**UNIVERSITY OF SOUTHERN QUEENSLAND**

# Developing and implementing asynchronous online discussions to facilitate deep learning among trainee teachers in a non-western and non-native English speaking setting

A Dissertation submitted by
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# ABSTRACT

This study examined how to develop and implement asynchronous online discussions using design principles and guidelines drawn from constructivist principles such that deep learning is facilitated among non-western trainee teachers who are non-native English speakers. The study was conducted among eleven non-native English speaking trainee teachers in a non-western learning context. Reeves' model of design-based research (DBR) was chosen to guide the research design of the study. This approach allowed the researcher to design and implement online discussions based on design principles and guidelines that were progressively and iteratively tested and refined.

The study consisted of four phases, namely identification of a practical problem, development of an online discussion based on draft design principles, testing and refinement of the design principles, and reflection to develop contextually sensitive design principles. Mixed methods of data collection and analysis were used during the different phases of the study. Data from literature review, questionnaires, online discussion transcripts, semi-structured interviews and a reflective log were gathered and analysed during the different phases of the study. The degree and nature of the tutor's online interaction were influenced by trainees' mixed conceptions about teaching and learning. The findings revealed that the tutor should encourage and guide trainees to express their disagreements and objections clearly and politely to maintain a sense of safety and trust, and to promote active and meaningful online interaction. To address language barriers, adequate time should be allowed for reading and interpreting learning materials and postings. Moreover, focus should be on clear formulation of ideas, using the appropriate wordings and tone rather than on the grammar, spelling and punctuation. The provision of marks and clear assessment criteria are also important.

Content analysis of trainee's online postings using Henri's model showed that there were more deep level postings than surface level postings. It can thus be concluded that when culture and language are given due consideration in the formulation of design principles and guidelines drawn from constructivist principles, online discussions can facilitate deep learning among non-western and

non-native English speaking students. The findings also suggest that DBR is an appropriate research approach to explore and develop effective design principles for online discussions. The revised design principles and guidelines have theoretical and practical implications for tutors designing and implementing online discussions to facilitate deep learning among non-western or culturally diverse groups of students who are non-native English speakers.

# CERTIFICATION OF DISSERTATION

I certify that the ideas, experimental work, results, analyses, software and conclusions reported in this dissertation are entirely my own effort, except where otherwise acknowledged. I also certify that the work is original and has not been previously submitted for any other award, except where otherwise acknowledged.

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Signature of Candidate Date

ENDORSEMENT

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Signature of Supervisor/s Date

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# CHAPTER 1: INTRODUCTION

## *1.1 Research problem and context*

Mauritius is a small island of 2000 square kilometres and is located in the south-west of the Indian Ocean. It has a multi-ethnic population of about 1.2 million consisting of people of Asian (71%), African (27%) and European (2%) origin (Central Statistical Office, 2010). English is the official language and medium of instruction in all state-funded schools and higher education institutions, although it is not the mother tongue of the vast majority of the Mauritian people; the island was a British colony until it attained its independence in 1968. It has one teacher education institution that runs under the aegis of the Ministry of Education and Human Resources. The teacher education institution, as per its Act, is a tertiary education institution and it is mandated to engage in educational research, curriculum development and teacher education (Mauritius Institute of Education, 2007). Teacher education remains at the core of the activities of the institution and the clientele are mainly local teachers (pre- and in-service) working in pre-primary, primary and secondary school.

Since the past decade, with wider access to computer and Internet technologies throughout the island, teacher educators at the local teacher education institution have been called upon to include components of online learning in their courses. According to the latest strategic plan of the institution (Mauritius Institute of Education, 2007), by 2015, all departments should offer at least one course that includes components of online learning. Currently, asynchronous online discussions have been integrated in a few on-campus courses and distance learning courses. Many tertiary education institutions worldwide are incorporating the discussion board to complement their courses as it is a common tool built into many learning managements systems such as Web-CT, Blackboard and Moodle (Reeves, Herrington & Oliver, 2004; Teo & Webster, 2008). The discussion board is considered to be one of the most beneficial tools of online learning since it allows student-student and student-tutor interactions, unlike a static web-page of information (Teo & Webster, 2008).

At the local teacher education institution, the main reason for including online discussions in selected courses is to promote communication and exchange of information among the trainee teachers and between the trainee teachers and their tutors. Although communication is critical in the professional development of teachers (pre- and in-service) (Jetton, 2003; Romano, 2008), increased communication through social interaction and exchange of information in online discussions does not necessarily engender a deep approach to learning, which is the approach to foster in higher education, including teacher education (Garrison & Cleveland-Innes, 2005; Leamnson, 1999; McGee & Wickershame, 2005; Richards & Schofield, 2005; Smith & Colby, 2007; Szabo & Schwartz, 2009). A deep approach to learning reflects a student's intention to extract meaning by using active learning strategies that involve relating ideas, establishing patterns and principles, using evidence, and examining the logic of arguments (Entwistle, 2000). It results in deep learning whereby students can stand back, conceptualise and seek out interconnections between concepts and data while reflecting on the learning (Rosie, 2000). This approach suggests that teacher educators should implement online discussions with the intent to help trainee teachers to think in a critical and reflective manner (Havard, Du, & Olinzock, 2005) rather than to simply increase opportunities for communication; tutors should capitalise on the text-based, reflective and collaborative properties of asynchronous online discussions (Ferdig & Roehler, 2003; Hara, Bonk, & Angeli, 2000; Henri, 1992; Kanuka, 2005; Schallert, Reed, & D-Team, 2003). Some studies have shown that asynchronous online discussions have the potential to facilitate deep learning (Garrison & Cleveland-Innes, 2005; Hara et al., 2000; Havard et al., 2005; Hawkes & Romiszowski, 2001; Szabo & Schwartz, 2009).

My own experiences and those of colleagues with online discussions suggested that online discussions were not being used to facilitate deep learning at the local teacher education institution. Online discussions were mainly being used to increase the communication opportunities among trainee teachers and between trainee teachers and their tutors with little consideration given to improving the quality and depth of the online information being exchanged. I had jotted down the following issues in my reflective log that I kept throughout the duration of the study:

- Trainee teachers used the discussion forums for social interaction with their peers.
- Trainee teachers used the discussion forums to post their course content-related queries, expecting the tutors to respond and clarify the queries.
- Online discussion was perceived by tutors as a tool to increase communication opportunities rather than a tool that can be used to promote deep learning.
- During these workshops conducted at the local teacher education institution to train tutors to integrate elements of online learning into their courses, it was noted that the tutors were unaware of how to design online discussions such that deep learning is facilitated.

Online discussions, in and of themselves, do not facilitate deep learning nor do they automatically become interactive, collaborative and reflective by virtue of their text-based, reflective and collaborative properties (Kanuka, 2002; Pawan, Paulus, Yalcin, & Chang, 2003; Wang, 2009). According to Garrison and Cleveland-Innes (2005), designing online discussions that facilitate deep learning is a challenging task and tutors need to develop online discussions based on sound design principles and guidelines. Developing and implementing online discussions using design principles and guidelines that are based on constructivist principles can foster deep learning as learners are required to work collaboratively, to actively interact with peers and to think critically (Biggs, 1995; Chan, 2002; Gordon & Debus, 2002; Wang, 2009).

Most of the studies that have shown that online discussions have the potential to facilitate deep learning have been conducted among homogeneous groups of students from western countries and for whom English is their first language. There are few studies that have focused on the design of online discussions to facilitate deep learning among non-native English speaking students from non-western cultures. Culture and language are important factors to be considered for the effective implementation of online discussions (Gerbic, 2005; Gunawardena et al., 2001; Moghadam & Assar, 2008; Pisutova-Gerber & Malovicova, 2009; Schallert et al., 2003; Yildiz & Bichelmeyer, 2003). The use of English to

communicate in an online discussion can be a challenge for non-native speakers (Lai, Berg & McDonald, 2008).

Moreover, there is evidence that culture influences students' adoption of online learning technologies and their attitudes toward and approach to learning in an online learning environment (Lim, 2004; McLoughlin, 1999; Moghadam & Assar, 2008). Hofstede (1993) has developed several sets of dimensions to characterise the concept of a national culture. This study focused on the 'individualism/collectivism" dimension since online learning environments have been more effectively implemented in countries with an individualistic culture as opposed to countries with a collectivist culture (Anakwe, Kessler, & Christenssen, 2002; Lai et al., 2008). Western societies are more individualistic than non-western ones; ties between individuals are loose and they are expected to look after themselves and to take care of their own immediate family (Hofstede, 1993). On the other hand, in collectivist cultures individuals since birth are integrated into strong, cohesive in-groups, and these groups look after one another due to an innate feeling of loyalty. Hofstede has measured the "individualism/collectivism" dimension in several countries, but not in Mauritius. Ethnicity has been found to be a primary indicator of the national culture (Morse, 2003). Since Mauritius consists mainly of individuals of Asian and West African descent, it is likely that the 'individualism/collectivism' dimension will be similar to that which has been measured in Asian and West African countries. As per Hofstede's research, these countries have low individualism ranking, such that they share a more collectivist culture.

In many cultures, including the Mauritian culture, the teacher is perceived as the figure of control and authority and an authoritarian teaching approach prevails (Gerbic, 2005; Pisutova-Gerber & Malovicova, 2009; Yildiz & Bichelmeyer, 2003). An authoritarian teaching approach tends to favour one-way communication; learners are passive recipients of information from the teacher/tutor who is believed to hold all the relevant knowledge on the topic of study. Participation in online discussions based on constructivist principles may contradict the traditional pedagogical values and experiences of the learners (Gunawardena,1998; Lin, 2008; Schallert et al., 2003). The learners may be faced

with what has been described by Wilson (2001) as cultural discontinuity, that is a mismatch between the conditions of the learning environment and the learners' socio-cultural values and experiences. This study attempted to determine how the design principles and guidelines known to facilitate deep learning among western and native English speaking students could be adapted for students from non-western cultures and for whom English is their second language. The study culminated in the formulation of contextually sensitive design principles and guidelines for the development and implementation of online discussions such that deep learning is facilitated among non-native English speaking trainee teachers with a non-western cultural orientation.

## *1.2 Purpose and scope of the study*

The purpose of this study was to formulate contextually sensitive design principles and guidelines for the development and implementation of online discussions such that deep learning is facilitated among non-native English speaking trainee teachers with a non-western cultural orientation. The terms 'online discussions' or 'online interactions' in this study, unless otherwise specified, refer to asynchronous online interactions between students and the tutor or among students while using the online discussion forums.

Design-based research (DBR) was chosen to guide the research design of the study. The aim of DBR is to improve educational practices and refine design principles through design, development, implementation, and iterative analysis of interventions in real world settings (Design-Based Research Collective, 2003; Wang & Hannafin, 2005). It is particularly appropriate for the development, implementation and assessment of innovative learning environments such as online learning (Anderson, 2005; Design-Based Research Collective, 2003; Hill, Song, & West, 2009; Wang & Hannafin, 2005), and it is based on the assumption that existing practices are inadequate or can, at least be improved upon (Marden, Herrington, & Herrington, 2007). It supports a pragmatic approach to research which is congruent with my view as a researcher that research conducted in real-world settings should focus more on selecting methods for data collection and analysis that best address the research questions rather than selecting methods that

draw exclusively from the qualitative or quantitative research paradigm (Tashakkori & Teddlie, 2002).

In this study, the use of DBR allowed me to assume the roles of the researcher, designer and practitioner through the implementation of online discussions developed using grounded design principles and guidelines which were progressively and iteratively tested and refined. The study consisted of four phases based on Reeves' model of DBR (Reeves, 2006). The first phase involved the identification of a significant problem based on my experiences with online teaching and through conversations and discussions with colleagues at the local teacher education institution who also had some experience with online teaching. Extant literature was extensively reviewed in the second phase of the study to determine students' characteristics and tutors' practices that foster a deep approach to learning. The researcher considered the implications for the formulation of design principles and guidelines that were used to develop an online discussion to facilitate deep learning among trainee teachers. The online discussion was implemented during Phase 3 of the study. Given the iterative nature of DBR, the design principles and guidelines were tested and refined through two iterative cycles. As such Phase 3 involved the implementation of two online discussions. The fourth and final phase of the study involved thorough documentation and reflection of data gathered during the different study phases. This culminated in the formulation of contextually sensitive design principles and guidelines for the development and implementation of online discussions such that deep learning is facilitated among non-native English speaking trainee teachers with a non-western cultural orientation.

The study was conducted at the local teacher education institution. The study participants (n = 11) were non-native English speaking high school (secondary) teachers enrolled in the core course *Independent Study* of the Teacher's Diploma Secondary programme. This course was selected as it was delivered using a blended mode (face to face and online sessions) and I was the course tutor. It was the first course in the Teacher's Diploma programme that required trainees to interact in an online learning environment.

## *1.3 Significance of the study*

The study findings have theoretical and practical implications for tutors designing and facilitating online discussions with the view of promoting deep learning, especially among non-native English speaking trainee teachers from a non-western culture. There are important benefits to exposing trainee teachers to online learning experiences that facilitate deep learning in teacher education programmes. The trainee teachers are more likely to develop a constructivist perception of teaching and learning rather than a transmissive one (Gordon & Debus, 2002). This is of particular interest to the local educational context, since the educational system in Mauritius at the primary and secondary levels has often been criticised for favouring the authoritarian teaching approach and encouraging the transmission model of learning. It has also been noted that when trainee teachers adopt a deep approach to learning, they tend to develop deeper notions of teaching and learning and problem-solving capabilities that enable them to cope with novel and challenging circumstances that can arise in classroom situations (Gordon & Debus, 2002).

Most of the studies that have shown that online discussions have the potential to facilitate deep learning have been conducted among homogeneous groups of students from western countries and for whom English is their first language. Culture and language are important factors to be considered for the effective implementation of online discussions (Gerbic, 2005; Gunawardena et al., 2001; Moghadam & Assar, 2008; Pisutova-Gerber & Malovicova, 2009; Schallert et al., 2003; Yildiz & Bichelmeyer, 2003). There are few studies that have addressed cultural and language issues when designing online discussions to facilitate deep learning among non-native English speaking students from non-western cultures. Moreover, it has been stated that there is a need to conduct research that explores and develops effective design principles for online learning environments using a DBR approach (Hill et al., 2009). This study, using a DBR approach, attempted to determine how the design principles and guidelines known to facilitate deep learning through online discussions could be adapted or improved for non-native English speaking students from non-western cultures. Thus, findings of the study add to extant literature by examining the formulation of contextually sensitive

design principles and guidelines for the development and implementation of online discussions such that deep learning is facilitated among non-native English speaking trainee teachers with a non-western cultural orientation.

This study addressed another significant limitation of extant literature on online discussions among students from non-western cultures, that is the lack of details on what facilitates deep learning, why, in what ways, and under what conditions (Cotton & Yorke, 2006; Garrison & Clevelan-Innes, 2005; Kanuka, 2005; Wang, 2009). As pointed out by several researchers (Kanuka, 2002; Pawan et al., 2003; Wang, 2009), online discussions, in and of themselves, do not facilitate deep learning nor do they shift students' learning approach from a surface one to a deep one (Rosie, 2000). With the development of a set of design principles and guidelines to facilitate deep learning through asynchronous online discussions as the ultimate goal of the proposed study, it is anticipated that the task of designing and implementing online discussions would be less challenging for tutors at the local teacher education institution and other practitioners working with culturally diverse groups of students or students from non-western cultures and who are non-native English speakers.

Redmond and Lock (2008) observe that:

> Creating a space for deep learning using technology within teacher education, provides students the opportunity to experience what that it looks and feels like. In addition, they have a model from which they can then design online learning that fosters deep learning when they become teachers. (p. 4296)

Thus, this study and the application of the design principles and guidelines for the development and implementation of online discussions in teacher education courses might also prove to be beneficial to the trainee teachers by assisting the prospective teachers to develop similar online learning activities in order to facilitate deep learning among their students.

## *1.4 Structure of the dissertation*

The dissertation has been organised into seven chapters. This first chapter examined the research problem. It outlined the purpose, the context and the scope of the study and it also specified the significance of the research. Chapter 2 reviews literature on

approaches to learning and constructivism, the principles of which constitute the theoretical foundation for the design of the online discussions in the study. It also focuses on the use of online discussions, especially in teacher education courses. Special consideration has been given to cultural and linguistic issues while discussing the potential benefits, barriers and challenges of online discussions for students and tutors as this study was carried out in a non-western learning context where trainee teachers, for whom English is a second language, were expected to use English as the medium of interaction. The aims of the literature review are to clarify the research problem and to locate potential gaps in the literature on the use of online discussions to facilitate deep learning among culturally diverse groups of students who are non-native English speakers.

Chapter 3 identifies the research questions that guided this study. It outlines and provides justification for the research design. The aims, methods of data collection and analysis for the study phases have been discussed in detail. The study context, ethical and political considerations, and the study limitations are also addressed. Chapter 4 presents and discusses the findings of Phase 2 of the study. Extant literature is again extensively reviewed to address the first two research questions. The first research question focuses on the students' characteristics and tutors' practices that facilitate deep learning, according to extant literature. The second research question explores the design principles and guidelines for the development and implementation of online discussions such that deep learning is facilitated among non-native English speaking trainee teachers from a non-western culture. This chapter also presents background information about the study participants that were taken into consideration in the formulation of the draft design principles and guidelines. Chapter 4 concluded with the design and development of the first online discussion used in this study.

Chapter 5 addresses how the design principles and guidelines developed in the previous chapter have been taken into consideration in the implementation of the first online discussion (first iterative cycle of Phase 3 of the study). My role as the tutor is acknowledged. The aim of the first iterative cycle was to determine the effectiveness of the draft design principles and guidelines and to identify issues and problems related to the design and implementation of the first online discussion. The chapter

concludes with the formulation of a revised set of design principles and guidelines following thorough analysis, comparison and integration of data from various sources, including online transcripts, questionnaires and a reflective log maintained by the researcher.

Chapter 6 focuses on the second iterative cycle of Phase 3 of the study. This phase of the study involved the design and implementation of another online discussion using the revised design principles and guidelines in Chapter 5. Data collected and analysed from the transcripts of the online discussion and semi-structured interviews of study participants are examined to inform further revisions to the design principles and guidelines. Chapter 7 concludes this dissertation. It involves thorough analysis and reflection of key findings that have emerged from the study phases to identify a set of contextually sensitive design principles and guidelines for the development and implementation of online discussions such that deep learning is facilitated among non-native English speaking trainee teachers from a non-western culture. Some areas of further research that emerged from the integrated analysis of data and from the limitations in the scope of the study are also identified in the last chapter.

# CHAPTER 2: LITERATURE REVIEW

This chapter reviews extant literature on constructivism and approaches to learning, namely deep and surface approaches. The principles of constructivism constitute the theoretical foundation for the design of the online discussions in this study. The use of online discussions, especially in teacher education programmes, is also explored. Special consideration has been given to cultural and linguistic issues while discussing the potential benefits, barriers and challenges of online discussions for students and tutors as the present study was carried out in a non-western learning context where trainee teachers, for whom English is a second language, were expected to use English as the medium of interaction.

## *2.1 Constructivism*

Online learning is a relatively new field and there seems to be no single learning theory that applies specifically to online learning environments. One of the most often cited and widely accepted theories closely related to technology facilitated learning environments, including online learning, is the constructivist learning theory (Chan, 2002). Constructivist learning theory has developed from the epistemological philosophy of constructivism. There is evidence that learning environments designed using constructivist principles support a deep approach to learning (Biggs, 1995; Gordon & Debus, 2002). Thus, in this study the principles of constructivism constitute an appropriate theoretical foundation for the design and development of online discussions such that deep learning is facilitated. The next section describes the principles and tenets of constructivism.

Constructivism describes a philosophy of learning whereby each individual constructs knowledge through his or her interactions with the environment, including other learners (Ravai, Ponton, & Baker, 2008). It has emerged from the work of theorists such as Piaget, Dewey, Vygotsky, Kelly and Bruner (Taylor, Marienau, & Fiddler, 2000). With its focus on learners constructing their own knowledge, constructivism has gradually gained acceptance among educationists to become a dominant epistemology in lieu of the objectivist and positivist paradigms over the past three decades (Tan, Hung, & Chai, 2003). This paradigm shift may

apply more to western educationists that non-western ones (Gerbic, 2005; Schallert et al., 2003; Yildiz & Bichelmeyer, 2003).

Constructivism emphasises thinking, the thinking process and the application of knowledge, in line with a deep approach to learning, rather than a surface approach to learning that is characterised by rote learning, memorisation and repetition of information (Chan, 2002). It views learning as an active process in which students, in a learner-centred environment, construct new ideas or concepts based upon their prior knowledge, preferably in a realistic and meaningful context. Constructivism focuses on two things: how learners construe ideas and how they construct meaning (Candy, 1991). Thus, learning involves not just constructing knowledge, but also the interpretation of ideas and experiences to create or develop new knowledge. If learners encounter ideas and situations that are not consistent with their current understanding, they can change their understanding to accommodate the new experience.

Constructivism comprises two main schools of thought: cognitive constructivism and social constructivism. The former was developed by the Swiss psychologist, Piaget. It is concerned with meaningful learning and the construction of knowledge structures (Shuell, 1987); individuals construct knowledge through their actions on the world. Meaning is imposed by an individual's interpretation of his or her own world and therefore, there are many ways to structure and interpret the world, and there are many meanings and perspectives for any event or concept.

