using the BbCMS in a totally online environment. Teacher educators suggested that the use of the BbCMS in a totally online environment for course delivery in teacher education would deprive student teachers of the benefits of teacher educators’ modelling of many of the tacit competencies that are required for development of a ‘total’ teacher. Modelling behaviour by teacher educators was deemed to be an important aspect of teacher training because their interactions in the classroom, in terms of the way they present their material, the way they treat with issues in the classroom are all lessons for student teachers. As such, another finding that was revealed in this study for the underutilisation of the affordances of the BbCMS at the CEPUTT was teacher educators’ belief that they must maintain power and control of the teaching situations in the classroom.

As such, the belief that the practical pedagogical skills required to become a teacher can only be developed in a face-to-face environment continues to keep teacher educators trapped in a pedagogical paradigm that has not changed for centuries. Instead of trying to find ways to use the technology to enhance their students’ learning, teacher educators continue to advocate for more face-to-face sessions.

* How have teacher educators at the CEPUTT integrated the BbCMS into their courses?

The analysis of the data showed that the majority of the teacher educators in the study mainly used the BbCMS for the storage of course material and announcements. The second most reported method of integration was the use of the BbCMS for communication and collaboration. Teacher educators used the affordance to store lectures, power point presentations, video and audio files and links to external sites and material. In addition, communication tools such as emails and announcements were used to keep in touch with students as well as provide feedback on assignments. Collaborative tools such as blogs and wikis were only used by a small number of teacher educators. These findings suggest that teacher educators integrated the BbCMS in ways that supplemented their face-to-face sessions.

* What is the relationship between teacher educators’ pedagogical beliefs and the integration of the BbCMS for course delivery at the CEPUTT?

The present study revealed that although the majority of teacher educators espoused student-centred beliefs in line with their constructivist views of teaching and learning, their use of the BbCMS has been quite the opposite. Although all teacher educators are quite knowledgeable on the requirements of creating a constructivist learning environment in a face-to-face classroom it seems that many teacher educators are unable or find it challenging to use the BbCMS to create an online constructivist learning environment.

Another issue causing the inconsistency between pedagogical beliefs and the integration of the BbCMS is the view that teacher educators are satisfied using the BbCMS in ways that do not require them making major changes to their work and their role.

Teacher educators’ pedagogical beliefs about how teaching should be done in their subject discipline also played a significant role in determining the level of integration of the BbCMS. The level of integration varied among teacher educators within the same discipline. Based on their pedagogical beliefs and their perspectives of the affordances of electronic course management systems, teacher educators used the BbCMS in different ways in their courses. While some teacher educators used many of the tools available in constructivist ways, many others simply used the tools as an add-on to their courses. To these teacher educators the BbCMS is another method of providing material for students, instead of a means of engaging students outside of the classroom through discussion and project work. Hence most teacher educators expressed no intention to integrate the BbCMS in ways to substantially change how they believe they should teach their subject area.

* What challenges did teacher educators encounter as they integrated the BbCMS into their courses at the CEPUTT?

Teacher educators spoke of three major challenges they encountered in their integration of the BbCMS into their courses; these were: administrative, teacher and technical issues. In terms of the administrative issues, teacher educators gave the following reasons: no clear guidance on how to integrate the BbCMS into their courses and unsuitability of course design for integration of the BbCMS. Teacher issues included lack of time, lack of competence in both the technical and pedagogical use of the BbCMS. Technical issues included the lack of proper internet service at the campuses and at the homes of students who live in rural communities throughout the island.

## 9.3 Recommendations

This qualitative study allowed me to understand many of the issues pertaining to teacher educators’ perspectives of the affordances of the BbCMS as a resource to achieve the goals of their courses, how teacher educators integrated the BbCMS into their courses, the relationship between teacher educators’ pedagogical beliefs and the integration of the BbCMS into their courses, and the challenges teacher educators experienced while integrating the BbCMS into their courses. The following are some recommendations based on the findings of the study.

**Recommendation 1 -** A comprehensive professional development programme which provides training in both the technical aspects of the BbCMS and also how to use the affordances of the BbCMS to create a constructivist learning environment

Teacher educators need to know how to use the affordances to develop an online constructivist learning environment. In addition to the procedural method that focuses on teaching how to use the different tools available in the system, the training courses should use examples of best practice to show teacher educators how the system can be used to create a constructivist learning environment.

**Recommendation 2 -** A dedicated support desk should be established to provide assistance to teacher educators in resolving pedagogical problems that they may encounter while attempting to integrate the affordances of the BbCMS into their courses.

**Recommendation 3** – A CEPUTT policy on the integration model that teacher educators can follow for the integration of the BbCMS into their courses.

Teacher educators need to have a clear idea of how they can integrate the system into their courses. For example, what percentage of classes must be face-to-face as opposed to online. Questions such as, if teacher educators deliver a lecture online, does it count as hours worked in the delivery of their course?

**Recommendation 4**– Peer combinations within departments.

Teacher educators who are making extensive use of the BbCMS and are using the system in constructivist ways should be paired with their departmental colleagues who are having difficulties using the software. This will allow teacher educators to see the use of the system from their context.