The primary focus of social constructivism, developed by the Russian psychologist, Vygotsky, is on social interaction (Vygotsky, 1978). Learning is perceived as a social process and knowledge is socially and culturally constructed. Social interaction and discourse with knowledgeable members of the community enable individuals to construct and create meaning within the environment they live in (Taylor, Gilmer & Tobin, 2002). Through interaction in a community of learners, an individual can gain multiple perspectives of an issue to enable them to appropriate them as their own (Jonassen & Land, 2000).

Social interaction, according to social constructivism, also fosters the development of a learner's zone of proximal development (ZPD), defined as the social processes that help learners to bridge the gap between the known and unknown (Vygotsky, 1978). A learner is thus able to extend his or her own knowledge, skills and abilities within a limited range under adult guidance or with the aid of more capable co-participants (Chaiklin, 2003). This view of learning has important implications for online discussions since it emphasizes learning as a social process and the importance of interaction and scaffolding instructions in order to promote learning.

Cognitive constructivism and social constructivism share several common perspectives about teaching and learning (Jonassen, 1994):

- Emphasis is on knowledge construction rather than knowledge reproduction.
- Constructivist learning environments provide multiple representations of reality.
- Multiple representations minimise oversimplification and reflect the complexity of the real world.
- Learning environments that reflect real-world settings are preferred to predetermined sequences of instruction.
- Thoughtful reflection on experience is encouraged.
- Context- and content-dependent knowledge construction is fostered.
- Collaborative construction of knowledge is favoured among learners through social negotiation rather than competition among learners for recognition.

Despite the clear advantages of designing constructivist learning environments, tutors can face certain conceptual, pedagogical and cultural challenges in implementing constructivist instructions (Windschitl, 2002), both at a personal level and at an institutional level. The applicability of constructivist approaches in non-western learning contexts or among learners who come from non-western cultural backgrounds and who are used to teacher-centred learning environments has been questioned (Gunawardena, 1998; 2007; Lai et al., 2008) because the educational system may favour transmissive conceptions about teaching and learning rather

than constructivist ones. This might have important implications for this study, which was carried out in a non-western learning context among trainee teachers who come from predominantly Asian and African cultural backgrounds.

According to Windschitl's framework, successful implementation of constructivist instruction requires that tutors themselves have a good grasp of the underpinnings of cognitive and social constructivism and that they change their epistemological orientation necessary for constructivist learning. They have to encourage their students' thinking, facilitate and manage discourse and collaborative work in classroom. Moreover, they need to be conscious of classroom culture, the discourse patterns of students, the transformation in student's beliefs and practices, and the types of activities that are being valued. Tutors may also need to negotiate with various stakeholders in the school community for their support. These challenges are of particular relevance to this study and may have had an influence on students' approach to learning and the quality of the learning outcomes when they engaged in online discussions.

## *2.2 Approaches to learning*

The way in which students approach their learning has been widely researched. Approaches to learning describe the way students engage with a task or course and provide a framework for understanding the complex relationship between the learning context and the learning processes that result in specific learning outcomes (R. D. Garrison & Cleveland-Innes, 2005). They include the process that guides a student through the learning as well as the student's engagement with the learning process. They reflect students' motives, that is the reasons students have for learning, and the strategies, that is the actual methods used by the students in learning the material (Biggs, 1999). In a particular learning context, students will try to seek congruence between their learning motives and the strategies.

The original work on approaches to learning was carried out by Marton and Saljo (1976) and has been elaborated by others (Entwistle, 1991; Ramsden, 1992) . The study of Marton and Saljo explored students' learning approaches to a particular task. Students were instructed to read a text, and were told that they would later be asked questions related to the text. The students adopted two different learning

approaches to this task. The researchers determined that one group of students adopted an approach where they tried to understand the whole picture; their focus was on comprehending and understanding the text. These students were identified as having a deep approach to learning. The second group of students tried to remember the facts and details from the text, and they were more concerned with what they thought they would be questioned about later. This group focused on rote learning and their approach to learning was characterised as a superficial or surface approach.

The concept of approaches to learning as described above is mainly concerned with the way students engage with a task or a course, but it does not explicitly address the specific factors which influence students to adopt a particular approach to learning. Besides knowing how a student is engaging with a task or a course, it is also important to know why the student adopts a deep or surface approach to learning. In this study the focus was on both the 'how' and why' trainee teachers adopted a particular learning approach when they participated in online discussions. The 'how' and 'why' are seen as complementary in order to assist in the formulation of sound pedagogical principles and guidelines for the development of online discussions such that deep learning is facilitated.

Biggs (1987) proposed a model, the Presage, Process and Product model (Biggs' 3P model, see

Figure 1) to describe a range of factors that are known to influence students' choice of learning approach (Biggs, 1987). According to this model, the learning process is conceptualised in terms of three sets of variables: the learning

environment and learner characteristics (presage), students' approaches to learning (process) and learning outcomes (product). The presage factors describe how students differ within a given context. They mainly refer to personal and situational factors. Personal factors include learners' ability, personality, prior knowledge, motivation, past experiences, personal values and conceptions of learning, while the situational factors include course design, teaching methods, assessment, nature of task, time pressures and the atmosphere of the learning environment. Given that these factors are known to have an influence on the quality of the learning outcomes via the learning process used, many of them have been considered in this study. More details about these factors are discussed in Phase 2 of the study (Chapter 4) in order to address the first research question about tutors' practices and learners' characteristics that facilitate deep learning.

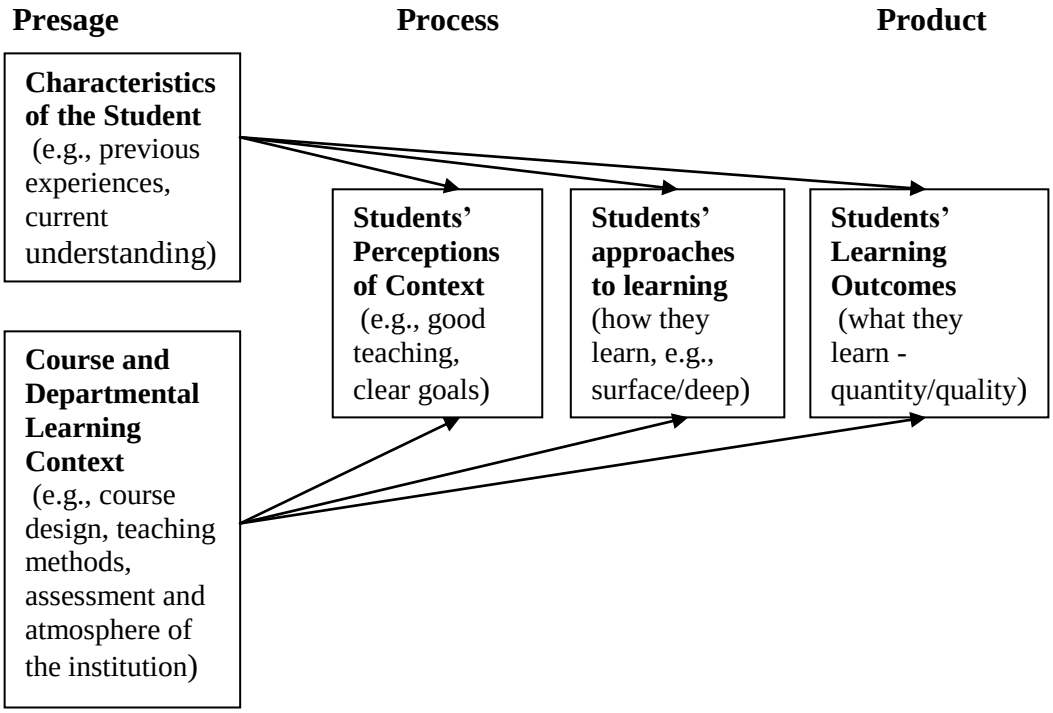


**Figure 1: Biggs' 3P model** (Adapted from Lew, 2005)

The process factors describe how the specific tasks are tackled. They include motives students have for studying a particular course or completing a particular task, and the strategies used in learning the materials. The product factors refer to the learning outcomes, both qualitatively and quantitatively. They can include a combination of objective measures of performance such as exams and class tests, and subjective measures such as level of satisfaction. In this study, content

analysis of online discussion transcripts for the level of information processing constituted an objective measure of performance, and the levels of satisfaction of students were gauged through a questionnaire and semi-structured interviews.

Before discussing more extensively the two specific approaches to learning, deep and surface, it is important to point out that learning approaches should not be perceived as a stable trait of a learner, although he or she may have a preference for one or the other (Biggs, 1987). A learner can adopt both approaches in the same course or adopt a deep approach in one course and a surface approach in another course in response to the presage factors, namely the situational factors.

### 2.2.1 Deep approach to learning

A deep approach to learning reflects the intention to extract meaning through active learning processes that involve relating ideas and establishing patterns and principles on the one hand, and examining the logic of an argument on the other hand (Entwistle, 2000). Learners need to be engaged in deep-level information processing (Mitsifer, 2004), critically analysing new ideas and relating them to already known concepts and ideas. They are personally committed to learning and show much interest in the subject. Students who adopt a deep approach to learning are intrinsically motivated to understand the material thoroughly through critical examination of new facts and ideas, tying them into existing cognitive structures and linking them to past and current knowledge and experiences (Gordon & Debus, 2002; Lew, 2005; Ramsden, 2003; Vaughan, 2008). In a study by Chin and Brown (2000), students who used a deep approach tended to refer to their past and daily life experiences, and their ideas were more interconnected, reflecting a greater degree of cognitive processing to foster ongoing thinking rather than piecemeal thinking.

Besides improving the quality of learning outcomes, including students' analytical skills, a deep approach to learning can help students to reshape pre-existing concepts which they initially had before actively engaging in the learning process (Riley & Anderson, 2006). When students actively engage in the learning process, they can gain a deeper understanding of the various, and at times conflicting

factors and conditions of a given issue or concept. Consequently, they can develop multiple perspectives about an issue whereby they get to explore and accept the positive and negative aspects of the issue under focus. Kanuka (2002) states that a deep approach to learning "is challenging and removes us from our comfort zones in that it requires us to take perspectives and positions that are unfamiliar and sometimes conflicting with our own world view" (p. 165). Consequently, one would expect trainee teachers who mostly use a deep approach during their training to be more prepared to face challenging and unforeseen situations that can arise in the school setting once they become practising teachers. Research has shown that trainee teachers who receive greater exposure to learning experiences that facilitate deep learning are more likely to develop deeper notions of teaching and learning and problem-solving capabilities to cope with problematic classroom situations (Gordon & Debus, 2002).

A deep approach to learning results in deep learning whereby students can stand back and conceptualise, seeking out interconnections between concepts and ideas while reflecting on their learning (Rosie, 2000). Students thus develop a better understanding of concepts and can then organise their understanding and thoughts in various ways to apply them in real-life and unfamiliar or problematic situations (Biggs, 1995; Kanuka, 2005). Deep learners have good critical thinking skills, skills often referred to as higher order cognitive skills (Halpern, 1998). These skills involve the ability to analyse, synthesize and evaluate information, identify main ideas, and cite evidence in support of a conclusion. Critical thinking skills are essential and need to be fostered as part of teacher education programmes (Szabo & Schwartz, 2009). When students think critically about topics learned, they use metacognitive skills and consequently, they not only apply what they learn, but also think about their own processes of thinking, in time becoming self-regulated or independent learners (Yip, 2008). Independent learning has been recognised as one of the factors that can contribute to the success of learning in an online course (Mimirinis & Bhattacharya, 2007). Unlike face to face courses, online courses are characterised by less reliance on the course tutor whereby learners need to seek relevance or purpose from the learning materials under the guidance and feedback from their tutor (Gill & Halim, 2007).

Deep learning, thus, is more likely to occur when learners are intrinsically motivated and are exposed to learning experiences that are designed to foster the use of active teaching and learning strategies such as group discussions, case studies, role plays, as opposed to passive strategies such as lectures. If tutors want their students to use a deep approach to learning, they need to give due consideration to the design and implementation of a task or a course. In this study the key elements that facilitate deep learning, more specifically through the use of online discussions in a non-native English speaking and non-western educational setting, are explored.

### 2.2.2 Surface approach to learning

A surface approach to learning, unlike a deep approach, is reflected by students' intention to simply complete the task requirements for a course in a bid to obtain the minimum passing mark (Entwistle, 2000; Ramsden, 2003). Students are more concerned with making minimal effort and acquiring just sufficient knowledge to avoid failure rather than to seek further connections, meaning or implications of what they have learned. The focus is on rote memorisation and the use of reproductive strategies. In a study by Lew (2005) among undergraduate students, it was found that students who adopted a surface approach to learning perceived academic texts and lecture notes as a mass of information that had to be memorised for recall and reproduction.

When students adopt a surface approach to learning, they perceive the knowledge acquired as unrelated pieces of information for assessment purposes rather than to be applied to real-life situations. Studies have shown that surface learners tend to compartmentalise their learning such that they cannot find the links between knowledge acquired from one course or task and the knowledge acquired from another task or course (Entwistle, 2000; Redmond & Lock, 2008; Richards & Schofield, 2005). Surface learning is thus characterised by repetition of information, lack of originality, elaboration and justification without evidence, and suggesting solutions without explanation. Students would offer opinions without grounding them on evidence from reliable sources, they would fail to reason with evidence, and they would jump from one idea to another without a sense of

directional link between the isolated ideas (Angeli, Valanides, & Bonk, 2003; Chin & Brown, 2000; Hara et al., 2000; Ng & Murphy, 2005).

It has been stated that "a surface approach to learning in potential teachers is less that desirable, to say the least" (Richards & Schofield, 2005, p. 2950). According to Gordon and Debus (2002), teachers using this approach find it difficult to generate a range of alternative solutions in various contexts. They also point out that the memorisation of materials and modelling of teaching methods from practicum supervisors are not to be encouraged since when difficulties arise, teachers may not be in a position to cope or solve the problematic situation. If a surface approach to learning is the predominant approach, neophyte teachers may not be able to adapt and apply whatever they have learned in their teacher education courses to novel situations, while those who have been mainly using deep strategies will have better analytical and problem-solving skills to face similar situations (Gordon & Debus, 2002; Havard & Du, 2004). Analytical and critical thinking skills are essential higher order cognitive skills and need to be fostered in teacher education programmes (Riley & Anderson, 2006; Szabo & Schwartz, 2009).

If students are using a surface approach to learning, they cannot be totally blamed. The use of surface learning strategies is not solely the result of poor intrinsic motivation. Students with poor intrinsic motivation are more concerned with getting a passing grade rather than understanding and integrating information from different sources. As stated earlier, a learner can adopt both approaches in the same course or adopt a deep approach in one course and a surface approach in another course in response to the presage factors, namely the learning context (Biggs, 1987). Mimirinis and Bhattacharya (2007) found that careful design and structure of online discussions can increase students' motivation.

**Table 1: Comparison of deep and surface learning approaches** (Adapted from Biggs (1999) and Ramsden (1992))

| ***Approach*** | **Deep Approach** | **Surface Approach** |
|---|---|---|
| ***Features*** | • Genuinely interested to gain a thorough understanding of | • Perceives course content simply as material to be learnt |

| | | |
|---|---|---|
| | material through active learning strategies.<br>• Good intrinsic motivation.<br>• Relates previous knowledge to new knowledge.<br>• Makes connection between content from different courses.<br>• Relates theoretical concepts to everyday experience.<br>• Relates and distinguishes evidence and argument. | for assessment purposes using rote learning and memorisation<br>• Poor intrinsic motivation.<br>• Cannot recognise new knowledge as building on previous knowledge.<br>• Treats content from different courses as separate.<br>• Treats theoretical concepts unreflectively.<br>• Cannot make the distinction between principles and examples |

The features of deep and surface approaches are summarised in Table 1. If online discussion is to be used to facilitate deep learning, careful thought needs to be given to its design and implementation in order to minimise the adoption of surface learning strategies.

## *2.3 Online discussions in teacher education*

In teacher education programmes, online discussions are used for various purposes and this has been widely researched according to Steinbrecher (2008). For example, online discussions are used to prepare students for face to face discussions in courses using a blended learning environment or to discuss topics that are not fully discussed in class due to time constraints (Jetton, 2003; Szabo & Schwartz, 2009; Teo & Webster, 2008). Through online discussions, students can engage with course topics in a collaborative way even when they are not in the classroom. In blended online learning environments, online discussions have been frequently used to foster reflection and reflective thinking; teacher educators have used the online forums to encourage trainee teachers to reflect on their field experience or to stay connected with their tutors and peers (Kumar, 2008).

The design and development of effective online discussion by a class tutor requires that he or she has a sound understanding of the benefits of online discussions and the potential challenges for tutors and their students. In this chapter, Section 2.3.1 provides an overview of the cultural and language issues that are of significance to online discussions; these issues are further looked into in Sections 2.3.2, 2.3.3 and Phase 2 of the study. Sections 2.3.2 and 2.3.3 include a review of extant literature

on the benefits and limitations of online discussions, with special consideration given to linguistic and cultural issues that can arise while developing and implementing the discussions in non-western and non-native English speaking learning contexts.

### 2.3.1 Culture and language issues

Culture is defined as the "the distinctive pattern of thought, action and value that characterise the members of a society or social group" (Winthrop, 1991, p. 50). It has been found to have a significant effect on the design and adoption of online learning technologies (McLoughlin, 1999; Moghadam & Assar, 2008). According to these researchers, national culture can be either a restraining or a driving force. Other researchers have found that learners' cultural background, learning styles and cognitive processing are interrelated (Sanchez & Gunawardena, 1998). There is also evidence that cultural differences in online learning environments influence students' attitudes toward and approaches to learning (Lim, 2004). Hence, cultural factors cannot be overlooked when designing online discussions to facilitate deep learning.

Extant literature shows that technology-facilitated distance learning environments, including online learning environments, can be implemented more effectively in countries with an individualistic culture as opposed to countries with a collectivist culture (Lai et al., 2008; Anakwe et al., 2002). A collectivist society includes individuals who since birth are integrated into strong, cohesive in-groups, often extended families, and these groups look after them due to an innate feeling of loyalty. In comparison, an individualistic society, more prevalent in western countries, is one where the ties between individuals are loose; everyone is expected to look after himself or herself and to take care of his or her own immediate family (Hofstede, 1993).

Sanchez and Gunawardena (1998) compared the western and non-western world views and their influence on learning. They found that western world views include competition, individuality, timing and scheduling, dualistic thinking, nuclear family, separation of religion from culture, and task orientation. On the other hand, non-western world views include cooperation, collectivity, relativity of

time, holistic thinking, extended family religion as part of culture, and social orientation. Research shows that in many Asian cultures, individuals are less likely to express their disagreement and they are very much concerned with protecting one's face in public, "face saving", a concept common in collectivist culture; arguing one's point of view is perceived as confrontational and undesirable (Gunawardena, 1998; Samovar & Porter, 2001).

It is important for online tutors to recognise that students from different cultures may communicate differently in an online learning environment and thus, the design of the online learning activities must be based on culturally sensitive principles and guidelines (Lai et al., 2008). It should be noted that there is a lack of research on the online communication and interaction patterns of students from various cultural backgrounds. Extant literature demonstrates that the power distance, that is the relationship between students and teachers, significantly influences students' readiness to ask questions in group situations; students with a high power distance are less likely to ask questions (Holmes, 2005 and Tu, 2001, cited in Lai et al., 2008).

The use of English language by non-native speakers in an online environment can be a challenge. It can increase students' workload as they require more time to formulate their postings and to understand the online postings of their peers and tutor (Lai et al., 2008). The emphasis on context in students' native language is also another challenge. In low context cultures, most of the meaning is provided in explicit verbal utterance, whereas in high context cultures, contextual/non-verbal cues convey certain important information that cannot be inferred solely from the words used (Morse, 2003). Given that online discussion is a predominantly text-based medium of communication where there is a lack of non-verbal cues, students from high context cultures may be disadvantaged. Though culture and language constitute significant challenges for the effective implementation of online discussion in the present study, one cannot ignore the benefits of online discussions in teacher education, some of which are of special relevance to non-western and non-native English speaking students.

### 2.3.2 Potential benefits of online discussions

Due to the increasingly complex roles of teachers nowadays, it is recognised that they should be provided with opportunities to examine their beliefs about teaching and learning, to construct their own knowledge in a supportive environment, and to collaborate with peers (Hawkes & Romiszowski, 2001; McLoughlin, 2004; Szabo & Schwartz, 2009). An online discussion forum provides a powerful learning environment for understanding the complexity of students, teachers, classrooms, schools, and their surrounding communities (Teo & Webster2008). It also seems to offer a solution to the limited opportunities teachers have to engage in professional development experiences that are collaborative, collegial, and reflective (Courtney & King, 2009; Jetton, 2003). Teacher educators, trainee teachers and in-service teachers can all gain from the use of online discussions.

Online discussions offer several benefits for trainee teachers, some of which are of particular significance to non-native English speakers. According to Ferdig and Roehler (2003), an "electronic discussion forum represents a unique opportunity for teaching and learning in teacher education. It retains many of the benefits of discourse and dialogue (the opportunity to socially interact) while offering the meta-linguistic and meta-analytic advantages of print" (p. 125). The relative permanence of the text-based messages provides students with more time to reflect on their teaching experiences as well as those of their peers (Andresen, 2009; Dutt-Doner & Powers, 2000; Jetton, 2003; Killian & Willhite, 2003; Lin, 2008; Tiene, 2000), thus facilitating internalisation and peer interaction. This is of particular benefit to non-native English speakers who have reported being motivated to think, to clarify their position, to develop understanding through reading and to discuss the different points of view (Campbell, 2007; Gerbic, 2005; Schallert et al., 2003). Kumar (2008) reported that the ability to edit and improve postings on online discussions encouraged the non-native English speaking students to participate more actively in online discussions than face to face discussions.