**Recommendation 5** – Celebration of examples of best practice with the use of the BbCMS.

Teacher educators who are using the BbCMS in innovative ways should share their success with colleagues at staff meetings and training sessions. When teacher educators see good examples of best practice and talk to like-minded peers, it may motivate them to enhance their own integration of the system into their courses.

## 9.4 Future research

1. Conducting this research made me aware of the issue of teacher educators’ identity and its relationship with the integration of electronic course management systems in the training of student teachers. It seems for some teacher educators the use of electronic course management systems takes away an important part of what it means to be a teacher educator. To remove teacher educators from the classroom and have them teach via an online virtual environment touches at the core of what it means to be a teacher educator. Therefore, research on teacher educators’ identity and the integration of electronic course management systems would go a long way in understanding why teacher educators may be unwilling to use such systems in teacher education.
2. More research is also required in the area of student teacher learning and the use of electronic course management systems. In this study many teacher educators argued that the Blackboard course management system can only be used in teacher education if it is used to supplement face-to-face sessions. It would be interesting to study what are the perceptions of students and teacher educators who are involved in fully online teacher education programmes.

## 9.5 Reflecting on the research process

At the end of a major study such as this and one that has taken four years of my life, it is natural to wish that I had done some things differently. On an academic level, my readings have meant that I have become a more confident educational researcher and my research questions and theoretical focus evolved during the research process. My research questions have been moulded and changed by my readings, responses and conversations with the teacher educators who were the focus of this thesis. While, this conclusion marks the end of this thesis, this research trajectory goes beyond the limits of this thesis and I realise that if I was to revisit my research findings a year from now, I would analyse them differently, and I would bring different theoretical tools to this analysis.

As I described at the beginning of this thesis, I was prompted to undertake this study because of my review of the literature, my past life trajectory, my professional ambitions and my experience as a teacher of educational technology. However, as a researcher, my emphasis shifted during the process of reading for and researching this thesis. Given my technology background, I was initially focused on a more narrow definition of my research questions and I wanted to examine how teacher educators integrated the BbCMS and their reasons for not making extensive use of the software. As a reflexive researcher, I spent much time re-thinking the focus of my research and my research questions. I became aware that my initial approach reflected a market-research view of the research, one that as a teacher educator I wanted to go beyond. It also smacked of positivist epistemologies in that I was assuming that teacher educators’ responses would provide me with a particular ‘truth’ that I could then compare with other market-led studies. As I continued my research journey, I realised that teacher educators’ experiences and perspectives were far richer and more complex than could be expressed by simply comparing the findings of studies with the reality of participants’ experiences. My research focus and questions evolved during the research process as I sought an approach that could do justice to their experiences and to my positionality as an interpretative researcher of these experiences. I shifted my research focus from one concentrated on how the BbCMS was being used and the reasons for such usage to one that focused on understanding of how teacher educators’ perspectives of the value of the affordances of the BbCMS and their pedagogical beliefs influenced their integration of the BbCMS.

When deciding on the research methods at the initial phases of researching this thesis, I firstly decided to adopt the approach of semi-structured interviews and observations. I encountered two difficulties with this approach; firstly my main focus was to determine how teacher educators who espoused a constructivist perspective are integrating the BbCMS. Without some type of instrument it was difficult to determine which teacher educators truly espoused a constructivist philosophy. With this in mind I decided to use an open-ended questionnaire for reasons described in chapter 5. My second problem arose with the use of observations. How teacher educators were actually using the BbCMS was difficult to observe as most of the interactions took place at nights when teacher educators were at their homes. I also asked to look at their BbCMS sites to see what they were doing. This also proved futile as most of the teacher educators were unwilling to allow me to look at their sites. I finally decided to use a two phase process firstly using an open-ended questionnaire and then semi-structured interviews.

In the first phase, using purposive sampling, an open-ended questionnaire was sent to all 112 teacher educators at the CEPUTT using the internal courier service. From the total sent out approximately one-half (53) was returned. The open-ended questionnaire focused on teacher educators’ views on the use of the BbCMS for course delivery, their philosophy of teaching and learning, how they integrated the BbCMS, their pedagogical beliefs and its relationship to the integration of the BbCMS and the challenges teacher educators experienced with the integration of the BbCMS. The open-ended questionnaire was used to extend the breadth of the study and as a way of selecting the participants for the interview. Based on a preliminary analysis of the open-ended questionnaire and an indication on the open-ended questionnaire that the respondent was willing to participate in the interview, a preliminary list of teacher educators was created. Using purposive sampling, two teacher educators from four departments were chosen from the 23 respondents who indicated their willingness to participate in the interview. The participants chosen all espoused a constructivist philosophy, had been teaching at the tertiary level for more than five (5) years and had used the BbCMS for more than two years.

The findings of this research allowed me to better understand the powerful relationship between teacher educators’ beliefs and their practice. I recognised that for teacher educators at my institution to use the BbCMS in constructivist ways to enhance teaching and learning greater focus has to be placed on showing them examples of such use, getting them involved, allowing them to experience success using the BbCMS thereby providing opportunities for them to gradually change their beliefs. Recognising that the use of the BbCMS is set to play a greater role in the delivery of courses at the CEPUTT, I see my role as a resource person for the training unit and administration on the integration of the BbCMS into the courses at the CEPUTT.