Online discussions have been found to promote critical thinking skills and deep learning among pre-service as well as in-service teachers (Hara et al., 2000; Hawkes & Romiszowski, 2001; Szabo & Schwartz, 2009). A few studies have

compared face to face and online courses when evaluating students' critical thinking skills and they have shown that the use of online discussions fostered critical thinking; students used higher level questions and their online responses reflected more breadth and depth than time-constrained classroom discussion where students often make spontaneous unsubstantiated comments (Derry, Hmelo-Silver, Nagarajan, Chernobilsky, & Beitzel, 2006; Schumm, Webb, Turek, Jones, & Ballard, 2006; Teo & Webster, 2008). Online discussions also promote metacognition, the self- evaluation of one's own thinking, which is part of the critical thinking process that pre-service teachers should use as part of their learning and as part of their classroom teaching (Ferdig & Roehler, 2003). This study contributed to existing literature on the potential of online discussions to foster deep learning and critical thinking skills among non-native English speaking student teachers in a non-western educational setting.

Besides deep learning and critical thinking skills, asynchronous online discussion has been found to improve other skills such as ICT skills, problem-solving and writing skills. Active participation in online discussions better prepared preservice teachers to use online discussions in their own teaching when online discussions were integrated into their teacher education courses (Kumar, 2008; Szabo & Scwartz, 2009). In a study by Jetton (2003), students were found to rely on each other to solve their problems rather than waiting for the online instructor to provide an answer, thus helping to establish a community of learners. Even when trainee teachers do not have the solutions to the problems, they may respond in sympathetic and caring ways, thus providing emotional support to their peers (Dutt-Doner & Powers, 2000).

Students can improve their writing skills by reading the postings of their peers and then responding to them. Among non-native English speaking students, writing is considered easier than speaking or listening, and dictionary or spelling/grammar checks can be used for postings (Gerbic, 2005; Yildiz & Bichelmeyer, 2003) . This can encourage participation to such an extent that students feel more at ease to voice out their opinions online than during in-class discussions. In addition, students used to teacher-centred approaches are more likely to disagree online

because, in the absence of visual cues, they feel that more importance is given to ideas than the identity of the participant. Kumar (2008) also found that in blended learning environments, online discussions increased students' comfort level with each other in the class; online discussions provided the students with the opportunity to better know their peers as a result of which they felt equally at ease to argue with their peers face to face.

Gerbic (2005) has pointed out that the pace of face to face discussion can be too fast for non-native English speaking students who may lack the general confidence to join class discussions. This concurs with the findings of Killian and White (2003) and Kumar (2008) who have reported in their studies that reluctant and shy students participate more actively in online discussions than in face to face discussions; this can largely be attributed to the much lower pace of online discussions, the reduced competition for "air-time", and the absence of visual cues.

The absence of visual cues has also been found to be beneficial in minimising distraction (Hammond, 1998) and emotional outbursts (Poole, 2000) – "Traditional class structures sometimes encourage emotional outbursts, whereas the online medium enabled students to respond with passionate, but well supported positions" (p. 175). In multicultural classes, online discussions can create a more egalitarian situation than in traditional face to face classes because barriers common to face to face communication such as race, physical appearance and language accent are absent (Gunawardena, 1998; Yildiz & Bichelmeyer, 2003). Male dominance in class discussions, noted in the local context and other patriarchal societies, can be partially overcome in an online environment because of the egalitarian situation and the social distance that prevail (Im & Lee, 2003). The gender dimension, although of significance, could not be addressed in this study because all the study participants were females.

Online discussion also provides a means for students used to teacher-centred approaches to adopt new roles, in line with constructivist approaches, where they take control of their learning (Poole, 2000). Students in this study were more used

to teacher-centred approaches. Hence, it was worth finding out in this study whether students took responsibility for their learning by participating in online discussions.

Whilst most research studies seem to highlight the benefits of online discussions for the learners, one should not underestimate the benefits for the course instructors. Ferdig and Roehler (2003) and Gunawardena (1998) have found that the use of online discussions may help instructors to adopt constructivist teaching approaches, thus promoting a shift of authority and power in the classroom from the instructor to the learners (Fauske & Wade, 2003); the course instructor is not seen as the only one who can answer questions (Dutt-Doner & Powers, 2000). Moreover, the online medium allows discussion of readings and specific topics outside "normal" class time, thereby enabling the course instructor to implement other learner-centred pedagogical activities during face to face sessions (Dutt-Doner & Powers, 2000; Ferdig & Roehler, 2003; MacKinnon, 2000).

The online discussion forum serves as an important tool for collaboration to promote interaction and sharing of experiences and opinions between trainee teachers and the instructor (Hawkes & Romiszowski, 2001; Jetton, 2003; Teo & Webster, 2008). Dutt-Doner and Powers (2000) have noted that trainee teachers are more likely to share negative experiences with their peers and the course instructor online than in class because the online medium provides "faceless" communication. The sharing of experiences (positive and negative) allows instructors and student to gain multiple perspectives about an issue or topic (Dutt-Doner & Powers, 2000; Jetton, 2003; McLoughlin2004; Pena-Shaff, Altman, & Stephenson, 2005). The online tutors in the study by Kumar (2008) reported that there are more "points of view" online than in face to face classes. The multiple perspectives presented in online forums can result in cognitive conflict among students. Cognitive conflict occurs as a result of dissonance between learners' pre-existing ideas and new ideas that they come across, that is the learners are faced with contradiction or inconsistency in their ideas (Teo & Webster, 2008). An instructional situation can provide an environment where contradiction and inconsistency in ideas are acknowledged and explicitly invoked. Such conflict has

been found to be beneficial to knowledge construction, to remedying misconceptions and to developing understanding among learners (Teo & Webster, 2008). Moreover, in a multicultural context, multiple perspectives can provide opportunities for instructors to better understand the cultures of their students. As pointed out by Schallert et al. (2003), computer-mediated discussion is a "wonderful medium for allowing the multicultural voices of students to be heard" (p. 115).

The relative permanence of text-based messages in asynchronous online discussions is beneficial to the course instructor. Students' online comments can be reused as an instructional tool to model expected answers and discourse patterns. The content of the messages can be used for tracking student professional growth and development over extended periods of time as well as within a single online session (Hara et al., 2000). In blended learning environments, online discussions of course topics prior to face to face classes can better prepare the tutor for class discussions because after reading the students' online postings, the tutor becomes more familiar with students' understanding of course topics and problematic areas that can be addressed in class (Kumar, 2008).

Despite the clear benefits, there are also a myriad of challenges and barriers that both online tutors and students face when they participate in online discussions. Hawkes and Romiszowski (2000) have pointed out that the use of computer-mediated communication promotes access to professional colleagues, but does not ensure professional growth and learning experiences. Tutors need to be aware of the various challenges and barriers in order to make more effective use of online discussions in their courses.

### 2.3.3 Potential barriers and challenges

In an online environment, culture and language have been recognised as challenges, especially for individuals coming from non-western countries (Gerbic, 2005). In many cultures, including the Mauritian culture, the teacher is perceived as the figure of control and authority while learners are passive recipients of information. Moreover, there is more emphasis on content than on thinking skills.

Studies by Yildiz and Bichelmeyer (2003) and Gerbic (2005) have found that Asian and Middle East students are not used to learning environments that put emphasis on critical thinking and interactive learning - they are used to learning directly from the teacher and find it challenging, unusual, and difficult to learn through peer discussion. When asked to participate in online discussions, they may be faced with what has been described as cultural discontinuity, that is a mismatch between the conditions of online learning and the learners' socio-cultural experiences (Wilson, 2001).

Learning in an online environment may contradict the traditional pedagogical values and experiences of learners, especially those from non-western cultures (Gerbic, 2005; Gunawardena, 1998; Lin, 2008; Schallert et al., 2003; Yildiz & Bichelmeyer, 2003). Consequently, these learners need to balance their own cultural values and perspectives with those of the new learning environment. In face to face class, they tend not to express their disagreement with peers or teachers as it is considered an offensive and impolite behaviour. The reluctance to disagree may also be the result of growing up in a collectivist culture where the tendency is to agree and support the view of others (Gunawardena, 2001). As pointed out earlier, the lack of visual cues in an online environment may to some extent curtail the reluctance to disagree as compared to a face to face learning environment.

Teacher-centred approaches may act as a barrier to the effective use of online discussion for tutors as well. Tutors may not be willing or be ready to change their role in an online environment – from a figure of authority to one of a facilitator (Yildiz & Bichelmeyer, 2003). Ferdig and Roehler (2003) found that instructors in blended learning environments who did not use discourse as a means to knowledge construction found it more difficult to integrate online discussion forums during their face to face sessions. Tutors also need to be aware of their degree of participation in online forums (Andresen, 2009). Some researchers have found that the tutor's response can end the discussion because he or she is perceived by the students as an authority, and he or she has the final answer (Jetton, 2003; Teo & Webster, 2008). On the other hand, Yidiz and Bichelmeyer (2003) pointed out that

the non-participation of the instructor can be a disabling factor to online participation of students, especially for students used to learning approaches that are teacher-centred as illustrated in the statement below:

> The instructor's absence was disturbing for Taiwanese and Turkish participants, especially for Fei-Fei who believed that the teacher is the only source of knowledge and instructor's opinions are more important than classmates' opinions. She indicated that she didn't want to learn only from her classmates because there was a possibility that they could be wrong. (p. 185)

Even if there are studies that have demonstrated that non-native English speakers improved their writing skills through participation in online discussions, there are some other studies which have found that students can encounter difficulties in writing messages and in understanding and interpreting the postings of their peers and their tutor (Hara et al., 2000; Schallert et al., 2003; Teo & Webster, 2008; Williams et al., 2001; Yildiz & Bichelmeyer, 2003). This may deter participation in online conferences. Gunawardena et al., (2001) found that "because of the premium on text-based communication, those who feel that they are not good writers or for whom the language of conference is not their native language, may feel disinclined to participate" (p. 90).

Besides culture and linguistic competencies, "cognitive maturity" of students has been found to influence their degree of participation and their readiness to learn through peer discussion (Pena-Shaff et al., 2005). Students who are cognitively "immature" tend to believe that knowledge is objective and held mainly by the instructor. Hence, they may not feel confident about expressing their ideas online and may not consider their peers' postings as plausible. Reticence in communicating in public can also result when students feel that they will be judged not only on what they say but how they say it (Hawkes & Romiszowski, 2001; Killian & Willhite, 2003; Pena-Shaff et al., 2005).

Assessing students' postings has been identified as an important barrier to a democratic online discussion forum. "If CMD (computer mediated communication) is intended to provide a democratic forum for discussion, then assessing the content of postings from the situated position of the instructor may inhibit alternative views and voices" (Fauske & Wade, 2003, p. 149). When

discussion postings are assessed, students may contribute to meet the course requirement rather than to develop their professional identity (McLoughlin et al., 2004). Students may also feel compelled to participate, viewing participation as a chore rather than "a thoughtful activity from which to learn something of value" (Pena-Shaff et al., 2005). However, it is worth pointing out that studies involving Asian students have found that the greatest motivational factor for online participation was the assessment of online contribution (Gerbic, 2005; Teo & Webster, 2008). In the study by Teo and Webster (2008) in Singapore, assessment of participation in online discussions contributed to the high rate of participation of pre-service teachers and succeeded in addressing the problem of non-participation. Improvements in the quality of the postings were also noted. Hence, in a multicultural class or when working in a non-western learning context, assessing online participation can be viewed as an enabling factor rather than a disabling factor.

Other barriers to effective asynchronous online discussion, irrespective of students' characteristics, but nonetheless of significance to teacher educators include:

- Server unreliability (Dutt-Doner & Powers, 2000; Killian & Willhite, 2003).
- Poor computer and Internet access (Dutt-Doner & Powers, 2000; Killian & Willhite, 2003).
- Old hardware systems that do not support the software used for online discussion (Killian & Willhite, 2003).
- Redundancy of issues addressed during face to face sessions in blended learning environments (Ferdig & Roehler, 2003; Jetton, 2003).
- Lapse of time between the time a question is asked and the time responses are received (Jetton, 2003).

The above challenges are worthy of consideration in the design and development of online discussions. Details about how these challenges were addressed in this study are included under phase two of the study in Chapter 4. The theoretical foundation for the design of online discussions is also of significance. In Section 2.1, the principles and tenets of constructivism were explored as they provide the

theoretical foundation for the design of online discussions in this study. The next section looks at how constructivist principles can help in fostering deep learning through asynchronous online discussions.

### 2.3.4 Constructivism and online discussions

Online discussion forums support interactivity and collaborative work, key elements that are valued in a constructivist learning environment (Ravai et al., 2008). They promote social construction of knowledge by enabling a group of learners with a shared goal to engage in collaborative discussion irrespective of time and geographical location (Chan, 2002).

Over the last decade, educational technologists have further explored how we construct knowledge based on constructivism. Several technology-facilitated learning environments, including web-enhanced courses that include online discussions, have been developed based on constructivist principles (Courtney & King, 2009; Hendriks & Maor, 2004; Li & Gunn, 2003; Schrire, 2006).

Table 2 lists some of the constructivist principles that have significantly influenced the development of these learning environments. The frameworks proposed by various educational technologists in

Table 2 support the notion that:

- Knowledge is actively constructed.
- Knowledge is contextual.
- Knowledge is constructed from prior experiences.
- Knowledge is reflective.

These are further considered in the design, development and implementation of asynchronous online discussions in phase two of the study (Chapter 4).

**Table 2: Constructivist principles in the development of technology-facilitated learning environments**

| Authors | Constructivist Principles |
|---|---|
| Merill (1991) | • Knowledge is constructed from experience.<br>• Learning is a personal interpretation of the world.<br>• Learning is an active process of meaning making based on experience.<br>• Learning is collaborative with meaning negotiated from multiple perspectives occurring in a situated and realistic setting.<br>• Assessment should be integrated with the task, not a separate activity. |
| Cunningham, Duffy and Knuth (1993) | • Learning should be embedded in authentic and relevant contexts and with a variety of modes of representation.<br>• Learners should be encouraged to voice their opinions and take ownership in the learning process.<br>• Learners should be provided with experience of the knowledge construction process so they can become aware of theory and their own knowledge construction process.<br>• Learners should experience and learn to value the multiplicity of perspectives.<br>• Learning should be a social process. |
| Jonassen, Peck and Wilson (1999) | • Knowledge is constructed, not transmitted.<br>• Knowledge construction results from activity, so knowledge is embedded in activity.<br>• Knowledge is anchored in and indexed by the context in which the learning activity occurs.<br>• Meaning is in the mind of the knower and there are, therefore, multiple perspectives on the world.<br>• Meaning making is prompted by a problem, question, confusion, disagreement, dissonance (a need o desire to know), and so involves personal ownership of that problem.<br>• Knowledge building requires articulation, expression, or representation of what is learned (meaning is constructed).<br>• Meaning may also be shared with others, so meaning making can also result from conversation.<br>• Not all meaning is created equal. |
| Kanuka (2002) | Higher levels of learning require:<br>• Active and purposeful engagement with complex and abstracted phenomena.<br>• Diverse and/or multiple perspectives about the issue(s) or problem(s) presented.<br>• Phenomena that have relevance to the learners.<br>• Diverse ways of knowing.<br>• Learners to take greater responsibility of the learning process.<br>• Learners to build meaning into the issues and problems presented.<br>• Learners to understand that their own world view is not the only one (or the correct one). |

## *2.4 Summary*

The preceding sections indicate several points to be considered in the design, development and implementation of online discussions such that deep learning is facilitated among non-native English speaking trainee teachers from a non-western culture. One of the key points is the way in which students approach their learning as this process has a bearing on the learning outcome. Studies show that learning approach is the dual combination of students' motivation and strategies they use for learning, and it is influenced by several factors, broadly categorised as personal and situational factors based on Biggs' 3P model (Biggs, 1987). Moreover, extant literature supports the notion that a deep or a surface approach to learning is not a stable trait of an individual, although he or she may have a preference for one or the other. The design of the learning task or learning environment is a significant factor that can foster either approach. In teacher education programmes, designing learning experiences that support a deep approach to learning will help student teachers to develop deeper notions of teaching and learning aligned with constructivism, and it will also develop their analytical problem-solving skills. An understanding of how students engage with a course or task and the reasons for adopting a particular learning approach is essential in the formulation of sound pedagogical principles and guidelines that can facilitate deep learning through online discussions.

A review of the literature on the use of online discussions has revealed that online discussions are being integrated in various ways in teacher education courses and they constitute a powerful learning tool. They increase tutor-student and student-student interactions outside class hours in distance courses as well as in courses using a blended learning environment, and promote sharing of opinions, ideas and experiences. Amongst other benefits, they can also foster deep learning, including critical thinking skills of teachers. Studies that provide evidence for this have mainly involved homogeneous groups of students from western countries and for whom English is their first language. There are fewer studies that have focused on the use of online discussions to facilitate deep learning among non-native English speaking students from non-western countries. Moreover, there is a lack of research on the online communication and interaction patterns of students from

non-western cultures. Culture and language are factors worthy of consideration in the design, development and implementation of online discussions in the present study.

The theoretical underpinnings of the design of an online discussion are also an important factor. In the present study, the principles of constructivism constitute the theoretical foundation for the design of online discussions to facilitate deep learning. Extant literature provides evidence that technology-facilitated learning environments, including online courses, developed using constructivist principles have the potential to facilitate deep learning. Nonetheless, there is some doubt as to the applicability of constructivist approaches to non-western learning contexts where students may hold transmissive conceptions of teaching and learning rather than constructivist conceptions. Further studies are warranted to determine the applicability and effectiveness of constructivist learning environments among students from non-western cultural background. This study sought to determine how the elements and design principles which have been found to support deep learning mainly among native English speaking students from a western culture could be adapted or improved for students from non-western cultures and for whom English is a second language. Hence, this study focused on the formulation of contextually sensitive design principles and guidelines for the development online discussion such that deep learning is facilitated among non-native English speaking learners from a non-western culture.

# CHAPTER 3: METHODOLOGY

Previous chapters have highlighted the need to find out whether the factors and design principles which have been found to promote deep learning and online interaction mainly among native English speaking students from a western culture are equally applicable to students from non-western cultures and for whom English is a second language. After reviewing extant literature on approaches to learning, benefits and challenges of using online discussions in teacher education programmes, and the principles of constructivism, this study explored students' characteristics and tutors' practices that have been found to facilitate deep learning. The extant literature was also reviewed to examine critical elements that can foster deep learning through online discussions. The goal of the present study was to design, develop and implement asynchronous online discussions such that deep learning is facilitated among non-native English speaking students in a non-western learning context. Thus, the present study culminated in the formulation of contextually sensitive design principles and guidelines for the development and implementation of online discussions such that deep learning is facilitated among non-native English speaking trainee teachers from a non-western culture.

This chapter presents the research questions that guided this study and the research approach that underpins this study. A description of DBR is included along with the rationale for the use of DBR to provide answers to the research questions. The aims and data collection methods for each of the study phases are also addressed to better understand the iterative and integrative nature of DBR. Details are also included on the study context, ethical and political considerations and potential limitations of DBR.

## *3.1 Research Questions*

The research questions for this study were:

1. What are students' characteristics and tutors' practices that facilitate deep learning, as reported in extant literature?
2. According to extant literature, what are the design principles and guidelines for the development and implementation of online discussions such that

deep learning is facilitated among non-native English speaking trainee teachers from a non-western culture?

3. How can the design principles and guidelines addressed in research question # 2 be refined to better facilitate deep learning among non-native English speaking trainee teachers from a non-western culture?

The research questions were addressed using the four phases of Reeves' model of design-based research (DBR) (Reeves, 2006). Details about the study sample and context, the different study phases and how the research questions are addressed are given in subsequent sections of this chapter. Chapter 3 also addresses the approach to the research, ethical and political considerations and study design limitations.

## *3.2 Research approach*

The research approach for the present study reflects a pragmatic paradigm that is congruent with the researcher's view that research conducted in naturalistic settings should focus on selecting methods for data collection that best address the research questions rather than selecting methods that draw exclusively from the qualitative or quantitative research paradigm (Tashakkori & Teddlie, 2002). Before looking more deeply at the research approach adopted specifically for the present study, a brief overview of research paradigms is given since the choice of research paradigm influences the research approach. A research paradigm refers to a set of beliefs, values and assumptions that a researcher has regarding what should be studied, how research should be done, and how data should be analysed (Bryman, 2004). In the social and behavioural sciences, research paradigms have traditionally been classified into either a post-positivist or a constructivist paradigm. Researchers who hold post-positivist beliefs tend to adopt a quantitative research approach while those who hold constructivist beliefs are more likely to adopt a qualitative research approach. The pragmatic paradigm has recently emerged in response to the debate that quantitative and qualitative research approaches are mutually exclusive (Tashakkori & Teddie, 1998). It is pluralistic based on a rejection of the forced choice between post-positivism and constructivism (Creswell, 2003).

Researchers who hold pragmatic beliefs choose a research approach that best answers the research questions. In many research studies, the research questions do not exclusively fit within a purely quantitative or qualitative approach, such that a mixed method research approach is warranted. The pragmatic paradigm supports a mixed research approach that involve collecting data using methods drawn from both quantitative and qualitative approaches to best address the research questions (Creswell, 2003). The pragmatic researcher uses a mix of methods of data collection and analysis to come up with practical solutions that address real life problems.

Combining insights and procedures from both the qualitative and quantitative approaches can in some situations result in more realistic and workable solutions to a problem (Johnson & Onwuegbuzie, 2004). Mixed methods research favours the use of multiple approaches in answering research questions, rather than restricting a researcher's choice. Johnson and Onwuegbuzie (2004) describe mixed methods research as inclusive, pluralistic, complementary, and supporting an eclectic approach to methods of data collection and analysis. Green et al. (1999, as cited in Johnson & Onwuegbuzie, 2004) state that there are five major purposes for using mixed methods research:

(a) Triangulation – seeking convergence and corroboration of findings obtained from different methods studying the same phenomenon.
(b) Complementarity – seeking elaboration and clarification of the results obtained from one method with results from another method.
(c) Initiation – discovering paradoxes and contradictions that lead to a re-framing of the research question.
(d) Development – using findings from one method to help inform the other method.
(e) Expansion – extending the breadth and range of research by using different methods for different inquiry components.

DBR has been chosen to guide the research design of the present study given that it supports a pragmatic approach to research as well as the use of mixed methods for data collection and analysis. Moreover, DBR is recognised as being particularly appropriate for the development, implementation and assessment of innovative

learning environments such as online learning (Anderson, 2005; Design-Based Research Collective, 2003; Hill et al., 2009; F. Wang & Hannafin, 2005), and it is based on the assumption that existing practices are inadequate or can, at least be improved upon (Herrington, McKenney, Reeves, & Oliver, 2007).

## *3.3 Research design*

DBR has been described using different terms in the literature, some of which include *design experiments* (Brown, 1992), *design research* (Cobb, 2001; Collins, Joseph, & Bielaczyc, 2004; Edelson, 2002), and *development research*. For the purpose of this study, the term DBRas described by the Design-Based Research Collective (2003) and defined by Wang and Hannafin (2005) was used. The latter define DBR as:

> a systematic but flexible methodology aimed to improve educational practices through iterative analysis, design, development, and implementation, based on collaboration among researchers and practitioners in real-world settings, and leading to contextually-sensitive design principles and theories. (p. 6)

DBR has five critical characteristics that align with the goals and research approach of this study:

- ***Pragmatic*** - DBR aims at addressing and solving practical problems through the design and implementation of interventions while extending theories and refining design principles (Collins et al., 2004; Design-Based Research Collective, 2003; Edelson, 2002).
- ***Grounded*** – DBR is theory-driven and grounded in real-world contexts. Researchers and study participants interact socially with one another in real-world settings rather than in laboratory settings isolated from everyday practice (Collins et al., 2004). In so doing, researchers take into consideration the different variables of relevance in a real-world context and study the design process to develop design principles that have greater external validity than those developed in laboratory settings (Wang & Hannafin, 2005).
- ***Interactive, iterative and flexible*** – DBR involves the interactive collaboration of researchers, designers and practitioners or the interplay of these roles by one person, as is the case for this study (Design-Based Research Collective, 2003;

Wang & Hannafin, 2005). Development of design principles and research take place through continuous iterative cycles of design, enactment, analysis and redesign.

- ***Integrative*** – DBR draws from both qualitative and quantitative research approaches in order to analyse the outcomes of an intervention and refine the intervention (Bell, Hoadley, & Linn, 2004; Design-Based Research Collective, 2003), thus supporting the use of mixed methods. The use of mixed methods and data from multiple sources increases the objectivity, validity, credibility and applicability of the research findings. Data collection methods may vary during different phases of the study as new needs and issues emerge and the research focus evolves.
- ***Contextual*** – Research findings are connected with both the design process through which the results are generated and the setting where the research is conducted (Wang & Hannafin, 2005). The research process, research findings, and changes from the initial design principles and plan are documented. The design principles derived are relevant to the design and development of tasks in learning environments where similar contextual conditions prevail (Van Den Akker, 1999).

### 3.3.1 Study phases

The present study was conducted in four phases (see

Figure 2 and

Figure **3**) based on Reeves' model of DBR (Reeves, 2006).

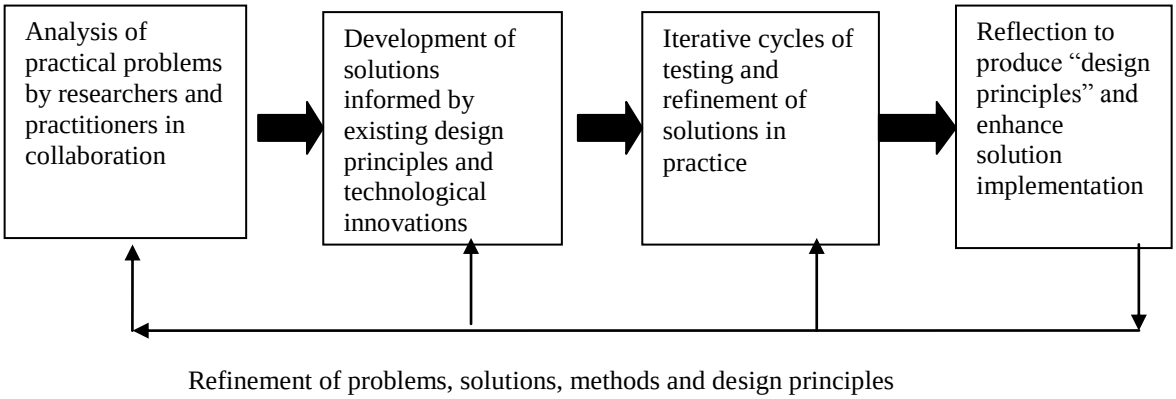


**Figure 2: Reeves' model of DBR** (Reeves, 2006, p. 59)

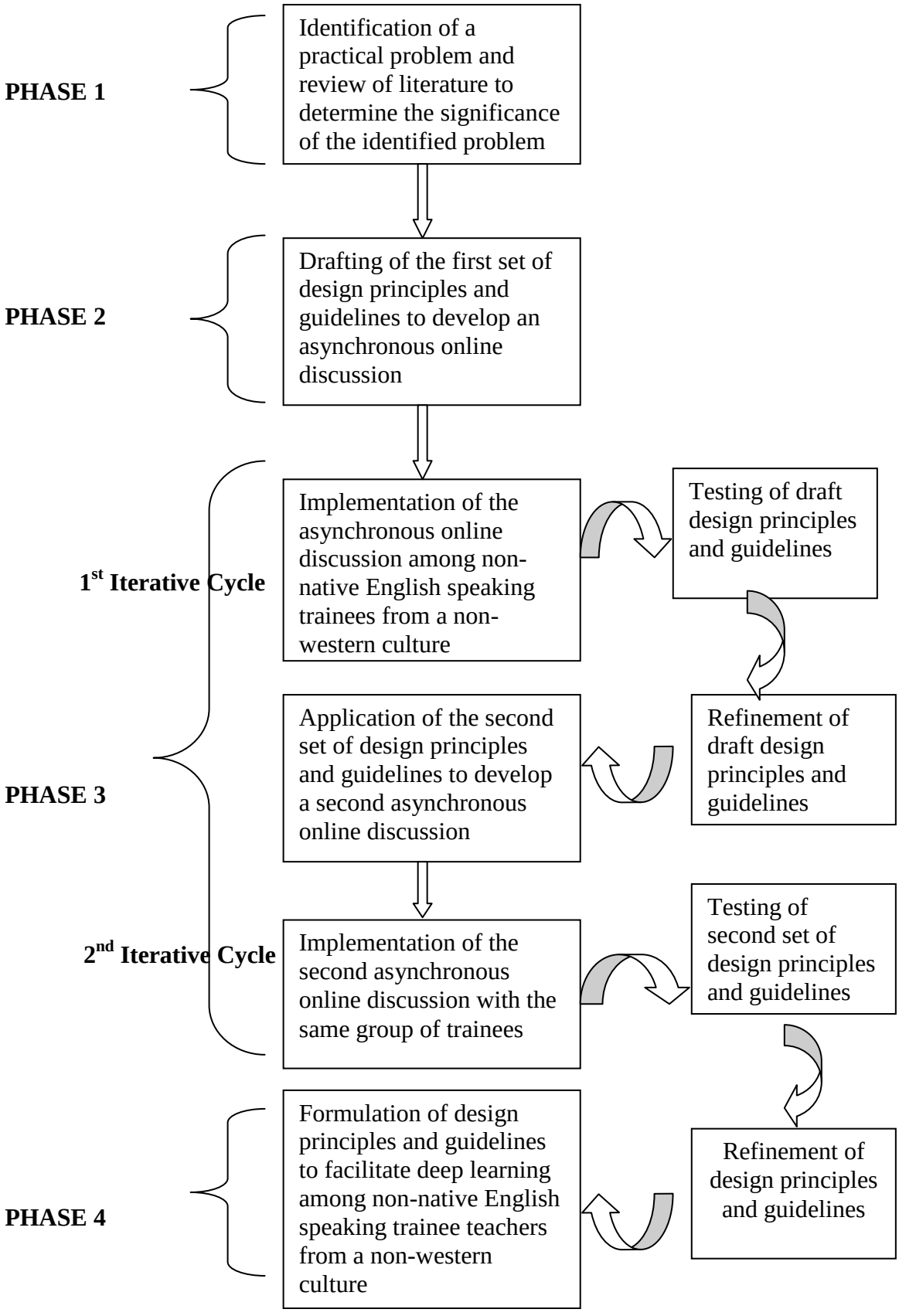


**Figure 3: Diagrammatical representation of the study phases**.

**Phase 1**

The first phase in Reeves model is the analysis of a practical problem by researchers and practitioners. In this study, the researcher also assumed the role of the practitioner. As highlighted in Chapter 1, the DBR started with the identification of a problem based on the researcher's experience with online teaching and through conversations and discussions with a few colleagues who also had some experience with online teaching. Once the local problem was identified, the researcher reviewed the literature to determine whether the problem to be addressed was of significance not only to the local context, but also to the online teaching community at large. According to Reeves (2006), identifying the significance of a problem is an important step in DBR. The research questions for the present study emerged from the stated problem and the literature review. Phase 1 also involved the review of extant literature on constructivism as its principles provided the theoretical foundation for the design and development of online discussions to facilitate deep learning.

**Phase 2**

Phase 2 involved an extensive review of extant literature on students' characteristics and tutors' practices that foster a deep approach to learning and considered the implications for the design and development of online discussions. In DBR the literature review is a critical process that in this study has facilitated the formulation of draft design principles. These principles have informed the design and development of the online discussion in a bid to address the identified problem. Moreover, the literature review has helped to build a logical framework for the research, and to identify gaps in research (Herrington et al., 2007). Phase 2 thus consisted of two key activities:

1. The development of the draft principles to guide the design and development of an online discussion such that deep learning is facilitated among non-native English-speaking trainee teachers from a non-western culture.
2. The design and development of an online discussion to facilitate deep learning among non-native English-speaking trainee teachers from a non-western culture.

**Phase 3**

Phase 3 involved the implementation of the online discussion forum designed and developed in Phase 2. Given the iterative nature of DBR, the implementation of a single online discussion is unlikely to be sufficient to gather enough evidence about the effectiveness of the design principles and guidelines in facilitating a deep approach to learning. According to Herrington et al. (2007), DBR should include at least two cycles such that after the first implementation and evaluation, changes are made to the learning environment to further improve its ability to address the problem. Hence in this study, the draft design principles and guidelines were tested and refined through two iterative cycles. The purpose of the first iteration was to determine the effectiveness of the draft design principles and guidelines developed in Phase 2 and to identify issues and problems related to the design and implementation of the online discussion. Following analysis of data collected during the first cycle, some changes were brought to the draft design principles and guidelines, and a second 'improved' online discussion forum was developed and implemented with the same group of trainee teachers.

**Phase 4**

The fourth and final phase was the documentation and reflection phase. In this study, data collected mainly from Phase 2 and the two iterative cycles of Phase 3 were documented and reflected upon in order to further refine the design principles and guidelines derived at the end of the first cycle of Phase 3. The revised and final set of design principles and guidelines can be used by other tutors working in a similar context to facilitate deep learning through the use of asynchronous online discussions.

## *3.4 The study context*

The study took place at the local teacher education institution. It involved non-native English speaking high school (secondary) trainee (pre-service) teachers enrolled in one of the core courses of the Teacher's Diploma Secondary Home Economics programme. All the trainees enrolled in the module (n = 11) gave their informed consent to participate in the study, and I was the course tutor. It is common among researchers using DBR to select participants in their own practice (Herrington et al., 2007).

The course, *Independent Study*, was chosen for the study because it was delivered over a period of fifteen weeks using a blended mode (face to face and online sessions) and it aimed at fostering learner autonomy while promoting intellectual curiosity, critical thinking and analytical skills of the trainees on topics related to pedagogy and their subject area (Mauritius Institute of Education, 2008). It comprised five three-hour face to face sessions; each face to face session was delivered every two or three weeks. This was the first course in the Teacher's Diploma Secondary Home Economics programme that required trainee teachers to interact in an online learning environment.

During the weeks that face to face sessions were not scheduled, the trainee teachers were required to complete readings and to participate in two graded asynchronous online discussions. The two online discussion forums, created in Moodle as the learning management system, were specifically designed and developed to facilitate deep learning among the trainee teachers. I was involved in the design, development and implementation of both the online discussions. Playing the multiple roles of online discussion designer, course tutor and researcher/observer had certain ethical implications which have been further discussed in Section 3.6**.**

## *3.5 Methods of data collection and analysis*

The integrative nature of DBR supports the use of mixed methods research, allowing the researcher to use a combination of qualitative and quantitative methods that will provide the best possible answers to the research questions posed (Design-Based Research Collective, 2003; Wang & Hannafin, 2005). In this study, the researcher used both qualitative and quantitative data collection methods and analysis, drawing on the strengths of the different techniques and minimising the biases associated with one another, thereby increasing the credibility and adaptability of the study findings (Johnson & Onwuegbuzie, 2004).

Data collection methods varied during the different phases of the study depending on the research focus and issues that emerged (see

Table 3).

**Table 3: Data collection methods during the different study phases**

| Study Phase | Data Collection Methods | Purpose |
|---|---|---|
| Phase 1 | • Literature review<br>• Reflective log | • Analysis of a practical problem of significance to researchers and practitioners. |
| Phase 2 | • Literature review<br>• Student questionnaire [includes Chan's (2001) Teaching and Learning Conceptions questionnaire]<br>• Reflective Log | • Identification of tutor's practices and students' characteristics that facilitate deep learning.<br>• Development of draft design principles and guidelines based on extant literature.<br>• Application of draft design principles and guidelines to develop an asynchronous online discussion. |
| Phase 3<br>1st Iterative Cycle | • Student questionnaire [includes Revised two-factor version of Biggs' Study Process Questionnaire (Biggs, Kember & Leung, 2001)]<br>• Online discussion transcripts<br>• Reflective log | • Refinement of the draft design principles and guideline to formulate a second set of design principles and guidelines.<br>• Application of refined design principles and guidelines to develop a second asynchronous online discussion. |
| Phase 3<br>2nd Iterative Cycle | • Online discussion transcripts<br>• Semi-structured interviews<br>• Reflective log | • Provides data for further refinement of the second set of design principles and guidelines. |
| Phase 4 | | • Data from Phase 2 and Phase 3 thoroughly analysed for formulation of contextually sensitive design principles and guidelines. |

**Phase 1**

This study phase involved the identification of a significant problem. The problem was identified based on my own experience with online teaching and through conversations and discussions with colleagues who also had used the online learning environment. The main ideas and issues that emerged from these

discussions were jotted down in my reflective log (see p. 12-13 for a summary presented as a list of dot points). The reflective log was kept throughout the duration of the study to record specific events and problems, insights about the study, and questions that I needed to reflect upon; it was a secondary source of data. As pointed out by Gillham (2000, p. 23), "writing things, even summarily, has a curiously clarifying and focusing effect on the mind". The reflective log also serves as an audit trail, thereby increasing the credibility of the study findings (Sturman, 1994). The identified problem was further explored through the review of extant literature on approaches to learning, constructivism and the use of online discussions in higher education programmes, with due consideration to cultural and linguistic issues (Chapter 2).

**Phase 2**

This phase involved the review of literature on students' characteristics and tutors' practices that foster a deep approach to learning in face to face and online classes. A paper-based questionnaire consisting of four sections (see Appendix 1) was developed. After the trainees had given their consent to participate in their study, they were contacted by email about six weeks prior to the start of the *Independent Study* course to meet me for a briefing about the study and the *Independent Study* course. The questionnaire was given to all the trainee teachers after the briefing. Trainees completed the questionnaire in about 30 minutes. The questionnaire provided data that supplemented the information from the literature review to assist in the formulation of the draft design principles and guidelines. The first two sections gathered information about trainees' access to computer and the Internet, their computer skills, and their socio-demographic background. The third section focused on their prior experience(s) with online discussions, and their expectations and opinions about the integration of online discussions in their teacher education courses. Data from these three sections were analysed using descriptive statistics, namely frequency and percentages of responses, and mean ratings for items that required rating on a five-point Likert scale.

The fourth part of the questionnaire looked at trainees' conceptions of teaching and learning. Pre-service trainee teachers' conceptions about teaching and learning have been found to influence their approach to learning (Chan, Tan & Koo, 2007).

The 30 items from Chan's Teaching and Learning Conceptions Questionnaire (TLCQ) were used to determine whether trainees had a traditional or constructivist conception (Chan, 2001). Individuals who hold traditional conceptions perceive teaching as the unilateral transmission of knowledge from an expert to a novice, and learning is seen as the absorption of the knowledge. Individuals who hold constructivist conceptions, on the other hand, view teaching as the provision and facilitation of the learning process and for them learning results in the creation and acquisition of knowledge through reasoning and justification.

The TLCQ consists of 12 items to measure constructivist conceptions about teaching and learning and 18 items to measure traditional conceptions. The instrument has been validated among Hong Kong pre-service teachers and has also been used with pre-service teachers in Singapore and in Turkey (Chan, 2001; Chan et al., 2007; Eren, 2009). The 30 items of the questionnaire were pilot tested with a group of 6 trainee teachers enrolled in an Educator's License course before being administered to trainees in the present study to check their understanding of the items. After the pilot testing, one item that read "I have really learned something when I can remember it later" was changed to "I have really learned something when I can remember it later, i.e., whatever I have learned is not forgotten after a short while". All the trainees had to rate their responses for each of the 30 items on a five-point Likert scale (1 = Strongly Disagree and 5 = Strongly Agree). The mean values for each subscale were then calculated to determine whether a trainee held mainly traditional or constructivist conceptions of teaching and learning.

The data obtained from the various sources, including the literature review during Phase 1, were analysed and integrated through a comparative and analytic process to derive draft design principles and guidelines. The principles of constructivism provided the theoretical foundation for the design principles and guidelines that were used to develop an asynchronous online discussion aimed at facilitating deep learning among the trainees.

**Phase 3 - First iterative cycle**

The first iterative cycle of Phase 3 involved the implementation of the online discussion developed at the end of Phase 2. One week after the trainee teachers

had finished participating in the online discussion, they were given a two-part questionnaire which was completed in about 40 minutes (see Appendix 2). The first part included 44 items to gather information about trainee teachers' perceptions of the online discussion task they had completed. All the items were carefully selected and worded to assist in the refinement of the draft design principles and guidelines developed during Phase 2. The first 42 items required trainees to rate their responses on a five-point Likert scale (1 = Strongly Disagree and 5 = Strongly Agree). The responses from these items were analysed using descriptive statistics (frequencies, percentages and mean score). The last two items were open-ended; trainees were required to list down the three things they liked best and they least liked about the online discussion.

The second part of the questionnaire included the twenty items from the Revised two-factor version of Biggs' Study Process Questionnaire (R-SPQ-2F) (Biggs et al., 2001) to determine whether trainee teachers adopted a deep or surface learning approach to complete the first online discussion task. A surface learning approach is associated to students' intentions to learn by memorisation and then reproduce the factual contents of the study materials. On the other hand, a deep learning approach reflects students' intentions to understand and construct meaning about the content to be learned.

The R-SPQ-2F is a shorter and simpler version of the original Study Process Questionnaire (SPQ). It has been rigorously tested and shown to have very good psychometric properties (Biggs et al., 2001). It is thought to be particularly useful for instructors to monitor their teaching following some innovations in teaching and assessment. The authors have pointed out that the tool can be used by any researcher provided that due acknowledgement is given to the source, and researchers accept that the copyright is owned by John Biggs and David Kember. The authors also mention that the questionnaire items can be reworded to better reflect a particular assessment task; in this study the items were reworded to better reflect the online discussion. Trainee teachers were required to rate their level of agreement with each statement on a five-point Likert scale. In order to avoid cueing trainees that their responses would be used to identify their learning approach, no reference was made to learning approaches before or while they were

filling out the questionnaire. Rather, trainee teachers were told that this part of the questionnaire would elicit information about their attitudes on how they tackled the online discussion task and their preferred ways of studying.

Students' learning approach, that is how they handled the online discussion task, was determined by summing the Likert responses to statements identified for each approach, 10 items for surface approach and 10 items for deep approach. The motive and strategy scores for deep and surface approaches to learning were also calculated for each of the trainees. Trainees with a higher deep motive score would be considered as being more intrinsically motivated to complete the task rather than completing the task simply to avoid failure (Biggs et al., 2001). Higher deep strategy scores reflect trainees' use of learning strategies to maximise understanding of the content rather than rote learning to reproduce factual information.