## 9.6 Concluding remarks

In this thesis, I have discussed how teacher educators’ perspectives of the value of the affordances of the BbCMS and their pedagogical beliefs influenced their integration of the BbCMS into their courses. Although this study provided some clarity to the messiness of studying teacher beliefs and the integration of electronic course management systems, there is an urgent need for more studies in this area.

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# Appendix 1

**Open-Ended Questionnaire**

**SCHOOL OF EDUCATION**

**UNIVERSITY OF SHEFFIELD**

**OPEN-ENDED QUESTIONNAIRE FORM**

1. To which department are you assigned at the Centre for Educational Programmes University of Trinidad and Tobago (CEPUTT)?

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1. How long have you been teaching at the tertiary level?

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1. How long have you been using the Blackboard Course Management System in your courses?

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1. Describe ways in which you have used the BbCMS in your courses.

For example: Do you use the BbCMS

* To store course documents for access by all students
* For online course assessments
* To communicate with your students

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1. What are your views on the use of the BbCMS for course delivery?

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1. What philosophy informs your teaching approach? Explain some key concepts of this philosophy.

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Continued on page 3

1. Describe your teaching style?

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1. Does the Blackboard Course Management System (BbCMS) fit into your philosophy of teaching? If yes, how? If no, Why?

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. Does the BbCMS fit into your style of teaching? If yes, how? If no, why?

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1. What difficulties you experienced while integrating the BbCMS into your courses?

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If you are willing to be interviewed please include your contact information below.

Name : \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Phone : \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Thank you for your time in completing this open-ended questionnaire

# Appendix 2

**Interview Protocol**

Key research question 1

1. What are your views on the use of the BbCMS for course delivery?

Additional questions

* 1. Why do you believe it can be a useful resource?
  2. Do you believe the use of the BbCMS can enhance students learning?
  3. Do you believe the use of the BbCMS can enhance your teaching effectiveness?

Or

Why do you believe it is not a useful course for course delivery?

Key research question 2

1. Describe ways in which you have used the BbCMS in your courses.

For example: Do you use the BbCMS

* To store course documents for access by all students
* For online course assessments
* To communicate with your students

1. What assessment features do you use?
2. Describe how you use the communication and collaboration tools.
3. Do you use the BbCMS in any other ways?

Key research question 3

1. You reported in your questionnaire that your teaching and learning philosophy is based on constructivism? Is that true?
2. Please explain some key concepts of this philosophy.

Continued on page 3

1. You also reported that your teaching style is based on the teacher centred approach. Please describe some aspects of your teaching style.
2. Does the Blackboard Course Management System (BbCMS) fit into your philosophy of teaching? If yes, how? If no, Why?
3. Does the BbCMS fit into your style of teaching? If yes, how? If no, why?

Key research question 4

1. Did you experience any difficulties while integrating the BbCMS into your courses?
2. Can you please explain some of the difficulties you encountered while integrating the BbCMS into your courses.

# Appendix3

**Cover letter for Open-ended Questionnaire**

12 Rosalind Drive

Palmiste.

26/9/2011

Dear Colleague

I am conducting research on the adoption of an Electronic Course Management System to facilitate teaching and learning. The research project title is: **Understanding the perspectives and experiences of teacher educators as they integrate an Electronic Course Management System into their courses at the Centre for Educational Programmes University of Trinidad and Tobago.**

You are invited to take part in this research project. It is important that you understand why the research is being done and what it will involve. Please take the time to read the information in the Participant Information Sheet carefully and discuss it with others if you wish. Ask me if there is anything that is not clear or if you would like more information. You can contact me at 779-9475 or email me at [rbirbal@gmail.com](mailto:rbirbal@gmail.com).

If you wish to participate you must return to me in the envelope provided, the completed survey form and the Participant Consent Form which must be signed.

Thank you for reading this.

Yours truly

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Roland Birbal

Instructor II

# Appendix 4

**School of Education University of Sheffield**

**Participant Consent Form**

|  |
| --- |
| **Title of Project: ‘Understanding the experiences of instructors as they adopt an Electronic Course Management System in their courses at the Faculty of Education of University Y (Pseudonym): A Case Study.’**  **Name of Researcher: Roland Birbal**  Participant Identification Number for this project:  **Please initial box**   1. I confirm that I have read and understand the information sheet/letter (delete as applicable) dated *[insert date]* for the above project and have had the opportunity to ask questions. 2. I understand that my participation is voluntary and that I am free to withdraw at any time without giving any reason. 3. I understand that my responses will be anonymised before analysis.  I give permission for members of the research team to have access to my anonymised responses. 4. I agree to take part in the above research project.   \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  Name of Participant Date Signature  (*or legal representative*)  \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  Researcher Date Signature  *To be signed and dated in presence of the participant*  Copies:  *One copy for the participant and one copy for the Principal Investigator/* |

# Appendix 5

**Participant Information Sheet for Open-ended Questionnaire**

**Research Project Title**: ‘Understanding the perspectives and experiences of teacher educators as they integrate an Electronic Course Management System into their courses at the Centre for Educational Programmes University of Trinidad and Tobago.’