Another primary source of data for the first iterative cycle of Phase 3 was the trainees' online postings. These were evaluated for depth of information processing (surface vs. deep) using content analysis after trainees had finished participating in the online discussion forum. Content analysis is described as a form of textual analysis, involving the comparison, contrasting and categorization of elements of written dialogue for meaning, in this case the online discussions (Panko & McLoughlin, 2001). It is an effective tool to establish the educational value of asynchronous online discussions (Ng & Murphy, 2005) and to study their impact on student learning. Cotton and Yorke (2006) state that content analysis provides a more effective means of evaluating the impact of online discussions on student learning than determining correlations between students' online participation rates and their exam grades.

Several models of content analysis are available such as Henri's model (Henri, 1992), the model of Newman, Webb and Cochrane (1995), the model of Gunawardena, Lowe and Anderson (1997) and the model of Garrison, Anderson and Archer (2001). For the proposed study, Henri's model was selected. It is considered as one of the most influential models for content analysis of online messages because it allows for the analysis of various aspects of computer-

mediated communication (Ng & Murphy, 2005; Stacey & Gerbic, 2003). It provides a framework for educators to better understand the learning process and the richness of the content of online messages (Henri, 1992; Redmond & Lock, 2008). It takes into consideration five dimensions related to the learning process:

- Participative: quantifies participation rates by calculation of the total number of messages;
- Social: includes elements that reflect socialising, community building in postings;
- Interactive: postings connected to or responding to other postings in an attempt to move the discussion forward;
- Cognitive: postings used to clarify, formulate inferences, make judgements or propose strategies;
- Metacognitive: students identify knowledge of self, task and strategies for completion in addition to skills in evaluation, planning regulation and self-awareness.

**Table 4: Indicators for analysis of level of information** (Adapted from Henri, 1992)

| Surface Processing | Deep Processing |
|---|---|
| Repetition of information contained in the statement of the problem without making inferences or offering an interpretation | Linking facts, ideas and notions in order to interpret, infer, propose and judge |
| Repetition of what has already been said without adding any new elements | Offering new elements of information |
| Stating that one shares the ideas or opinions stated, without taking these further or adding any personal comments | Generating new data from information collected by the use of hypotheses and inferences |
| Proposing solutions without offering justification | Proposing one or more solutions with short-, medium-, or long-term justification |
| Asking questions which invite information not relevant to the problem or not adding to the understanding of it | Providing proof or supporting examples |
| Making judgements without offering justification | Setting out the advantages and disadvantages of a situation or solution |
| Offering several solutions without suggesting which is most appropriate | Perceiving the problem within a larger perspective |
| Perceiving the situation in a fragmentary or short-term manner | Developing intervention strategies within a wider framework |

The cognitive dimension can be broken down into two methods of processing information: surface processing and deep processing. Online messages were analysed for surface or deep processing using the indicators in Table 4, as defined by Entwistle and Waterston (1988, as cited in Henri, 1992). In this study, although the focus was on the cognitive dimension, more specifically the level of information processing, analysis of the online messages was opened to evidence from the other dimensions, e.g., the participative, interactive and social dimensions.

The unit of analysis in the proposed study was the entire message. Different units of analysis have been used in research on computer conferencing – proposition units, sentence units, paragraph units, thematic units, and message units (Anderson, Rourke, Garrison, & Archer, 2000). The message unit was preferred for this study because it has been found to have better unit reliability; it overcomes the problem of deciding where to slice the message to get the appropriate sub-section (Panko & McLoughlin, 2001), and it increases reliability of the coding when only one person is involved in the coding, as was the case in this study. Subjectivity on the part of the rater is reduced as the unit of analysis is determined by the unit/message writer rather than the message rater (McLoughlin & Mynard, 2009).

All the online postings for the first online discussion task were saved and printed out. Each message was then coded for surface or deep processing on a hard copy using the indicators listed Table 4. For lengthy postings containing indicators of both surface and deep information processing, the researcher decided to adopt the approach of Meyer (2004); the researcher chose the information processing level which was most consistent with the entire posting (Meyer, 2004). After completing the coding, the number of postings in each category (surface and deep) was calculated for each trainee teacher and for the entire group.

Data from the two-part questionnaire, content analysis of the online postings and reflective log informed the second iterative cycle of Phase 3. The data were analysed and integrated through a comparative and analytic process for confirmation, rejection or modification of the draft design principles and guidelines

initially identified in Phase 2 of the study. Consequently, a refined set of design principles and guidelines was developed to guide the design and development of another online discussion forum.

**Phase 3 – Second iterative cycle**

Data for the second iterative cycle of Phase 3 were collected after the implementation of the second online discussion forum. All the trainees' online postings were evaluated for the participative, social, interactive and cognitive dimensions (surface vs. in-depth level of information processing) based on Henri's model (Henri, 1992) and using the same procedures as described above for the first iterative cycle of Phase 3. Content analysis of the online postings was followed by semi-structured interviews with seven trainees who were purposefully drawn from the group of eleven trainees. The trainees were selected to represent different levels of participation both qualitatively (depth of postings) and quantitatively (number of postings). Semi-structured interviews can be a very rich source of data if properly carried out and the questions allow interviewees to provide free and open responses (Gillham, 2000).

Questions and schedules for the interview were developed after reviewing data collected from the Phase 3 questionnaire, records of the reflective log and content analysis of online postings for the two online discussions (see Appendix 3). The interviews provided qualitative data to capture the online experiences of the trainees, their perceptions of the educational value of the online discussions, how they tackled the online task, enabling and disabling factors to participation in online discussions, and suggestions to improve the use of online discussions in teacher education programmes.

The trainees were individually interviewed. A brief introduction of the interview was given to ensure that the interviewees understood the purpose of the activity and the questions to be asked, and also to reassure them that their responses would in no way affect their grade for the online forums. Each question was read aloud in English, but in order to make the interviewees feel more at ease to answer the questions, they were told that they could use French, English or a mix of both. Interviewees were at times requested to elaborate on some answers either to clarify

or justify certain issues they had mentioned. Each interview took about 30 to 40 minutes and was audio recorded. The researcher also noted the key points for each question during the interview and at the end of the interview each interviewee was invited to have a look at the written notes and to check whether the notes reflected what they said. Member checks served to strengthen the credibility of the study findings. None of the trainees found any mistakes or statements that I had wrongly interpreted. All the interviews were conducted within a week with each trainee.

Within two weeks after all the interviews were completed, the texts from the audio records were transcribed verbatim. For answers given in French, the researcher translated the text in English and sought the assistance of a colleague from the English Department to counter check the translation. A hard copy of each transcript was read through carefully several times, and then the data were coded manually using a deductive approach (Holloway, 1997). The deductive approach of data analysis starts with an idea or theoretical framework and uses the data to verify or disprove the idea. In this study, the coding scheme was informed by the design principles and guidelines that were initially developed based on review of the extant literature and subsequently revised based on findings from the first cycle of Phase 3. Analysis of the interview transcripts and the online postings guided Phase 4 of the study.

**Phase 4**

Phase 4 involved the thorough documentation and reflection of data gathered and analysed from various sources (questionnaires, online postings, interviews, reflective log) during Phase 2 and Phase 3. The data contributed to contextual understanding and led to further confirmation, rejection or modification of design principles and guidelines developed during the first iterative cycle of Phase 3. Thus, Phase 4 culminated in the development of a refined set of design principles and guidelines to facilitate deep learning through asynchronous online discussions among non-native English speaking students in a non-western learning context.

## *3.6 Ethical and political considerations*

It has been stated that applying the traditional view of credibility to DBR is particularly challenging because DBR does not strive for “context free claims”;

researchers are expected to immerse themselves in the research context and interact with the participants to achieve theoretical and pragmatic goals (Peer Group, 2006). In this study, I was involved in the design, development, implementation, and researching of the online discussions. In DBR, the goal of the researcher/designer "moves beyond offering explanations *of*, to designing interventions *for*" (Barab & Kirshner, 2001, p. 9), challenging the common methodological concern for the independence of the researcher and the learning environment. Thus, my involvement as designer of online discussions, course tutor and researcher constituted a key aspect of the study rather that a contaminating intervention.

Researchers using DBR need to balance their roles as designer and researcher to ensure that practical and contextual constraints that appear during the course of a study are addressed in the design process, and alternative perspectives are provided during the research process (Van Den Akker, 1999). They should be humble, act as facilitators and adapt to the study participants' perspectives, beliefs and strategies while aligning and extending the design process rather than adopt the values of the study participants or impose their own (Amiel & Reeves, 2008; Wang & Hannafin, 2005).

Respondent bias and researcher bias are potential threats to the credibility of the findings of this study. Respondent bias was curtailed by highlighting to trainees, right at the outset of the study, the objectives and significance of the study and the fact that their responses would in no way affect their course grade and these would be treated confidentially during data collection, analysis and reporting. Pseudonyms were used when reporting the responses of specific study participants. Moreover, the use of electronic transcripts to analyse online postings eliminated the risk of transcription bias. The integrative use of multiple data collection methods and the triangulation of data from the various sources during the different phases of the study, repetition of analysis across the iterative cycles of Phase 3, and the use of standardised instruments (e.g., R-SPQ-2F, Chan's TLCQ) also helped to increase the credibility of the study findings (Cohen, Manion, & Morrison, 2000; Design-Based Research Collective, 2003; Wang & Hannafin, 2005).

Ethics clearance was sought from the directorate of the Mauritius Institute of Education prior to submission of the ethics application to the USQ Human Research Ethics Committee (see Appendices 4 and 5). All potential study participants were contacted to get their informed consent (see Appendix 6) prior to starting the study. It is argued that it is unethical to obtain data from a setting or group, and then leave without giving anything in return (Sikes, 2004). In this study, it is assumed that the participants improved their computer proficiency skills and critical thinking skills by participating in the online discussions. These are skills that would benefit the study participants personally and professionally. Outcomes of the study would also be made available to the study participants.

## *3.7 Limitations of DBR*

Researchers who plan to use DBR need to be aware that it also has some limitations. One limitation commonly mentioned in extant literature is the lack of independence of the researcher and the learning environment, thus presenting a challenge to the credibility of the research study (Barab & Squire, 2004; Wang & Hannafin, 2005). Concern about this issue in the present study is mitigated by the reasons discussed in Section 3.6.

Another limitation is related to the fact that it is an emerging methodology which is still evolving. As such, there are, as yet no standards to justify its effectiveness and also for researchers and designers using DBR to determine whether to continue or abandon an iterative design (Dede, 2004). Dede (2004) also points out that many studies using DBR lack a sound theoretical foundation and the findings do not add to the literature to refine and extend the theory. In the present study, this shortcoming is addressed by developing design principles that are based on constructivist principles and on pertinent findings published in extant literature.

Given that DBR is contextual, the research findings cannot be generalised across participants and contexts. Nonetheless, documentation of changes brought about during the iterative design and planning processes provides researchers and designers, working in different contexts, with a clear picture of the relevant contextual factors such that they can modify and adapt the design principles to suit their context (Wang & Hannafin, 2005). Documentation of the whole design

process and the use of multiple research methods require extensive and comprehensive data collection, which at times may not be fully utilised due to lack of time and resources (Brown, 1992; Collins et al., 2004; Dede, 2004). This is a matter of concern which has been given due consideration in the study when selecting data collection methods for the different study phases.

## *3.8 Summary*

In this chapter the research questions that guided the present study were identified, followed by the rationale for the use of DBR to provide answers to the research questions. A description of DBR and the research approach taken by the researcher was presented. An overview of the study context, ethical and political considerations, and study limitations was also presented. The aims, data collection methods and analysis for each of the study phases were described to better understand the iterative and integrative nature of DBR. The next chapter details the analysis process and presents the findings that emerged during Phase 2 of the study.

# CHAPTER 4: FINDINGS AND DISCUSSION OF STUDY PHASE 2

This chapter presents and discusses the findings of Phase 2 of the study. Given the iterative nature of DBR (Anderson, 2005), the findings of Phase 2 have informed the design and implementation of Phase 3 (see Figure 4). Hence, findings of Phase 2 have been presented and discussed within this chapter before presenting the findings of the two iterative cycles of Phase 3. The findings of study Phase 3 are presented and interpreted in Chapters 5 and 6.

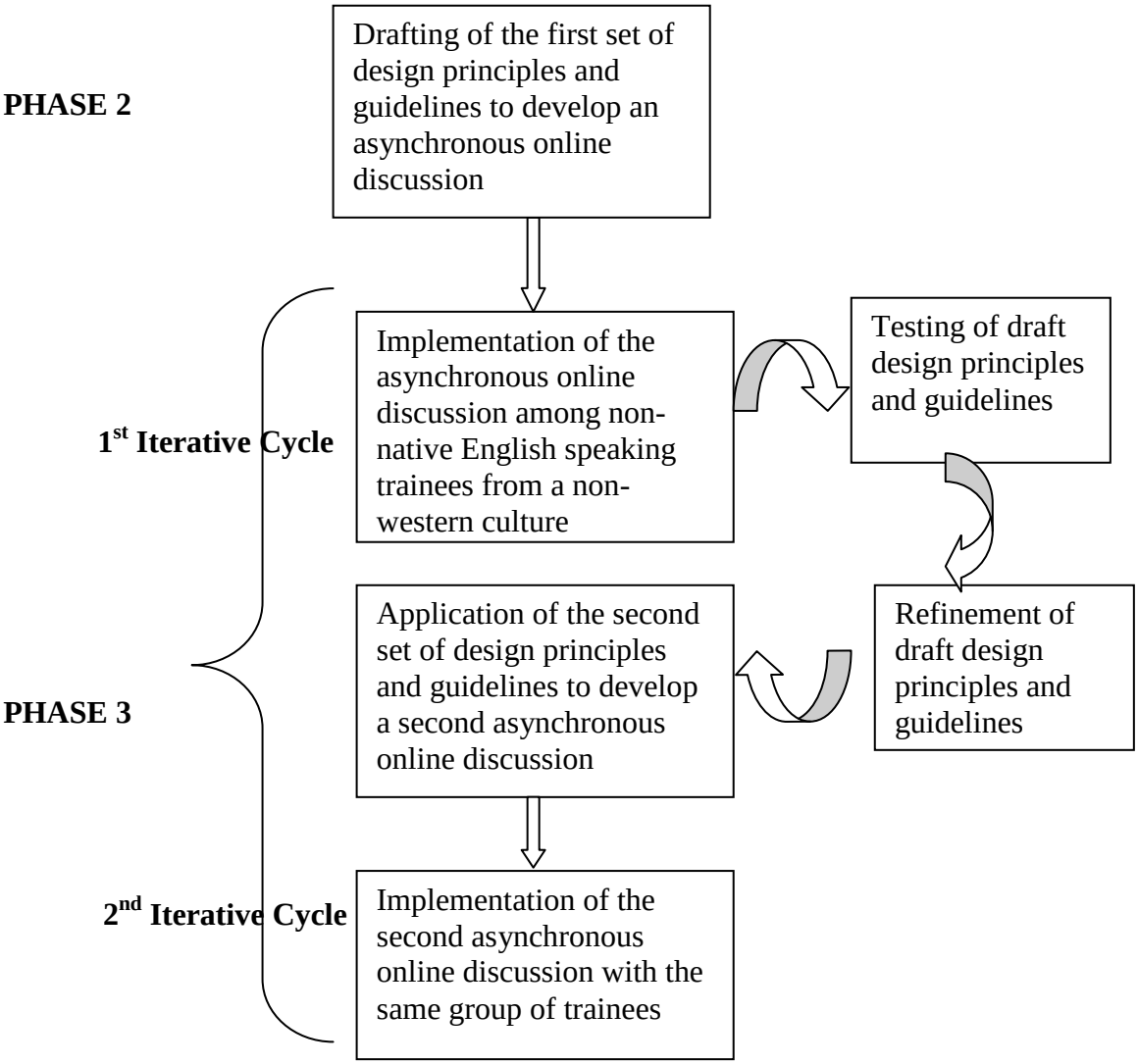


**Figure 4: Diagrammatical representation of study Phases 2 and 3**

The second phase of the study involved an extensive review of extant literature on students' characteristics and tutors' practices that foster a deep approach to learning. This is addressed in Section 4.1 which also considers the implications of for the design and development of asynchronous online discussions to facilitate

deep learning. Besides the literature review, Phase 2 involved the administration of a questionnaire to the study participants to gather information about their access to computer and the Internet, their computer and Internet skills, their socio-demographic background, their prior experience(s) with online discussions, and their expectations and opinions about the integration of online discussions in teacher education courses.

The questionnaire also looked at trainees' conceptions about teaching and learning There is evidence that pre-service trainee teachers' conceptions about teaching and learning influence their approach to learning (Chan et al., 2007). The 30 items from Chan's TLCQ were used to determine whether trainees had traditional or constructivist conceptions (Chan, 2001). The questionnaire findings are presented and interpreted in Section 4.2. Section 4.3 considers the implications of the questionnaire findings and the findings from the literature review in Chapter 2 and Section 4.1 to formulate design principles and guidelines for the development of online discussions such that deep learning is facilitated among non-native English speaking students from a non-western culture. The last section of this chapter focuses on the design and development of an online discussion based on the first set of (draft) principles and guidelines that were identified in Section 4.3.

## *4.1 Students' characteristics and tutors' practices that facilitate deep learning*

According to Biggs' 3 P model, a student's learning approach is influenced by both the students' characteristics (personal factors) and the learning environment (situational factors) (Biggs, 1987). Moreover, it has been reported that research on online education needs to focus more on the characteristics of students, the educational strategies that engage students, and the interaction between the instructor and students (Schrum, 2004). Thus, besides the questionnaire to gather information about the personal characteristics of study participants, Phase 2 of the study also included an analysis of extant literature to address the first research question which was articulated as:

1) What are students' characteristics that facilitate deep learning?

2) What are the practices of tutors that facilitate deep learning?

The next two sections of this chapter addressed the first research question.

### 4.1.1 What are students' characteristics that facilitate deep learning?

A student's approach to learning (deep or surface) should not be perceived as a stable trait of the student, but rather as a response to the learning environment. Nonetheless, Biggs (1987) points out that the extent to which students can change their approach to learning is influenced by their predisposition, which in turn is affected by personal characteristics such as one's ability. It has been reported that students with high cognitive ability are more likely to adopt a deep approach to learning as they have better learning and thinking skills and can better tackle high level questions (Offir, Lev, & Bezalel, 2008). However, one should not conclude that students with lower cognitive ability cannot adopt a deep approach to learning; the use of scaffolding and guidance can foster a deep approach (Teo & Webster, 2008). When learning is scaffolded and adequate guidance is provided, students tend to experience lower anxiety levels, an enabling factor for a deep approach to learning (Entwistle, 2000; McGee & Wickershame, 2005). In this study, the provision of scaffolding was considered in the formulation of the design principles, despite the fact that the cognitive ability of the trainee teachers was not determined. It was assumed that the trainee teachers constituted a group of mixed ability based on their academic performance in courses they had completed in previous semesters of the Teacher's Diploma programme.

Some researchers have found that metacognitive skills tend to increase with age and experience (Biggs, 1987; Offir et al., 2008). Hence, as pointed out by Lew (2005), older and more mature students are more likely to adopt a deep approach to learning. Students who have aspirations for further studies (Biggs et al., 2001) and those with the appropriate background knowledge for a sound foundation are also more apt to adopt a deep approach to learning (Entwistle, 2000). Henri (1992) stated that when students lack the relevant knowledge, they are not able to carry out in-depth processing of information. In a study by Redmond and Locke (2008) among trainee teachers, surface postings were three times more frequent than postings reflecting in-depth information processing either because of the lack of

basic knowledge of the topic or because of the extra time required for reading the materials. Background knowledge though may not be such an important factor. A study carried out by Chin and Brown (2000) among Science students found that the difference between students using a deep approach and a surface approach was more of a qualitative difference in terms of the strategies that the students used when they were presented with a problem or new information. The responses of students who had adopted a deep approach reflected more planning, reflection-in-action and reflection-on-action. The students could relate their past experiences to the problem presented unlike those with a surface approach, and they were also more persistent in following up on an idea with sustained interest before discussing another idea. Teo and Webster (2008) have noted that the lack of know-how to discuss online is a problem among novice online learners. Online discussion tasks that require problem solving, reflection and critiquing may be new to the novice learners. They need to be guided and prompted on the procedures to take. Hence in this study, the design principles and guidelines made provision for familiarising the trainee teachers with the online learning environment and fostering in them the skills to reflect and think critically.

A higher level of interest in completion of a task is often observed among students who are intrinsically motivated rather than extrinsically motivated (Entwistle, 2000; Lew, 2005; Ramsden, 2003; Yip, 2008). Students with greater intrinsic motivation have the firm intention to understand and integrate materials from different sources rather than to simply get a passing grade; they have an intrinsic curiosity in the subject matter. When students perceive concepts to be learned as relevant to their own experience, the real world and to their career, they tend to be more intrinsically motivated and to engage more actively with the learning materials (Edwards, 1999; Yip, 2008) than when they perceive the discussion topic to be boring and uninteresting (Teo & Webster, 2008). In this study, analysis of the R-SPQ-2F (Biggs et al., 2001) for the motive scores of the trainee teachers provided an indication of their level of intrinsic motivation.