I am conducting research on the adoption of an Electronic Course Management System to facilitate teaching and learning. A fundamental aim of this study is to understand the experiences of faculty as they go through the process of adopting and integrating features of an Electronic Course Management System in their courses. The study also aims to investigate the impact of the Electronic Course Management System on faculty members’ pedagogical beliefs.

Your participation is meaningful as there have been very few similar studies carried out before in the Caribbean. This study will be conducted during the period May 2011 to August 2011. The study proposes to contribute to the growing body of research in the area of Electronic Course Management Systems adoption and integration in universities. The findings can be used to inform institutional policy and the practice of all faculty members.

I am asking for your permission to participate in the study. This will require you to participate in the accompanying open-ended questionnaire. You will be required to complete the questions included in the open-ended questionnaire and post it back to me along with the signed consent form in the envelope provided. Your identity will be entirely confidential and your comments will be coded and transcribed to a word file which will be password protected on my computer and backed up on a compact disk. The transcribed data will be kept for a period of three years after which it will be destroyed.

**Participation is completely voluntary.** You may drop out of the study at any time without any explanation. You may retract anything you have written on the survey form. The information gathered during data collection will be kept strictly confidential. Your name will not be associated with any report, publication, or summaries derived from the data.

For any questions regarding this research, please contact Dr. Jason Sparks Email: [j.sparks@sheffield.ac.uk](mailto:j.sparks@sheffield.ac.uk). If you are interested in receiving the results of this study after I have completed the analysis and write-up, I will be happy to share it with you. Please keep my name and email address which is provided in the cover letter handy so that you can request the results. **Thank you for your Participation!**

# Appendix 6

**Participant Information Sheet for Interview**

**Research Project Title**: ‘Understanding the perspectives and experiences of teacher educators as they integrate an Electronic Course Management System into their courses at the Centre for Educational Programmes University of Trinidad and Tobago.’

I am conducting research on the adoption of an Electronic Course Management System to facilitate teaching. This study is entitled ‘Understanding the experiences of instructors as they integrate an Electronic Course Management System into their courses at the Centre for Educational Programmes University of Trinidad and Tobago.’

A fundamental aim of this study is to understand the experiences of faculty as they go through the process of integrating an Electronic Course Management System in their courses. The study also aims to investigate the impact of the Electronic Course Management System on faculty members’ pedagogical beliefs.

Your participation is meaningful as there have been very few similar studies carried out before in the Caribbean. This study will be conducted during the period May 2011 to August 2011. The study proposes to contribute to the growing body of research in the area of Electronic Course Management Systems integration in universities. The findings can be used to inform institutional policy and the practice of all faculty members.

I am asking for your permission to participate in the study. This will require you to participate in an interview. The interview will be audio recorded, transcribed, and coded so that I may analyze the results. The recorded data will be transcribed within a week of being collected and the audio file will then be destroyed. All transcribed data will be stored on a word file which will be password protected on my computer and backed up on a compact disk. The transcribed data will be kept for a period of three years after which it will be destroyed.

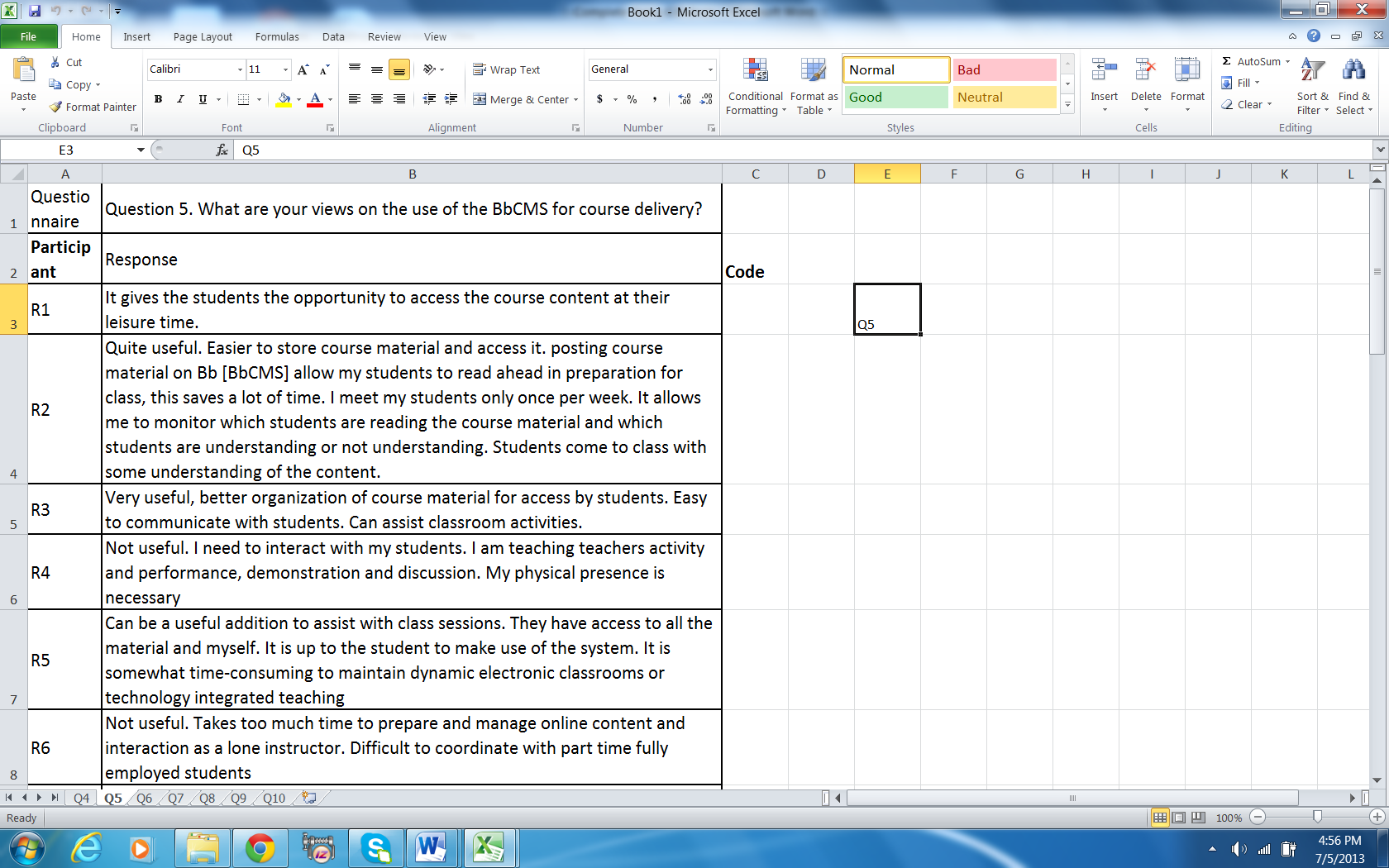
**Participation is completely voluntary.** You may drop out of the study at any time without any explanation. You may retract anything you have said during the interview or you may ask me to stop recording. The information gathered during data collection will be kept strictly confidential. Your name will not be associated with any report, publication, or summaries derived from the data.