Students' level of engagement with the learning materials is also influenced by their conceptions about teaching and learning (Chan et al., 2007; Chin & Brown,

2000). Students who hold constructivist conceptions of teaching and learning are more likely to engage actively in the learning process and adopt a deep approach to learning unlike students who hold traditional conceptions. The latter are more likely to adopt a surface approach to learning. They prefer to rote learn and memorise facts because they believe that learning is the absorption of knowledge. They consider the textbook as the store of knowledge to be memorised and practised. They will tend to rely on their peers and tutors to provide them with answers rather than trying to find things out on their own, unlike students who hold constructivist conceptions. Even when students hold traditional conceptions about teaching and learning, tutors can fine tune these conceptions. Tutors need to be aware of their students' prevailing conceptions and take these into consideration in the design of their courses to draw out the desired beliefs that support an inquiring attitude and learning by analysis and reflection (Chan & Elliott, 2004; Chan et al., 2007). In this study, prior to developing the first online discussion, Chan's TLCQ was used to determine whether trainees had traditional or constructivist conceptions (Chan, 2001).

Very often, the conceptions about teaching and learning of students who join higher education are shaped by their prior learning experiences during their formal schooling (Calderhead & Robson, 1991; Huinker & Madison, 1997). Prior exposure to a mainly teacher-centred learning environment may make students feel uncomfortable to work in a constructivist learning environment, especially at the beginning (Murphy & Cifuentes, 2001; Pisutove-Gerber, 2009). However, formal schooling may not be the only factor that influences conceptions about teaching and learning. Prevailing cultural values can also shape these conceptions (Kukari, 2004). In collectivist cultures, students are less likely to speak up than students from individualistic cultures, and the students tend to accommodate the teacher's point of view (Parrish & Linder-VanBerschot, 2010). Teachers are treated as unchallenged authorities. Students feel uncomfortable to challenge the teacher's or peers' ideas in group situations (Lai, Berg, & McDonald, 2008). These points were addressed in the formulation of the design principles and guidelines given their relevance to the trainee teachers in this study.

In a teacher-centred learning environment, teachers as facilitators rather than a figure of authority and the content expert, students taking responsibility for their own learning, and asking students to work collaboratively with their peers may be new concepts to students. McGee and Wickershame (2005) have reported that students not used to learning experiences that foster deeper thinking may experience discomfort and dissatisfaction when exposed to such learning experiences. Moreover, it is reported that if students have had success with the use of a surface approach during prior learning experiences, they are more likely to continue with the same approach when they join higher education institutions (Ramsden, 2003).

Even when students have sound background knowledge, hold constructivist conceptions about teaching and learning, and are intrinsically motivated, they need adequate time to extract meaning from the learning materials and the online postings of their peers, to make connections, and to reflect. In addition to the provision of adequate time, students need to have good time management skills. When tutors allow for sufficient time, students who can manage their time effectively are more likely to adopt a deep approach to learning despite a heavy workload (Roper, 2007). Roper (2007) found that online students with better time management skills tried to incorporate a plan into their overall online course schedule for regular interaction with the course content and classmates.

In an online learning environment, there are other students' characteristics that have been found to contribute to the success of online learning and which may also influence students' learning approach (McGee & Wickershame, 2005; Murphy & Cifuentes, 2001; Schrum, 2004). The characteristics include access to appropriate computer hardware, adequate experience and comfort with computer technology, and learning preferences that can accommodate text-heavy materials. Murphy and Cifuentes (2001) reported that students who do not have adequate experience with computer technology require more time to start actively engaging with the course materials. They first need to get used to the technical aspects and processes required for online interaction. Even when online activities are well designed and structured, a deep approach to learning is not automatic – students need an

adjustment period (Garrison & Cleveland-Innes, 2005). In this study, the time factor, including an adjustment period, and the students' characteristics were considered in the development of the design principles and guidelines.

### 4.1.2 What are the practices of tutors that facilitate deep learning?

Besides students' characteristics, tutors' practices also have an influence on students' learning approaches (Biggs, 1987). Tutors' practices have a bearing on the situational factors identified in Biggs' 3P model, such as the course design, teaching methods, assessment, nature of the task, time pressures and the atmosphere of the learning environment. Biggs et al. (2001) state that both the tutor and students have an input in facilitating a deep approach to learning; the tutor structures the enabling conditions and the students need to engage themselves.

Students can adopt a deep or surface approach to learning depending on the requirements of the learning environment (Garrison & Cleveland-Innes, 2005; Lew, 2005). They can even switch from one approach to the other within the same course in response to the atmosphere and requirements of the learning environment. As pointed out by Kanuka (2005), generally students tend to select the approach that they feel is most appropriate for the circumstances. Mimirinis and Bhattacharya (2007) found that careful design and structure of online activities can positively influence students' motivation. Thus, in this study the tutor gave due consideration to the design of the online discussion, the teaching approach and the atmosphere of the learning environment.

The teaching approach adopted by the tutor influences the approach to learning. When tutors adopt a learner-centred teaching approach, they are more likely to foster a deep approach to learning among their students (Entwistle, 2000). The use of predominantly teacher-centred strategies such as lectures and traditional paper-and-pencil assessment methods favours a surface approach to learning (Riley & Anderson, 2006). Rosie (2000) stated that if the guiding principle of an online activity is the development of deep learning, approaches should be pedagogically driven rather than technologically led. Additionally, she has stated that poor use of online technology in learning and assessment can foster surface learning strategies.

In a study by Pisutova-Gerber and Malovicova (2009) online learning was found to foster surface learning because the focus was more on the technological aspect (ease of access and interface design) than the pedagogical aspect. Ease of access and interface design determine the usability of the online learning environment, but they do not necessarily facilitate a deep approach to learning (Wang, 2009). The pedagogical design has a more significant role in facilitating a deep approach to learning. It must support and satisfy learner's various needs and learning intentions, be flexible with regard to learning content and objectives and involve learning resources and activities that support active learning (Chen, 2003; Kirschner, Strijbos, Kreinjs, & Beer, 2004).

Tutors' preferred teaching approach is influenced by their conceptions about teaching and learning (Gordon & Debus, 2002). Those who hold traditional or transmissive conceptions about teaching and learning work in a more controlled, predictable and strict environment where the teaching/learning process is not open to the effects of "here and now" actions (Chang, 2005). They perceive themselves as transmitters of information, allowing students to remain passive and creating few opportunities for students to take control of their learning. If tutors are working in an online learning environment, for them online learning may be mainly about publishing lectures on the web (Pisutova-Gerber & Malovicova, 2009). Conversely, tutors who hold a constructivist view facilitate the learning process by creating opportunities for students to take greater responsibility for their own learning, sharing control with students and actively engaging students in activities (Eren, 2009). They also tend to have higher self-esteem, determination and enthusiasm for teaching. Tutors' enthusiasm and personal interest in the subject have been identified as important factors that support a student's deep approach to learning (Entwistle, 2000; Lew, 2005).

Deep learning is fostered when students are given learner ownership and provided with opportunities for independent thinking and reflection, critical elements that were considered in the formulation of the design principles and guidelines (McGee & Wickershame, 2005). Instructional strategies that actively encourage students to use various ways of thinking and learning can help them to shift from a surface

approach to a deep approach (Kanuka, 2005). Yip (2008) and Kim and Bateman (2010) found that strategies based on constructivist principles facilitate a deep approach to learning. Open–ended questions that apply to real-life situations and relate to previous experiences are particularly useful for online discussions. Students are given the opportunity to share their impressions, questions or reactions, while at the same time grounding or situating their comments in specific experiences or evidence (Haavind, 2005). Richards and Schofield (2005, p. 2592) stated that "the nature of the question with which students are presented holds the key to making this form of learning relevant to the real world of student" (p. 2592). If students perceive the question as irrelevant, then they are likely to perceive the learning materials also as irrelevant. In a blended learning environment, care should also be taken to develop online discussions that are not a replication of face to face discussions (Ferdig & Roehler, 2003; Jetton, 2003). Students should be encouraged to ask questions, to suggest causes for events or to predict consequences through the provision of sound guidelines for questions and tutors modelling good questions (Toledo, 2006; Yip, 2008). An environment should be created to deepen collaborative dialogue whereby postings of the tutor and students generate questions that probe for clarifications, assumptions, viewpoints, implications and consequences (Chin & Brown, 2000; Toledo, 2006).

Students should also be given the opportunity to work collaboratively. Collaboration in a learning environment involves interactions with peers, reciprocal exchanges of ideas, the sharing and generation of new knowledge, co-construction of knowledge through comparing alternative ideas, interpretations and representations (Redmond & Lock, 2008; Slotte & Tynjala, 2005). According to Mirmirinis and Bhattacharya (2007), students' collaboration and communication through the use of online discussions can play an important role in the development of a deep approach to learning. If small groups are set up, Kanuka (2002) suggests the use of heterogeneous groups in terms of age, gender, culture, race, and religion to encourage diversity of views and the exploration of multiple perspectives.

When new concepts are introduced, tutors should relate them or help students to relate them to one another rather than consider them in isolation (N. Entwistle,

2000). Presenting concepts and ideas from learning materials as a series of unrelated pieces of information encourages a surface approach to learning. Kanuka (2002) found that deep learning is facilitated in an online learning environment when learners are required to draw the relationships between different pieces of information. It is worth noting that students should also be given some freedom of choice of learning materials as this has been shown to foster the use of a deep approach to learning (Edwards, 1999). Nonetheless, in an online environment, providing students with too many hyperlinks, resources or other learning materials can act as a barrier to deep learning (Mimirinis & Bhattacharya, 2007). These researchers suggest that tutors ought to consider the principle of supply and demand, such that hyperlinks and other learning materials are provided according to students' requirements and progress. These factors were considered in the development of the design principles and guidelines.

In an online learning environment, the use of problem solving or case studies in which students are given the opportunities to engage and interact with the content, work in collaborative groups, and explore the solutions to open-ended and ill-defined problems can move discussions from exploration to integration and then to resolution (Garrison & Cleveland-Innes, 2005; Havard & Du, 2004; Richards & Schofield, 2005). Students need to clarify their own assumptions, discuss, choose relevant analytic techniques, synthesize ideas and examine their value judgements. Argumentation through online debates facilitates deeper levels of learning in different ways (Moore & Marra, 2005). When students produce arguments or counter arguments in an interactive and collaborative context, they are more likely to reflect on their own position. They confront situations that result in contradictions, at times challenging their own beliefs (Kanuka, 2005). This can result in knowledge construction and knowledge restructuring to reach a compromise between differing views. Kanuka (2005) points out that the text-based nature of online discussions facilitates the development of argument formation abilities and problem-solving skills. Moreover, Gerbic (2005) found that non-native English speaking students used to teacher-centred approaches find it easier to disagree online because of the lack of visual cues.

If students find it difficult, on their own, to actively engage in instructional strategies that support deep learning, Chin and Brown (2000) suggest that tutors can scaffold students' thinking. Tutors can provide task prompts and learning resources to guide students, and they can also craft questions that match the students' level of understanding of the learning materials (Roper, 2007). The use of "how" and "why" questions has been shown to foster a deep approach to learning as opposed to "what" and "when" questions or questions that produce dead-end answers (Toledo, 2006; Vaughan, 2008). Offir et al. (2008) suggest the use of high level questions by the tutor to promote deep processing of the information from the learning materials. Scaffolding students' learning from surface to deep learning may be of greater significance at the beginning of a course or task. Havard et al. (2005) point out that the need for scaffolding reduces over time as students develop the skills and competence for deep learning.

In order to promote deep learning in an online learning environment, besides good questioning skills, tutors require good moderating and chairing skills to establish a climate of trust and create a safe learning environment (Kanuka, 2002). Tutors should clearly communicate to students course expectations and the goals and purposes of online discussions (McGee & Wickershame, 2005; Schrum, 2004). They should maintain the pace and flow of online discussions and be responsive to the needs of their students. When tutors intervene in the online discussions, Haavind (2005) suggests the use of a guiding tone rather than a leading tone. If tutors are not careful with their tone, a leading tone or a critical and negative tone can diminish students' sense of safety and consequently inhibit online participation. He further suggests that tutors refrain from intervening during the first few days of an online discussion since the tutor's intervention can interrupt the flow of discussion. This may be more applicable in learning contexts where tutors are perceived by the students as an authority who has the final answer (Jetton, 2003; Teo & Webster, 2008). In order to praise the first few students' postings and to establish a sense of safety, Haavind (2005) proposes the use of emails to privately acknowledge and encourage online participation. Nonetheless tutors are required to read and monitor the postings regularly. If some students are not participating in an online discussion or are straying off, the tutor may wait for a

while to see if other students in the group will provide a hint to steer the online discussion back on target before intervening (Haavind, 2005). In this study, these points were considered in determining the nature of participation of the tutor in the online discussion.

Assistance should also be provided to guide students towards acceptable online behaviours and to reduce technical difficulties. Additionally, orientation sessions can be organised to familiarise students with the online learning environment (Albion & Weaver, 2006; Garrison & Cleveland-Innes, 2005) and to establish ground rules for participation in online discussions (Williams et al., 2001). Clear participation requirements should be provided in terms of length, content expectations and timeliness (Haavind, 2005; McGee & Wickershame, 2005). Private means of communication with students, for example, e-mail address or phone number, can also be provided to reduce the anxiety level of students (Haavind, 2005; McGee & Wickershame, 2005). Moreover, the provision of timely feedback and constructive criticism is important (Lew, 2005; Schrum, 2004). Regular feedback and immediate responses to technical queries demonstrate that the tutors are reading students' postings, thus maintaining a sense of safety (Haavind, 2005).

The type of assessment tasks is an important factor that influences students' approaches to learning (Entwistle, 2000; Garrison & Cleveland-Innes, 2005; Lew, 2005). Assessment methods that encourage students to be analytic and critical thinkers and apply their newly acquired knowledge and skills to novel situations or to solve problems are more likely to foster a deep approach to learning. When collaborative thinking is also integrated in the design of the assessment task, for example through group presentation, reciprocal exchanges of ideas, constructive peer review and collaborative group projects, students can shift to a deep approach (Riley & Anderson, 2006; Slotte & Tynjala, 2005). The focus should be on the quality of the assessment task rather than the quantity. According to Entwistle (2000) and Vaughan (2008), a deep approach to learning is fostered when students do not have a heavy workload, and when they are encouraged to engage with topics that are relevant to real world settings. The use of English language by non-

native speakers in an online environment can increase students' workload as it will take them more time to formulate their postings and to understand the online postings of their peers and tutor (Lai, Berg & McDonald, 2008). This particular challenge can be minimised by placing more emphasis on the quality of the ideas and arguments than the quality of the language used (Campbell, 2007; Schallert et al., 2003). Given that this study was conducted among non-native English speakers, care was taken to place more emphasis on the quality of ideas in the formulation of the design principles and guidelines. McGee and Wickersham (2005) have also pointed out that if online discussions are to facilitate deep learning, the assessment task should be congruent with the learning outcomes of the course. This is in line with Bigg's model of 'constructive alignment'. The fundamental principle of this model is that learning activities, teaching method and assessment should be aligned to the intended learning outcomes of the course to support student learning (Biggs, 1999). Thus, during course design, the learning outcomes should first be clearly defined. The assessment tasks should then be developed to determine whether the specific learning outcomes have been met, and learning opportunities should be provided to get students to successfully undertake the assessment tasks.

When students have a heavy workload, they tend to be more concerned with finding the required time to complete the task rather than finding the time to actively engage with the learning materials. If assessment tasks emphasize content coverage and reward low level learning outcomes such as knowledge recall and comprehension, students are more likely to adopt a surface approach to learning (Biggs, 1995; Smith & Colby, 2007). Tutors should provide adequate time for students to complete the assessment tasks. Entwistle (2000) states that short assessment cycles tend to favour a surface approach to learning. In an online discussion, students have the opportunity to return to the discussion a few days after their initial postings either to reformulate their postings or to reflect on their peers' postings. If the time allowed for participating in the online discussion is too short, students may not be able to internalise an idea and come back with a new and different perspective (Gunawardena, 1998). On the other hand, Gunawardena (1998) found that if the online discussion is spread over too long a period of time, it may become more difficult for students to keep an overall perspective of the

discussion as a whole. Time frames to be used depend on the nature of the activity, how often students go online, and the social cohesiveness of the group. A period of 2-3 weeks was deemed appropriate to discuss a question or a topic when students go online at least once every two days (Gunawardena, 1998; Rosie, 2000).

When an online discussion is designed, the number of topics or themes should be limited. Rosie (2000) found that when students participated in online discussions that focused on a few themes and they were given two to three weeks to participate, the postings reflected more developed arguments and positions. On the other hand, a surface approach to learning was encouraged when students had to address several themes over a short lapse of time since students worked their way through the resources to meet the minimum task requirements; students were unable to cope with the large amount of information or to interpret the elements of meaning that were significant to the learning process (Gunawardena, Lowe & Anderson1997; Roper, 2007; Rosie, 2000). In this study, the number of topics for the online discussion and time allocation for participation were given due consideration.

Rubrics are particularly appropriate for the assessment of complex tasks, including online discussions (Duffy & Kirkley, 2004; Hanna, 2002). They offer several benefits that are of relevance to this study. Yip (2008) found that carefully constructed rubrics, with clear assessment criteria, guided students towards deep learning. Students knew better what skills they were expected to demonstrate at the end of the task and had a better understanding of the relevance of the task. There is also evidence that a rubric can encourage students to assume ownership of their task (Rovai, 2004). According to Jonassen (1999), making a rubric available as a tool for students can provide the scaffolding necessary to improve the quality of students' work. Moreover, the use of rubrics helps to establish an atmosphere of trust and decrease students' anxiety levels because they feel that tutors are more likely to be fair and consistent when assessing their work (Entwistle, 2000).

## *4.2 Phase 2 questionnaire findings*

All the trainee teachers (n = 11) who had enrolled for the course *Independent Study* of the Teachers' Diploma Home Economics programme gave their informed consent to participate in the study. It is important to consider students' characteristics when analysing the learning benefits of new learning technologies (Pena-Shaff et al., 2005; Schrum, 2004). This section of Chapter 4 provides some background information about trainees' socio-demographic profile, their access to computer and the Internet, their computer and Internet skills, prior experience(s) with online discussions, expectations and opinions about the integration of online discussions in their teacher education courses, and their conceptions about teaching and learning. These details were collected from a questionnaire administered to all study participants as part of Phase 2 before the start of the *Independent Study* course.

### 4.2.1 Socio-demographic profile

The study comprised only female trainee teachers. The mean age of the study participants was 22.5 yrs, the youngest participants being 20 years old and the oldest being 26 years old. Creole is the first language for all participants. They belong mainly to communities of Asian origin as illustrated in Table 5. The highest qualification for all of them was the UK University of Cambridge London Examinations Syndicate (UCLES) Higher School Certificate (HSC). None of them had pursued any award programmes post high school.

**Table 5: Community of study participants**

| Community* | Frequency | Percent |
|---|---|---|
| Indo-Mauritian | 10 | 91.0 |
| Creole | 1 | 9.1 |
| Sino-Mauritian | 0 | 0 |
| Total | 11 | 100.0 |

*Indo-Mauritian refers to individuals of Indian origin.
Sino-Mauritian refers individuals of Chinese origin
Creole refers to individuals of African origin.

### 4.2.2 Computer and Internet access, related skills, prior experiences and perceptions about online discussions

All the trainees had access to computers and the Internet at home. Their frequency of use and their level of skills varied as illustrated in

Table 6. Five trainees used the computer every day or every two days while the remaining six used their home computer several times a day. Their computer skills ranged from good (n = 9) to very good (n = 2). Most of the trainees accessed the Internet at least once every day or two, except Trainee G who reported accessing the Internet once a week. Three trainees felt that their Internet skills were very good; seven rated their Internet skills as good and one as fair.

**Table 6: Frequency of computer and Internet use, access and prior experiences**

| Trainee | Frequency of computer use | Frequency of Internet use | Computer skills | Internet skills | Previous participation in online discussions |
|---|---|---|---|---|---|
| A | Several times a day | Several times a day | Good | Very good | No |
| B | Every day or two | Every day or two | Good | Good | Yes |
| C | Several times a day | Several times a day | Very good | Very good | Yes |
| D | Several times a day | Several times a day | Good | Good | No |
| E | Every day or two | Every day or two | Good | Fair | No |
| F | Every day or two | Every day or two | Good | Good | Yes |
| G | Every day or two | Once a week | Good | Good | Yes |
| H | Several times a day | Several times a day | Good | Good | Yes |
| I | Every day or two | Every day or two | Good | Good | No |
| J | Several times a day | Several times a day | Good | Good | No |
| K | Several times a day | Every day or two | Very good | Very good | Yes |

Only six of the trainees (B, C, F, G, H, K) had participated in an asynchronous online discussion in the past. Five of them felt either very comfortable or comfortable to participate in the online discussions and one of them (Trainee G)

felt unsure about her participation in online discussions. Most of them (n = 10) were either very keen or keen to participate in online discussions in courses offered in their teacher education programme. Only one trainee (Trainee A) felt unsure about the inclusion of online discussions in teacher education courses. She reported having never participated in an online discussion before.

There was not much divergence in their opinions with regards to their role, the role of their peers and that of their tutor in online discussions (see Table 7). Ten trainees agreed and one strongly agreed that they could use the online discussions to explain their ideas to others, and they could also ask their peers to explain their ideas. Nine trainees agreed and one strongly agreed that they expected their peers to respond to their online postings. One trainee teacher (Trainee H) was not quite sure whether her peers should be responding to her online postings. Six trainees agreed and five strongly agreed that their tutor should respond to most of their online postings.