For any questions regarding this research, please contact Dr. Jason Sparks Email: [j.sparks@sheffield.ac.uk](mailto:j.sparks@sheffield.ac.uk). If you are interested in receiving the results of this study after I have completed the analysis and write-up, I will be happy to share it with you. Please keep my name and email handy so that you can request the results.

**Thank you for your Participation!**

# Appendix 7

**Sample workbook**



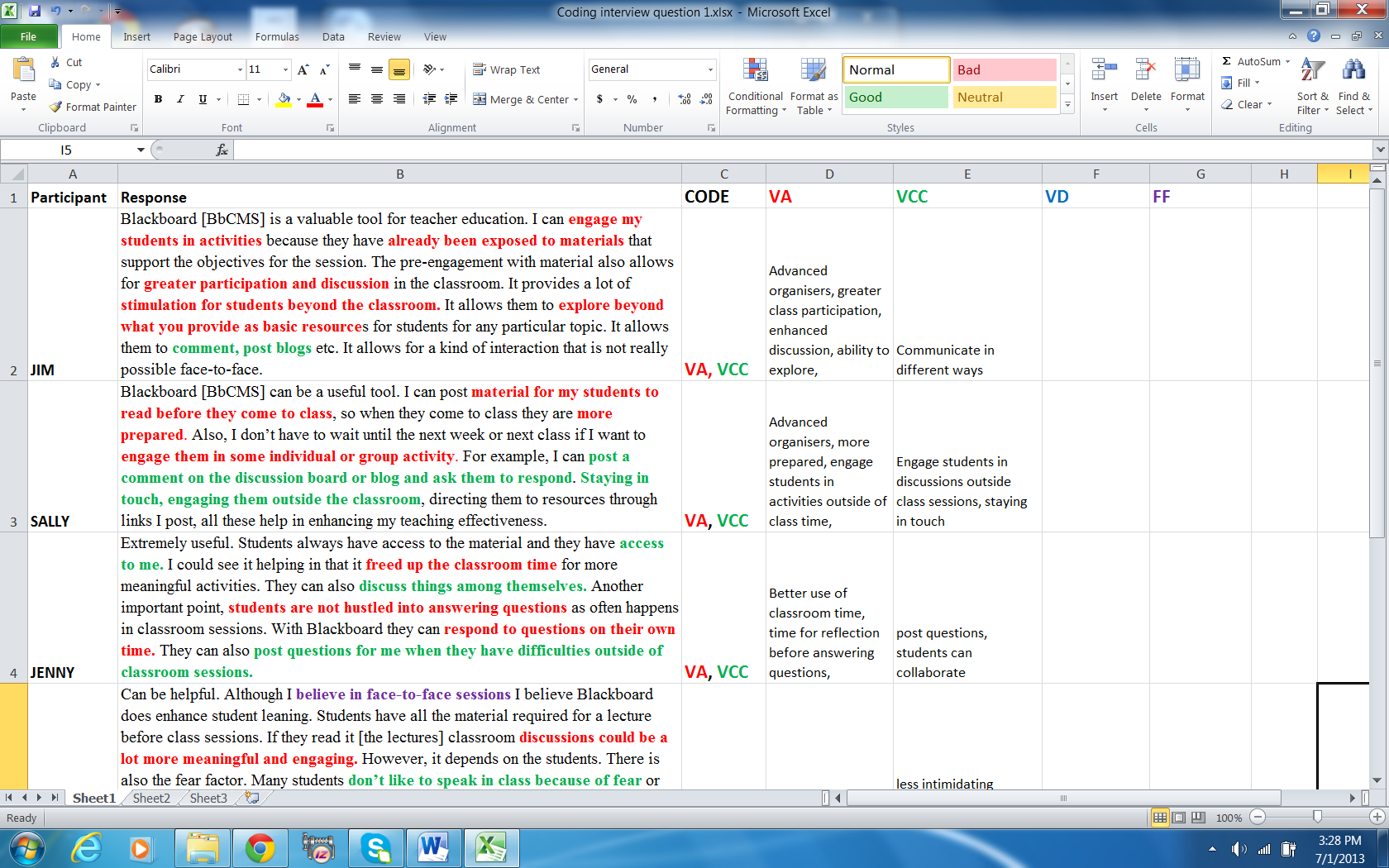
# Appendix 8

**Sample coding of questionnaire**



# Appendix 9

**Coding of interviews**



|  |  |
| --- | --- |
| **Code** | **Meaning** |
| VA | Value of accessibility |
| VCC | Value of communication and collaboration |
| VD | Value of diversity |
| VFF | Value of face-to-face interaction |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Category** | **Enhances teaching and learning** | | | |
| **Sub-category** | **Value of Accessibility** | **Value of Communication and collaboration** | **Value of Diversity** | **Need for face-to-face interaction** |
|  | Advanced preparation  Learn at own pace  Enhances class discussions  Better use of class time  Self-directed learning | Immediate feedback Collaboration among students  Extends discussion beyond class time  Access to teacher educator outside of class time  Benefit to absent students  Non-threatening environment | Caters to students’ multiple intelligences, | Students learn by doing, Communication methods are limited |

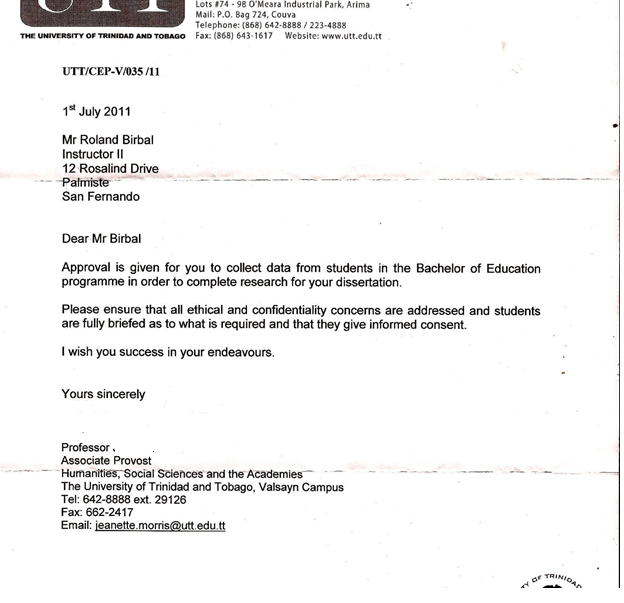
# Appendix 10

**Ethics Committee Permission**



# Appendix 11

**Permission to conduct study at CEPUTT**



# Appendix 12

**Demographic Data**

|  |  |  |  |
| --- | --- | --- | --- |
| Respondent | Department | Tertiary Teaching Experience | Blackboard Experience |
| R1 | Visual Arts | 22 | 2 |
| R2 | Mathematics | 8 | 3 |
| R3 | Social Studies | 6 | 3 |
| R4 | Language Arts | 25 | 3 |
| R5 | Mathematics | 23 | 3 |
| R6 | Language Arts | 12 | 3 |
| R7 | Special Needs | 5 | 4 |
| R8 | Special Needs | 8 | 8 |
| R9 | Special Needs | 12 | 3 |
| R10 | Physical Education | 7 | 3 |
| R11 | Early Childhood Care and Education | 3 | 2 |
| R12 | Visual Arts | 8 | 2 |
| R13 | Mathematics | 12 | 3 |
| R14 | Language Arts | 21 | 3 |
| R15 | Physical Education | 25 | 2 |
| R16 | Social Studies | 16 | 2 |
| R17 | Science | 15 | 7 |
| R18 | Mathematics | 20 | 3 |
| R19 | Science | 3 | 1 |
| R20 | Visual Arts | 15 | 3 |
| R21 | Special Needs | 6 | 2 |
| R22 | Early Childhood Care and Education | 3 | 1 |
| R23 | Educational Technology | 12 | 4 |
| R24 | Science | 17 | 3 |
| R25 | Physical Education | 25 | 2 |
| R26 | Educational Technology | 7 | 5 |
| R27 | Special Needs | 13 | 4 |
| R28 | Educational Technology | 12 | 2 |
| R29 | Mathematics | 5 | 3 |
| R30 | Educational Technology | 6 | 3 |
| R31 | Science | 5 | 2 |
| R32 | Educational Technology | 4 | 2 |
| R33 | Visual Arts | 8 | 3 |
| R34 | Educational Technology | 12 | 7 |
| R35 | Physical Education | 12 | 3 |
| R36 | Early Childhood Care and Education | 15 | 8 |
| R37 | Early Childhood Care and Education | 14 | 4 |
| R38 | Educational Technology | 6 | 3 |
| R39 | Mathematics | 6 | 3 |
| R40 | Social Studies | 8 | 2 |
| R41 | Mathematics | 12 | 2 |
| R42 | Mathematics | 4 | 2 |
| R43 | Social Studies | 7 | 3 |
| R44 | Special Needs | 9 | 2 |
| R45 | Special Needs | 4 | 2 |
| R46 | Social Studies | 5 | 3 |
| R47 | Language Arts | 6 | 2 |
| R48 | Educational Technology | 22 | 5 |
| R49 | Special Needs | 11 | 3 |
| R50 | Language Arts | 7 | 3 |
| R51 | Mathematics | 15 | 2 |
| R52 | Science | 3 | 1 |
| R53 | Language Arts | 13 | 2 |