**Table 7: Trainee teachers' opinions about their role, the role of peers and the tutor in online discussions**

| | ***Strongly disagree*** | ***Disagree*** | ***Unsure*** | ***Agree*** | ***Strongly Agree*** |
|---|---|---|---|---|---|
| *As a student, I can use online discussions to explain my ideas to others.* | 0 | 0 | 0 | 10 | 1 |
| *I can ask other students* to *explain their ideas in the online discussions.* | 0 | 0 | 0 | 10 | 1 |
| *I expect other students to respond to my online postings.* | 0 | 0 | 1 | 9 | 1 |
| *I expect my tutor(s) to respond to most of my online postings.* | 0 | 0 | 0 | 6 | 5 |

Trainees' perceptions about the usefulness of online discussions as compared to face to face discussions and about the allocation of marks for online postings varied. Five trainees felt that online discussions were more useful than face to face discussions while another five (trainees B, C, F, H, K) felt that face to face discussions were more useful (see

**Table 8**). Trainee D was unsure about which of the two types on discussions was more useful. She had never participated in an online discussion in the past.

**Table 8: Perception that face to face discussions are more useful than online discussions**

| | ***Frequency*** |
|---|---|
| Disagree | 5 |
| Unsure | 1 |
| Agree | 2 |
| Strongly agree | 3 |

Analysis of trainee teachers' perceptions about the usefulness of online discussions with respect to their prior participation in an online discussion revealed that most of those (trainees B, C, F, H, K) who had previously participated in an online discussion perceived face to face discussions as more useful than online discussions (see
Table 9).

**Table 9: Cross tabulation of trainee teachers' perceptions of the usefulness of online discussions vs. their previous participation in online discussions**

| | | *As a student, I feel that face to face discussions are more useful than online discussions.* | | | | Total |
|---|---|---|---|---|---|---|
| | | ***Disagree*** | ***Unsure*** | ***Agree*** | ***Strongly agree*** | |
| *Online discussion participation* | Yes | 1 | 0 | 2 | 3 | 6 |
| | No | 4 | 1 | 0 | 0 | 5 |

Four trainees (B, D, G, I) reported that they were more likely to participate in online discussions if their postings were graded while four trainees (Trainees, A, C, F, J) were not sure whether allocation of marks to their postings would influence their participation. On the other hand, trainees E, H, K felt that grading of online

postings would not necessarily increase their participation in online discussions. Communicating online in English did not seem to be a problem for the trainee teachers as all of them reported feeling comfortable to do so (see Table 10). Moreover, none of the trainees stated that they felt more comfortable expressing themselves in English orally than in writing.

**Table 10: Ease to communicate in English**

| | ***Strongly disagree*** | ***Disagree*** | ***Unsure*** | ***Agree*** | ***Strongly Agree*** |
|---|---|---|---|---|---|
| *I feel comfortable communicating online in English.* | 0 | 0 | 0 | 9 | 2 |
| *I feel more comfortable expressing myself in English orally than in writing.* | 0 | 6 | 5 | 0 | 0 |

### 4.2.3 Conceptions about teaching and learning

It is recognised that pre-service teachers enter their teacher education programmes with conceptions about teaching and learning acquired in their formal schooling (Calderhead & Robson, 1991; Huinker & Madison, 1997; Pisutova-Gerber & Malovicova, 2009). In this study Chan's TLCQ (Chan, 2001) was used to measure the trainee teachers' conceptions about teaching and learning. All the trainees had to rate their responses on a five-point Likert Scale (1 = Strongly Disagree and 5 = Strongly Agree). Analysis of the responses from the questionnaire filled out by all the trainees (see Table 11) showed that on the whole, the trainees were more inclined towards constructivist conceptions (mean = 4.54, SD = .25) than traditional conceptions (mean = 3.00 , SD = .27 ). Trainees with traditional conceptions are more inclined to rote learn and memorise facts because they believe that learning is the absorption of knowledge and tend to rely more on their peers and tutors to provide them with answers rather than trying to find things out on their own, unlike students who hold constructivist conceptions.

In this study, all the trainees felt that the ideas of students are important and should be given due consideration and good teachers always make their students feel

important. All of them also felt that students should be provided with many opportunities to express themselves and it is important that in a classroom there is a democratic and free atmosphere that stimulates students to think and interact. Moreover, they agreed that effective teaching promotes discussion and hands on activities for students and the focus of teaching is to help students to construct knowledge from the learning experience instead of knowledge communication. Most of them (n = 10), except Trainee C, agreed that it is important for the teacher to understand the feelings of the students.

**Table 11: Trainee teachers' ratings of selected items that measure constructivist conceptions about teaching and learning (n = 11)**

| ***Items*** | ***Strongly disagree*** | ***Disagree*** | ***Unsure*** | ***Agree*** | ***Strongly agree*** |
|---|---|---|---|---|---|
| The ideas of students are important and should be carefully considered. | 0 | 0 | 0 | 5 | 6 |
| Effective teaching encourages more discussion and hands on activities for students. | 0 | 0 | 0 | 4 | 7 |
| Students should be given many opportunities to express their ideas. | 0 | 0 | 0 | 3 | 8 |
| In good classrooms there is a democratic and free atmosphere which stimulates students to think and interact. | 0 | 0 | 0 | 2 | 9 |
| Good teachers always encourage students to think for answers themselves. | 0 | 0 | 0 | 6 | 5 |
| The focus of teaching is to help students to construct knowledge from the learning experience instead of knowledge communication. | 0 | 0 | 0 | 10 | 1 |
| Good teachers always make their students feel important. | 0 | 0 | 0 | 4 | 7 |
| It is important that a teacher understands the feelings of the students. | 0 | 0 | 1 | 2 | 8 |
| Learning means students | 0 | 0 | 0 | 2 | 9 |

| | | | | | |
|---|---|---|---|---|---|
| have ample opportunities to explore, discuss and express their ideas. | | | | | |

However, the trainees did not exclusively hold constructivist conceptions about teaching and learning (see Table 12). The comparison of individual study participant mean values for the traditional and constructivist items showed that three of the trainee teachers (Trainees C, E and F) held traditional conceptions about teaching and learning.

**Table 12: Trainee teachers' ratings of selected items that measure traditional conceptions about teaching and learning (n = 11)**

| ***Items*** | ***Strongly disagree*** | ***Disagree*** | ***Unsure*** | ***Agree*** | ***Strongly agree*** |
|---|---|---|---|---|---|
| The major role of a teacher is to transmit knowledge to students | 0 | 0 | 0 | 6 | 5 |
| Learning occurs primarily from drilling and practice | 0 | 0 | 1 | 5 | 5 |
| Teachers should have control over what students do all the time | 0 | 1 | 1 | 6 | 3 |
| Learning means remembering what the teacher has taught. | 1 | 2 | 1 | 6 | 1 |
| A teacher's major task is to give students knowledge/information, assign them drill and practice, and test their recall. | 0 | 1 | 1 | 8 | 1 |
| Learning mainly involves absorbing as much information as possible. | 0 | 1 | 1 | 8 | 1 |
| The traditional/lecture method for teaching is best because it covers more information knowledge. | 0 | 0 | 0 | 7 | 4 |

All the trainees felt that the major role of a teacher is to transmit knowledge to students. Most of them (n = 10), agreed that learning occurs primarily from drilling and practice while Trainee J was unsure about this item. Nine of them felt that teachers should have control over what students do all the time; only Trainee

K disagreed with this item and Trainee G was unsure. Nine trainees agreed that a teacher's major task is to give students knowledge/information, assign them drill and practice, and test their recall; only Trainee G disagreed with this item and Trainee A was unsure. The same pattern was noted for the item "Learning mainly involves absorbing as much information as possible". All the trainees felt that the traditional/lecture method for teaching is best because it covers more information.

### 4.2.4 Summary and implications of Phase 2 questionnaire findings

All the study participants were female for whom Creole was their first language. The majority of them (n = 10) belonged to communities of Asian origin. All of them had computer and Internet access at home and they had the appropriate computer and Internet skills. Most of them (n = 10) went online at least once every two days. Online discussions were new to five of the trainee teachers who reported having never participated in any online discussion in the past, but they all looked forward to doing so in their teacher education courses. Indeed, out of the eleven trainees, ten looked forward to participating in online discussions in their teacher education courses. Teo and Webster (2008) pointed out that students who have never participated in an online discussion need to be guided and prompted on the procedures to take to facilitate and encourage their participation. The novice online learners are likely to lack the know-how to discuss online tasks that require reflection and critical thinking.

Among the six trainees who had previously participated in online discussions, five of them felt comfortable doing so, although they felt that face to face discussions were more useful than online discussions. This was the first time that trainee teachers were to participate in online discussions in their teacher education programme. It could be that their prior experiences with online discussions were not very enriching or mainly encouraged social interaction rather than deep learning. Consequently, those five trainee teachers perceived face to face discussions as more useful as a teaching and learning strategy.

All the study participants agreed that online discussions integrated in their teacher education courses could be used to explain their ideas to their peers and their tutor

or they could ask others to explain their ideas. Expressing oneself in English online did not seem to be a barrier for the trainee teachers who also reported being more at ease to express themselves in English in writing than orally. Studies have shown that among non-native English-speaking students, writing is considered easier than speaking or listening and students feel more at ease to voice out their opinions and argue with their peers (Gerbic, 2005; Kumar, 2008; Yildiz & Bichelmeyer, 2003).

In this study, almost everyone expected their peers to respond to their postings. All the trainees also expected their tutor to respond to most of their online postings. This finding somewhat concurs with some of the traditional conceptions about teaching and learning held by trainees in Table 12 such as "Teachers should have control over what students do all the time" and "The major role of a teacher is to transmit knowledge to students". Findings from previous studies among students used to a teacher-centred learning environment have shown that the students expected their tutor to participate in online discussions since they perceived the tutor as the main source of knowledge and the tutor's opinions as being more important than the opinions of their peers (Yildiz & Bicehlmeyer, 2003).

Data analysed from the TLCQ showed that on the whole trainee teachers in the study did not exclusively hold traditional or constructivist conceptions about teaching and learning. There seems to be an intermingling of the two conceptions among the trainee teachers which is likely to be the result of trainees' past learning experiences and an exposure to new learning experiences and perspectives in education during their teacher education programme. The trainee teachers have for the most part been exposed to the traditional way of teaching and learning in elementary and secondary schools. This may explain why they hold certain traditional conceptions as shown in Table 12. The teacher education programme in which they are enrolled promotes a constructivist approach to teaching and learning, thus triggering constructivist beliefs and conceptions about teaching and learning. Similar findings have been found among trainee teachers in Singapore and Hong Kong who are also exposed to different teaching and learning

experiences during their schooling years and when they join teacher education programmes (Chan & Elliott, 2004; Chan, et al., 2007).

From the findings of this study, it was not very clear whether allocating marks or grades for online postings would encourage trainees to more actively engage in the online discussions since four trainee teachers expressed their disagreement with this and four of them were unsure. Some researchers have found that assessing students' postings may not necessarily improve the participation in online discussions either quantitatively or qualitatively (Fauske & Wade, 2003; McLoughlin et al., 2004; Pena-Shaff et al., 2005). Students may participate just to meet the task or course requirement rather than to learn something of value and grow professionally. These findings were from studies conducted among students mainly from a western culture and they are not supported by studies conducted among Asian students. Assessing postings has been found to be the greatest motivational factor among Asian students, resulting in higher rate of participation and also improvements in the quality of the postings (Gerbic, 2005; Teo & Webster, 2008). Hence, in the present study, I decided to grade the students for the quality of their postings using predefined criteria which were communicated to trainee teachers prior to their participation in the online discussion. The provision of meaningful assessment is one of the design principles identified in this study for the first online discussion. More details on the related guidelines and other design principles and guidelines are given in the section that follows.

## *4.3 Principles and guidelines for the design and implementation of online discussions that facilitate deep learning*

The content and depth of the design principles vary in DBR. The principles may be generic and based on the findings of various research studies, or content specific to facilitate direct action (Bell et al., 2004). In this study generic principles were used since they can be applied across various domains, unlike content specific principles. Guidelines for each of the design principles have also been developed to increase the adaptability and applicability of the principles.

The first set of design principles and guidelines were formulated based on data gathered from the Phase 2 students' questionnaire, an analysis of extant literature in Section 4.1, and the information included in Chapter 2 about constructivism, online discussions, and relevant cultural and linguistic issues. The design and development of the first online discussion is, thus, based on the following eight principles:

1. Establish a climate of trust and a safe learning environment.
2. Use authentic activities.
3. Promote online interaction and collaboration.
4. Provide appropriate coaching and scaffolding.
5. Promote critical reflection.
6. Allow exploration of multiple perspectives.
7. Promote learner autonomy and ownership.
8. Provide meaningful assessment.

Table 13 lists the design principles and guidelines that guided the development and implementation of the first online discussion. Principles 1, 3, 4, 5, 6, 7 and 8 were derived from the analysis of the Phase 2 student questionnaire and the literature while the principle 2 was derived from analysis of the literature only.

**Table 13: First set of principles and guidelines for the design and implementation of asynchronous online discussions to facilitate deep learning**

| **Principles** | **Guidelines for design and implementation of online discussions** |
|---|---|
| 1. Establish a climate of trust and a safe learning environment. | • Clearly communicate course expectations, goals and purposes of online discussions (Entwistle, 2000; McGee & Wickershame, 2005; Schrum, 2004).<br>• Familiarise students with the online learning environment (Albion & Weaver, 2006; R. D. Garrison & Cleveland-Innes, 2005).<br>• Establish ground rules (netiquette) and lay out clear boundaries for participation in online discussions (Williams et al., 2001).<br>• Provide timely feedback and constructive criticism to students (Schrum, 2004).<br>• Use of a guiding tone rather than a leading tone (Haavind, 2005).<br>• Provide assistance for technical problems (Schrum, 2004).<br>• Guide students towards acceptable online behaviours. |

| | |
|---|---|
| | • (McGee & Wickershame, 2005).<br>• Encourage social interaction (R. D. Garrison & Cleveland-Innes, 2005).<br>• Be consistent and fair in assessing students' work (N. Entwistle, 2000).<br>• Offer private means to communicate with students (Haavind, 2005; McGee & Wickershame, 2005). |
| 2. Use authentic activities. | • Involve students in exercises that have real-world relevance (R. D. Garrison & Cleveland-Innes, 2005; Lew, 2005; Richards & Schofield, 2005; Yiong Hwee Teo & Webster, 2008; Yip, 2008). |
| 3. Promote online interaction and collaboration. | • Develop online discussions that are not a replication of face to face discussions (in blended learning environments) (Ferdig & Roehler, 2003; Jetton, 2003).<br>• Encourage reciprocal exchanges of ideas (Redmond & Lock, 2008).<br>• Put more emphasis on quality of ideas and arguments than quality of the language (Campbell, 2007; Schallert et al., 2003).<br>• Encourage students to work in collaborative groups (Havard & Du, 2004; Pisutova-Gerber & Malovicova, 2009; Schrum, 2004).<br>• Create an environment where posted messages generate questions that probe for clarification, assumptions, viewpoints, reasons, implications and consequences (Chin & Brown, 2000; Toledo, 2006). |
| 4. Provide appropriate coaching and scaffolding. | • Consider students' conceptions of teaching and learning (Chin & Brown, 2000).<br>• Support individual needs and provide feedback (Lew, 2005; McGee & Wickershame, 2005; Schrum, 2004).<br>• Assist students to develop personal understanding by crafting appropriate questions and using task prompts (Chin & Brown, 2000; Entwistle, 2000; Haavind, 2005; Yip, 2008).<br>• Use high-level questions (Offir et al., 2008).<br>• Demonstrate good moderating and chairing skills (Haavind, 2005; Kanuka, 2002).<br>• Model appropriate postings and/or provide exemplars (McGee & Wickershame, 2005). |
| 5. Promote critical thinking | • Allocate adequate amount of time for task completion, including an adjustment period (Dutt-Doner & Powers, 2000; R. D. Garrison & Cleveland-Innes, 2005).<br>• Create open-ended activities that foster reflection and critical thought (Havard & Du, 2004; Richards & Schofield, 2005; Schrum, 2004; Yip, 2008). |
| 6. Allow exploration of multiple perspectives. | • Give students the opportunities to explore open-ended and ill-defined problems (Havard & Du, 2004).<br>• Promote argumentation, and comparison of ideas and alternatives (Moore & Marra, 2005; Redmond & Lock, |

| | |
|---|---|
| | 2008; Richards & Schofield, 2005).<br>• Have heterogeneous groups in terms of race, community, age and ability (Kanuka, 2002). |
| 7. Promote learner autonomy and ownership. | • Provide freedom of choice of learning materials (Edwards, 1999).<br>• Create activities that allow students to think for themselves rather than rely on their tutor as the main source of information (Havard & Du, 2004).<br>• Avoid dictating the direction of the online discussion (Hara et al., 2000)<br>• Adopt a stance of collegiality and co-learning rather than a content expert and evaluator (Haavind, 2005). |
| 8. Provide meaningful assessment. | • Use assessment methods that encourage students to think collaboratively and to foster creativity, inquiry, analysis, and synthesis (Entwistle, 2000; Havard & Du, 2004; Kanuka, 2005; Lew, 2005; Riley & Anderson, 2006; Yip, 2008).<br>• Put more emphasis on the quality than the quantity of postings (Entwistle, 2000).<br>• Provide clear assessment goals and criteria that guide students' towards deep learning (Yip, 2008).<br>• Plan assessment congruent with learning outcomes of the course (McGee & Wickershame, 2005). |

## *4.4 Design and development of first online discussion*

The first online discussion was developed based on the design principles and guidelines in Table 13. The online discussion focussed on only one topic, that is, factors influencing the food choices of adolescents (see Figure 5)**.** Wang (2009) has suggested that in a web-based constructivist learning environment, it is a good idea to allow trainee teachers to choose a topic to explore. Thus, in this study the trainee teachers were consulted for the choice of topic for the first online discussion. A brainstorming session was carried out with the students at the beginning of the semester to find out which topics they wished to be addressed or further explored in the *Independent Study* course.

***Describe the factors which you feel most influenced your eating habits when you were an adolescent. Support your ideas with reference to readings and your own experiences (Length: 500 words)***

**PART A - FIRST POSTING DUE**: Monday 17 August 2009 (10%)

Your first posting will be graded based on the following criteria:
* Clearly defined position statement.
* Thoughtful and informed responses with clear reasons given for positions taken and views expressed.
* Accurate and appropriate reflection of course readings, online resources and personal experiences.
* Concisely expressed responses with consistent referencing system in-text and bibliography.
* Logical flow and organisation of ideas.
* Adherence to submission deadline.

**PART B**

After reading the first posting of **ALL** your peers, you will need to:

1. Ask **at least 2 questions** that will extend the discussion deeper and further. **DUE DATE** 27 August 2009.

2. Respond to your peers' and tutor's questions to:

- Provide additional reasons and evidence;
- Reflect upon your assumptions;
- Further discuss certain implications and consequences;
- Enter empathetically into the perspective or points of view of others;
- Address inconsistencies and vagueness in postings.

**DUE DATE**: 6 September 2009

You will be graded (10%) based on the following criteria:

- Ability to ask questions that extend the discussion deeper and further.
- Thoughtful and informed responses to your peers' and tutor's questions.
- Adherence to submission deadline.
- Concisely expressed responses with consistent referencing system in-text and bibliography.

**Figure 5: Design of the first online discussion**

As pointed out in Chapter 3, this course aimed at fostering learner autonomy while promoting intellectual curiosity, critical thinking and analytical skills of the trainees on topics related to pedagogy and their subject area (Mauritius Institute of Education, 2008). As such, there were no set topics for the course; rather topics

were negotiated with the trainee teachers. Care was also taken to select a discussion topic that was not going to be discussed in face to face sessions. There is evidence that students are more motivated to actively engage in online discussions that focus on topics that they find interesting and relevant (Teo & Webster, 2008; Yip, 2008) and that have not already been addressed in face to face discussions (Ferdig & Roehler, 2003; Jetton, 2003). In line with Biggs' model of constructive alignment, the online discussion was designed taking into consideration the intended learning outcomes of the *Independent Study* course, (Biggs, 1999). McGee and Wickersham (2005) have pointed out that if online discussions are to facilitate deep learning, the task should be congruent with the learning outcomes of the course.

The online discussion was divided into two parts. In the first instance, the trainee teachers were required to provide a position statement about the topic under study and to support their ideas with reference to readings and their own life experiences. Yip (2008) found that open-ended questions that apply to real-life situations and relate to previous experiences are particularly useful for online discussions. Students are able to share their views, questions or reactions, while at the same time grounding or situating their comments in specific experiences or evidence (Haavind, 2005). They are also given the opportunity to think for themselves rather than rely on their tutor as the main source of information (Havard & Du, 2004). The trainee teachers in this study were directed to two online resources and one print-based material for the first discussion. Nonetheless, they were also free to look for other relevant online or print-based learning materials and they needed to acknowledge all references in their postings. Edwards (1999) found that when students are given some freedom of choice of learning materials, it promotes learner autonomy and consequently the use of a deep approach to learning.

The trainee teachers were given two weeks to extract meaning from the learning materials, make connections with the key ideas and real-life experiences and reflect upon them before articulating their position statement which constituted their first posting. The word length was indicated to deter trainees from adding postings that would be too long and not reader-friendly online. After putting up their initial postings, the second part of the discussion required trainee teachers to

ask at least two questions to their peers in order to deepen and extend the discussion. The trainees were expected to respond to the questions, including questions from their tutor, and guidelines were provided. The responses could include clarifications, additional reasons and evidence, reflections upon their own assumptions, discussions of certain implications and consequences, and comments to enter empathetically into the perspective or points of view of others. Exemplars of position statements, questions and responses from a previous online discussion with another group of trainee teachers enrolled in an Educator's License course had been provided.