# Appendix 13

**Constructivist philosophy and student-centred teaching style does not fit with the BbCMS**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Respondent | Course | Constructivist Philosophy | | Teaching style | Philosophy and BbCMS fit | Teaching style and BbCMS fit |
| R6 | Language | “Teaching should be enjoyable. The teachers’ responsibility is to facilitate acquisition of knowledge and assist students in developing a hunger to pursue knowledge.” | | “I teach in a very relaxed student friendly environment in which the student is gently guided to discover the knowledge I intend to have them acquire.” | “It inhibits flexibility and does not provide for the creativity and inventiveness that teaching demands.” | “No. It deprives me of the interaction and relational development so vital to effective teaching.” |
| R18 | Maths | “Teaching is an opportunity to present information and perspectives to learners. It entails providing students with the tools that they may learn for themselves; that they may know when they are ignorant.” | “Informal and conversational. I attempt to have discussion with the class to bring to the fore what they know and to get them to think aloud. Student to student interaction - pairs or small group is also important.” | | “To small extent. One can provide resources beyond the classroom. Cannot develop the competencies that are necessary to become a teacher. | “No, because discussion and communication is dynamic. I learn from the interaction and so do students. This is distinct from the static, reasoned discussion of discussion boards.” |
| R40 | Social Studies | “Teaching is about assisting students to reach their maximum potential, academic and other wise. Motivating students to excel.” | “My style is very informal. I use discussion with lots of questions.” | | “No. It can help with delivering course material but that is not all to teaching. Especially when you are in the business of educating teachers. It does not allow for total teacher development.  ‘ | “To a limited extent. I can post content for students. Students can then be more prepared for their class room sessions.” |
| R14 | Language Arts | “The teacher is the facilitator of learning and must provide opportunities for each learner, whatever his/her intelligences to thrive.” | “Debate, inspire, move the heart and help the mind to rebel - I think outside the box.” | | “May destroy the personal touch that is the strength of my style of teaching. Capable of disseminating content and expediting much of what I do.” | “As a store house of materials for my students. In its present state, too disruptive. We have developed an alternative web-site 'philo-sophia' which is much easier to use.” |
| R35 | Special Needs | “To spark learner enthusiasm for learning. Assist students to construct their knowledge.” | “Discussion, social interaction group work.” | | “Not really. Does not allow for the type of social interaction that is possible in the physical classroom and is so necessary for developing teachers.” | “No. But it helps with the storage and dissemination of course material.” |
| R41 | Maths | “To promote positive learning following the constructivist model.” | “Active participation of students in all activities. Demonstration/modelling/discussion.” | | “No. Cannot be used in all aspects of my course. Causes more problems for me. Students learn by doing, getting involved. Blackboard is limited in these respects.” | “To a very small extent. . My subject has many practical aspects, its use would be limited. Perhaps for making material available to my students.” |
| R48 | Education. Technology | “To provide students with an environment conducive to learning, opportunities, support and feedback that will help them construct their own learning.” | “Include student’s life experiences. Engage students in problem solving, discussion, group work.” | | “No. Teaching teachers require face to face interaction.” | “No. Requires too much time to accomplish simple tasks.” |
| R49 | Special needs | “I believe that all of my students, with guidance and the help of the right tools will overcome any difficulties to learning.” | “An interactive teaching style that demands their participation and challenges their abilities.” | | “No. Offers a limited set of tools that are useful for teacher education.” | “I don’t believe that Black board allows for the type of interactive teaching that I like to incorporate in my teaching.” |
| R51 | Maths | “My philosophy is not just to promote learning of the subject matter but also try to guide students to help the students learn to think logically, learn problem-solving methods and techniques and most importantly to develop a worthy citizen.” | “Lots of discussion, interaction, group work and discovery learning.” | | “No. It does. Not provides avenues for the type of discussion and collaborative work useful for teacher education.” | “Same as before.” |

# Appendix 14

**Eclectic philosophy and teacher centred beliefs does not fit with the BbCMS**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Respondent | Course | Eclectic Philosophy | Teaching style | Philosophy and BbCMS fit | Teaching style and BbCMS fit |
| R4 | Lang Arts | “Lectures, Modelling, interactivity, hands-on and problem solving are the main methods behind my philosophy of teaching. Teaching should facilitate independent study and research.” | “Engagement of students ideas and experiences I constant dialogue, demonstration, use of current information, creation of original resources, encourage students expressiveness and creativity.” | “No! My subject matter requires lots of discussion with face to face interaction.” | “No. It does not. I only use the BbCMS to facilitate dissemination of course material.” |
| R8 | Special Needs | “All children can learn. Children learn in different ways. Each child is unique. All children have the right to quality education. Teacher must use whatever method needed to bring about learning.” | “Active learning and reciprocal classroom relationship.” | “No except for relevant information to be posted. It is not suited for teacher education.” | “No. Teaching teachers is not only about developing content knowledge. It is about developing an all round individual.” |
| R22 |  | “That all students can intake and process information once the teacher has use all possible means and manner afforded to him/her in order to achieve the learning outcome.” | “Free, uninhibited but within the structure of a given course outline/syllabus. I engage deeply with my students and ensure they understand and can synthesize information in a meaningful way. I ensure that content is relevant, recent and reproductive.” | “No. it is not intuitive. It requires too many steps to achieve a simple task. It is basically a bulldozer to dig up a potted plant. My philosophy of teaching accesses multiple strategies and BB provides 30% of such tools afforded to me.” | “No. It does not fit in since my style is free and 'evolvable', relatively malleable but Bb is too fixed, rigid, unfriendly and limited to my area/field. I use Bb for information delivery only. I am yet to see its application to my course otherwise.” |
| R31 |  | “A combination of constructivism and behaviourism. Students must feel free to share their ideas, thoughts and experiences. Teachers’ role is to develop the individual by using different strategies.” | “Create an environment that allows for the development of the student. Use of lectures, group work, discussion.” | “No. It is too impersonal. Teaching in a teacher education programme requires a physical presence for students to acquire all the skills necessary to be a teacher.” | “BbCMS cannot substitute for face-to-face interaction. However it is a useful tool for disseminating information.” |

# Appendix 15

**Profile of interview participants**

1. JIM

Jim (pseudonym) is a Mathematics teacher educator. He has been in the field of Mathematics education at all levels for more than thirty years. He indicated that he is quite competent with information and communication technology (ICT) and has used ICT for more than ten years in many different ways in his teaching. Jim started using the BbCMS about three years ago at the Centre for Educational Programmes University of Trinidad and Tobago (CEPUTT) after being informed about it during a presentation in a staff meeting.

1. Sally

Sally (Pseudonym) is a teacher Educator in the Special Education department. She has been teaching for more than thirty years. She reported that she has very good ICT skills and taught information technology for many years at a tertiary level institution. She has used ICT in multiple ways in her teaching and claimed that she is competent at using the BbCMS in her teaching. She explained that she developed her experience with the system while integrating it into her teaching over the past eight years, five years while teaching in a tertiary institution abroad and three years at the CEPUTT.

1. Jenny

Jenny (pseudonym) is a teacher educator in the Educational Technology department where she is responsible for teaching two courses; Educational Technology and Instructional Design. She has been teaching for more than twenty-five years; six of which has been at the tertiary level. Jenny taught at a secondary school before moving to the CEPUTT and has been using ICT in her teaching for the past nine years. She is quite competent in the use of ICT having completed a number of courses in integrating ICT into the curriculum. Jenny indicated that she had been using the BbCMS for over 3 years.

1. Tara

Tara (pseudonym) is in the Educational Technology department. She teaches Educational Technology as well as three other courses at the CEPUTT. Tara has more than twenty years of teaching experience; five of which has been at the CEPUTT. She has been using ICT in her teaching for more than twelve years and considers herself to be very adept at the integration of ICT in the classroom. Tara has used the BbCMS since its inception at the CEPUTT and has also used the Moodle course management system for more than eight years at another tertiary education institution on the island.

1. CINDY

Cindy (pseudonym) is a teacher educator in the Special Education department. She teaches Special Education courses. Cindy has been teaching for more than thirty years; eleven of which has been at the tertiary level. Cindy described her ICT skills as average and has used ICT in her teaching for the past eight years to do research and prepare and deliver lectures. She has been using the BbCMS for the past three years in a limited way.

1. Kate

Kate (pseudonym) is a member of the Mathematics department and had been teaching courses in Mathematics education for more than twenty years at the tertiary level. She rated her ICT skills as average and has used ICT in her teaching for about six years to prepare and deliver her lectures. Kate has been using the BbCMS in a limited way for the past three years.

1. Verna

Verna (pseudonym) is a member of the Language Arts department and has been teaching at the tertiary level for more than twenty one years. She teaches a number of courses in the Language department as well as practicum courses. Verna rated her ICT skills as average and stated that she has been using ICT in her teaching for the past seven years; this includes the use of PowerPoint presentations and sometimes videos. She admitted to using the BbCMS in a limited way for three years.

1. Simon

Simon is a member of the Language Arts department. He teaches a number of courses in language and other curriculum areas. Simon has been teaching for more than thirty years at all levels of the education system. He has been teaching at the tertiary level for the past twelve years. Simon indicated that he has fairly good ICT skills and has been using ICT in his teaching for the past six years. He reported that he delivers all his lectures with the aid of PowerPoint and use the internet to communicate with his students via email and also to get information for his classes. Simon has been using the BbCMS for the past three years.