Trainee teachers were given about three weeks to read and reflect on their peers' initial postings by asking questions that extended and deepened the discussion and by responding to their peers' and tutors' questions. Previous research has shown that a period of 2 to 3 weeks is appropriate to discuss a topic when students go online at least once (Gunawardena, 1998; Rosie, 2000) every two days. In this study, 10 out of the 11 trainee teachers accessed the Internet at least once every day or two.

The online discussion task was assessed in two parts and assessment criteria were provided for each part to guide students towards deep learning. There was not any criterion to specifically assess the quality of the language used in the postings since I did not want the trainee teachers to spend too much time on proof reading and correcting their postings for correct grammar, vocabulary and syntax. As pointed out by Campbell (2007) and Schallert et al. (2003), language barriers can be minimised by placing more emphasis on the quality of ideas and arguments than the quality of the language used.

It was assumed that the design considerations described above would promote online interaction and collaboration and would facilitate a deep approach to learning even among those study participants who held traditional conceptions about teaching and learning. Some researchers have stated that tutors can fine tune their students' learning conceptions provided they are aware of the students' prevailing conceptions and take these into consideration in the design of their courses (Chan & Elliott, 2004; Chan et al., 2007). The effectiveness of the design principles and guidelines in facilitating a deep approach to learning among the

trainee teachers in this study, including among those with traditional conceptions about teaching and learning, is discussed in the next chapter.

## *4.5 Summary*

In this chapter, extant literature was extensively reviewed to address the first two research questions. The first research question focused on students' characteristics and tutors' practices that facilitate deep learning. The second research question explored the design principles and guidelines for the development and implementation of online discussions such that deep learning is facilitated among non-native English speaking trainee teachers from a non-western culture. This chapter also presented background information about the study participants. The information gathered and analysed during Phase 2 of the study was taken into consideration in the formulation of the draft (first set) design principles and guidelines. The chapter concluded with the design and development of the first online discussion used in this study. The next chapter focuses on the implementation of the first online discussion and analysis of data from different sources for confirmation, rejection or modification of the draft design principles and guidelines.

# CHAPTER 5: FINDINGS AND DISCUSSION OF FIRST CYCLE OF PHASE 3

Phase 3 of this study involved two iterative cycles as illustrated in Figure 4. In the first cycle, the online discussion, designed and developed in Phase 2 using the draft design and principles, was implemented. The purpose of the first iteration was to determine the effectiveness of the draft design principles and guidelines and to identify issues and problems related to the design and implementation of the online discussion. Data sources included a questionnaire administered to all the trainee teachers, transcripts of online postings and a reflective log maintained by the researcher. Data from these sources were analysed to bring about revisions to the draft design principles and guidelines. The revised guidelines and principles were used to develop an 'improved' online discussion which was implemented with the same group of trainee teachers during the second iterative cycle of Phase 3. The design and implementation of the second 'improved' online discussion is addressed in the next chapter.

This chapter, in the first instance, discusses how some of the design principles and guidelines were taken into consideration in the implementation of the first online discussion and highlights the role of the tutor. Findings from the different data sources (online transcripts, questionnaire, reflective log) for the first iteration are then presented, analysed and integrated for confirmation, rejection or modification of the draft design principles and guidelines. Chapter 5 concludes by presenting the refined set of design principles and guidelines.

## *5.1 Implementation of the first online discussion*

Before getting the trainee teachers to participate in the online discussion developed during Phase 2, I conducted orientation classes with all the trainees with the aim of establishing a climate of trust and a safe learning environment. The orientation classes consisted of two 3-hour face to face sessions spread over the first two weeks of the semester. The course expectations and the goals and purposes of the online discussion were clearly communicated to the trainees during the first session. The trainees were then given the opportunity to familiarize themselves with the online learning environment.

In order to make sure that the novice online learners would feel at ease, three online tasks were included in this first session. The first two tasks required the trainees to work in groups of three or four members. Care was taken to group the novice online learners with trainees who had previously participated in online discussions so that the former would not feel at a loss and also to foster peer learning. The trainees needed to discuss with their group members potential Food and Nutrition or Home Economics issues that could be explored in the *Independent Study* course and then post the topics or issues online.

The second group online task required the trainee teachers to post online any two points that they considered important for effective online discussions. The trainees posted the following points:

- Be up-to-date and feel at ease with the online discussion.
- Comfortable with new technology.
- Good communication skills (use clear and simple language and be direct).
- Use of appropriate language.
- Feedback and responses by all the peers.
- Equal contribution from everyone.
- Be familiar with the online forum.
- Respect the opinion of everyone.
- While sharing ideas, be careful not to hurt anyone's feeling.

After reading the trainees' postings, I highlighted the ground rules and guidelines for effective use of the online discussion forums. My roles in the online discussion were also discussed during the first orientation session. I was to act as a coach, provide assistance with technical problems, locate and share relevant resources, monitor the online postings, take part in some discussions, and stand back when needed. I emphasised that I would be monitoring the postings daily although I may not intervene much at the beginning of the discussion because I wanted the trainee teachers to lead the discussion. All trainees were informed that they could communicate with me through private means by sending me an email, calling me

or sending me short text messages (SMS) on my mobile phone, or by making an appointment for a face to face meeting in my office.

The first orientation session concluded with an individual online discussion task. All trainees had to share their expectations or concerns about the online discussion tasks that would be included in the course, read their peers' postings and then reply to some of the postings of their peers. The trainees mentioned in their postings that they looked forward to working collaboratively in the online discussion forums. They also hoped that there would be good participation from everyone in the group and they would be able to share their views and opinions with their peers. On the whole, they expected the online discussion tasks to be enjoyable, interesting, and enriching.

The second face to face orientation session focused on strategies that could facilitate deep learning when participating in the online discussion. Trainees were given some guidance on how to write a clearly defined position statement that included valid reasons for positions taken and views expressed and involved reflection on course readings, online resources and personal experiences. Emphasis was also given to questioning techniques. According to Toledo (2006), sound guidelines for questions should be provided to the students in order to deepen student interactions in online discussions. In this study, the trainees were introduced to the Socratic questioning technique to create an environment where the trainees' postings would generate questions that probed for clarification, assumptions, viewpoints, reasons, implications and consequences, and to encourage reciprocal exchange of ideas and argumentation.

The trainees were given a list of questions originally compiled by Paul and Binker (1995) (see Table 14) that probed for clarification, assumptions, reasons and evidence, viewpoints or perspectives, and implications and consequences. There is evidence that the Socratic approach increases the depth of online discussions and consequently facilitates deep learning (Toledo, 2006). The depth of the online postings and the types of questions asked during the implementation of the first iterative cycle of Phase 3 are discussed in Section 5.2.

**Table 14: Selected Socratic questioning prompts from a list compiled by Paul and Binker (1995, p. 342)**

| ***Questions that Probe for:*** | ***Examples of Questions*** |
|---|---|
| Clarification | • What do you mean by _____ ?<br>• What is your main point?<br>• How does _____ relate to _____ ?<br>• What do you think is the main issue here?<br>• Could you give me an example?<br>• Could you explain that further?<br>• Why do you say that? |
| Assumptions | • What are you assuming?<br>• What could we assume instead?<br>• You seem to be assuming _____. Do I understand you correctly?<br>• Is that always the case? Why do you think the assumption holds here? |
| Reasons and Evidence | • Do you have any evidence for that?<br>• What led to that belief?<br>• How does that apply to this case?<br>• What would change your mind?<br>• Is there a reason to doubt that evidence?<br>• What other evidence can support that view? |
| Viewpoints or Perspectives | • You seem to be approaching this issue from a perspective. Why have you chosen this rather than that perspective?<br>• What would someone who disagrees say?<br>• Can/Did anyone see this another way?<br>• How would other groups of people respond? Why?<br>• Are there alternative points of view from which the problem might be approached? What are they? |
| Implications and Consequences | • When you say _____, are you implying _____ ?<br>• What effects would that have?<br>• What is an alternative?<br>• What are you implying by that?<br>• What are the implications of your reasoning?<br>• But if that happened, what else would happen as a result? Why? |

Once the orientation sessions were over, the trainee teachers were given two weeks to familiarize themselves with the online learning environment before being asked to add their first posting to the online discussion developed during Phase 2. I started the discussion by posting an open ended statement that would allow for exploration of multiple perspectives about factors influencing the eating habits of adolescents (see Figure 5). All the trainees needed to write a position statement

about those factors which most influenced their eating habits during their adolescence. During the first part of the online task, as the course tutor, I intervened only once to address a technical problem faced by one of the trainees, although I monitored the trainees' postings on a daily basis. Trainee K had sent me an email to inform me that she was experiencing some difficulties in posting her position statement online. She had typed her position statement using Microsoft Word and had included some tables and diagrams which could not be pasted into the Moodle online discussion forum. I provided her with the required technical support to fix the problem and posted the following message on the discussion forum so that others in the group would know how to proceed should they face the same problem.

> *Hi everyone, since 'Trainee K' was experiencing some difficulty to post her position, she emailed me a copy. I'm including it as an attachment to keep the format and lay out. However, I do not encourage you to post additional responses as attachments. We are doing this exceptionally for this posting because 'trainee K' has included certain pictures, diagrams and figures. In case you wish to include tables and pictures in your postings, I suggest that you use the features from the MOODLE online forum rather than paste the whole document from MS Word onto the forum space. We'll talk more about that on Thursday.*

No flaming messages (messages that express strong emotions, burst of anger or insulting words that can be threatening or offensive to others) were noted and there was no need for me to intervene to correct any online behaviours. For the second part of the online task, I waited for all the trainees to pose two questions to their peers before I posted my questions to each trainee teacher to avoid dictating the direction of the online discussion. In my messages containing the questions, I also provided some feedback on the quality of the ideas and arguments in the trainees' position statement rather than the quality of the language used, using a guiding tone instead of a leading tone (see extract below).

> *Hi 'Trainee D', this was an interesting piece of work where you very well supported your points with your own experiences. One of the first factors that you have mentioned is "awareness about nutrition". One would assume that students studying Food and Nutrition/Food Studies at school would be more aware about nutrition. Can you explain why it is that you were not too much aware about nutrition and healthy eating despite being a student of Food and Nut/Food Studies? Look forward to hearing from you.*

I acknowledged trainees' responses to my questions, praising those responses which significantly extended and deepened the discussion. Moreover, I asked a few additional questions to further extend and deepen the discussion.

> *Hello 'Trainee D'. Thanks for your response (smiley face emoticon). When you'll be a Home Economics teacher, how do you think you could motivate your students to eat more healthily and to develop a proper conception of healthy eating?*

Throughout the online discussion, I adopted a stance of collegiality and co-learning rather than a content expert and evaluator in order to promote learner autonomy and ownership (Haavind, 2005). When the discussion was over, I graded the postings of each trainee teacher out of 20 marks using the assessment criteria which were developed during Phase 2 and which were provided to all the trainees. As I graded the task, I jotted down the main strengths and weaknesses (see Table 15).

**Table 15: Summary of strengths and weaknesses noted for the first online discussion**

| ***Strengths*** | ***Weaknesses*** |
|---|---|
| PART A | |
| • Thoughtful and informed responses with clear reasons (in most postings).<br>• Accurate and appropriate use of course readings, online resources and personal experiences. | • Most influential factors and position statement not clearly stated in some postings.<br>• A few trainees did not clearly and adequately relate their positions and views to the course readings, online resources and personal experiences.<br>• In-text references and reference list missing in some postings.<br>• Wrongly formatted references.<br>• Conclusions do not reinforce the position statement. |
| PART B | |
| • Most questions asked were appropriately formulated to extend and deepen the discussion.<br>• When questions were not clear, clarifications or rewording was requested.<br>• Presence of social cues in online postings such as greeting, praise and acknowledgement. | • Lack of depth of some responses; responses treated the subject matter superficially.<br>• Responses did not always adequately address the questions asked.<br>• No acknowledgement of replies to questions asked to peers.<br>• Waiting close to deadline to post questions and replies to questions.<br>• Irregular/infrequent checking of online postings.<br>• In-text references and reference list missing in some postings. |

The strengths and weaknesses were communicated to all the trainee teachers during a face to face session. During this face to face session, I also provided a copy of the assessment rubric (see Appendix 7) with individual feedback to each of

the trainee teachers. The use of an assessment rubric ensured consistency and fairness in assessing the postings of the trainee teachers. The different strategies that were used for the first online discussion to address each of the design principles are summarised in Table 16.

**Table 16: Strategies to address the first set of principles**

| **Principles** | **Strategies** |
|---|---|
| 1. Establish a climate of trust and a safe learning environment. | • Two 3-hour face to face orientation sessions with all the trainee teachers at the beginning of the semester to:<br>  ○ Communicate course expectations and the goals and purposes of online discussion.<br>  ○ Familiarise trainee teachers with the online learning environment through hands-on tasks (two group tasks and one individual task).<br>  ○ Develop collaboratively ground rules and guidelines for effective use of the online discussion forums.<br>  ○ Discuss the tutor's roles in the online discussion.<br>• Use of private means of communication (email, SMS, telephone)<br>• Provision of timely assistance to trainee teachers for technical problem.<br>• Acknowledgement of responses of trainees' responses to tutor's questions.<br>• Praising trainee's responses to tutor's questions when the posting made a significant contribution to extend and/or deepen the discussion.<br>• Use of an assessment rubric to ensure consistency and fairness in the grading of trainees' online postings.<br>• Communicating to trainee at the end of the discussion period the general strengths and weaknesses of the online task. |
| 2. Use authentic activities. | • Consultation and negotiation with trainee teachers for the choice of topic for the discussion through a brainstorming session at the beginning of the course.<br>• Developing guidelines for the discussion that require trainee teachers to support their ideas in their postings with their real-life experiences. |
| 3. Promote online interaction and collaboration. | • Selection of a discussion topic that was not going to be discussed in face to face sessions.<br>• Use of the Socratic questioning technique by trainee teachers after their first online posting (position statement) to ask at least two questions to their peers in order to deepen and extend the discussion.<br>• Inclusion of guidelines to encourage trainees to respond to questions from peers and the tutor. |

| | |
|---|---|
| | • No criterion to assess the quality of the language.<br>• Provision of feedback that lay emphasis on the quality of the ideas and arguments rather than on the quality of the language used. |
| 4. Provide appropriate coaching and scaffolding. | • Indication of approximate word length for the first online posting (position statement) to deter trainee teachers from adding postings that are too long and not reader-friendly.<br>• Provision of exemplars of position statements, questions and responses from a previous online discussion with another group of trainee teachers.<br>• Use of Chan's TLCQ to determine the trainee teachers' conceptions about teaching and learning.<br>• Guidance to trainee teachers on how to write an appropriate position statement during the orientation.<br>• Guidance to trainee teachers on how to use the Socratic questioning technique; established list of questions that probe for clarification, assumptions, reasons and evidence, viewpoints or perspectives, and implications and consequences given to trainee teachers.<br>• Dividing the online discussion into different sections and provision of guidelines for each section.<br>• Daily monitoring of online discussion by the tutor.<br>• Posting of feedback (by tutor) on the position statement of all trainee teachers.<br>• Jotting down the main strengths and weaknesses for each trainee teacher.<br>• Provision of a copy of the assessment rubric with individual feedback to all trainees at the end of the discussion. |
| 5. Promote critical thinking | • Provision of an adjustment period of two weeks after orientation session to allow trainee teachers to familiarise themselves with the online learning environment.<br>• Use of an open-ended statement to start the discussion.<br>• Provision of two weeks for trainee teachers to extract meaning from the learning materials, make connections with and reflect on the key ideas and real-life experiences before articulation of the position statement.<br>• Provision of three weeks to allow trainee teachers to read and reflect on their peers' initial postings. |
| 6. Allow exploration of multiple perspectives. | • Use of an open-ended statement to start the discussion and opportunities provided to trainee teachers to share their views online with their peers.<br>• Use of Socratic questioning techniques to generate questions that probe for assumptions and viewpoints. |
| 7. Promote learner autonomy and | • Trainee teachers encouraged to ground or situate their comments in specific experiences rather than rely on |

| | |
|---|---|
| ownership. | their tutor as the main source of information.<br>• Freedom given to trainee teachers to look for relevant print-based and online learning materials other than the three learning materials provided by the tutor.<br>• Minimal posting from the tutor at the beginning of the discussion, except in case of flaming messages or technical problems.<br>• Posting of questions by tutor after all trainee teachers had posted at least two questions.<br>• Adoption of a stance of collegiality and co-learning rather than a content expert or evaluator. |
| 8. Provide meaningful assessment. | • Consideration given to the learning outcomes of the *Independent Study* course in the design of the online discussion.<br>• Development of assessment criteria for the two main parts of the discussion to guide trainee teachers towards deep learning.<br>• Communicating pre-defined assessment criteria to all trainee teachers at the beginning of the discussion.<br>• Use of pre-defined assessment criteria to grade trainee's postings at the end of the discussion. |

The next section focuses on the quantitative and qualitative analysis of the online postings.

## *5.2 Analysis of online postings*

Online postings, in the first instance, were analysed quantitatively for the participative dimension by looking at the:

- Total number of messages (overall participation).
- Total number of messages per trainee teacher (individual participation).
- Breakdown of trainees' and tutor's messages to determine the relative importance of the instructor and student in the learning process.

Henri (1992, p. 124) states that "quantitative data can be useful in content analysis if it is not the only factor considered and if it is analysed in conjunction with data from the analysis of the other dimensions as we have defined them". Thus, in this study, online postings were also analysed for the interactive and social dimensions, and the level of information processing (see summary of results in Table 17).

**Table 17: Analysis of online postings for depth of information processing, interactive dimension and social dimension**

| *Participant* | *Number of Postings* | | | | |
|---|---|---|---|---|---|
| | ***Deep processing*** | ***Surface processing*** | ***Questions to extend discussion**** | ***Socially-oriented statements*** | ***Total*** |
| ***Trainee A*** | 5 | 1 | 2 | 0 | 8 |
| ***Trainee B*** | 3 | 1 | 2 | 0 | 6 |
| ***Trainee C*** | 4 | 0 | 3 | 2 | 9 |
| ***Trainee D*** | 5 | 1 | 2 | 1 | 9 |
| ***Trainee E*** | 3 | 1 | 2 | 1 | 7 |
| ***Trainee F*** | 3 | 1 | 2 | 0 | 6 |
| ***Trainee G*** | 4 | 1 | 2 | 0 | 7 |
| ***Trainee H*** | 5 | 1 | 2 | 1 | 9 |
| ***Trainee I*** | 4 | 0 | 2 | 1 | 7 |
| ***Trainee J*** | 4 | 0 | 2 | 0 | 6 |
| ***Trainee K*** | 3 | 0 | 3 | 2 | 8 |
| ***Tutor*** | 0 | 1 | 13 | 5 | 19 |
| ***Total*** | 43 | 8 | 37 | 13 | 101 |

*Refers to the postings that were analysed under the interactive dimension

Analysis of the interactive dimension focused on postings which contained questions connected to other postings in an attempt to move the discussion forward. The questions asked were classified based on the categories listed in Table 14, that is, questions that probe for clarification, assumptions, reasons and evidence, viewpoints or perspectives, and implications and consequences. On the social dimension, the online postings were analysed for social cues that are likely indicators of the degree of social interaction and social cohesion within the group. A posting was classified as a socially-oriented posting if it contained social cues and statements not related to the formal content of the discussion.

From

Table 17, it can be seen that the first online discussion generated 101 postings, mostly from the trainee teachers - 82 (81.2%) from the trainees and 19 (18.8%) from the course tutor. The number of postings from each trainee did not show much variation. Trainees C, D and H posted the highest number of messages, with 9 messages each. Trainees B, F and J had the lowest number of postings, with 6 postings each. The average number of postings per trainee was 7.5.

The researcher had also noted some pertinent points in relation to the patterns of online participation and interaction in her reflective log. Most of the trainee teachers posted their questions and responses to their peers' questions close to or on the due dates for the different sections of the online task. Although they were told during the orientation session that they should be checking the online forum at least once every two days, this was not the case. They checked and participated actively in the online discussion forum close to the due date for asking questions and the due date for replying to the questions asked by their peers and their tutor. The follow-up postings (after the position statement as the initial posting) were not evenly distributed during the three-week discussion period. Rather they were concentrated close to or on the due dates.

### 5.2.1 Depth of online postings

Online postings were analysed for deep or surface level of information processing using the indicators in Table 4 in Chapter 3, as defined by Entwistle and Waterston (1988, as cited in Henri, 1992). Each indicator was given a code (see Appendix 8). The entire message was the unit of analysis. For lengthy postings containing indicators of both surface and deep information processing, the researcher chose the information processing level which was most consistent with the entire posting (Meyer, 2004). The researcher started with the analysis of the position statement of each trainee teacher since the online task required all the trainee teachers in the first instance to post their position statement prior to asking questions and responding to peers' and the tutor's questions.

Analysis of the position statements of all the trainees showed that nine of the postings reflected a deep level of information processing. The position statements of trainees B and F (see Appendix 9), on the other hand, reflected mainly surface

level of information processing. The position statement of Trainee B contained a few indicators of deep level of information processing such as offering new elements of information and providing supporting examples. However, on the whole her position statement was more consistent with surface level of information processing since it largely contained statements of judgement without proper justification. The position statement of Trainee F (see below) included a few supporting examples, but mainly contained indicators of a surface level of information processing, for example, making judgements without offering justification, and perceiving the situation in a fragmentary or short-term manner.

***Position statement of Trainee F***

*Adolescence is the transitional period between childhood and adulthood, and occurring roughly between the age of 10 and 20. It is a period of rapid growth and body development, and the nutrient requirements increase at this stage. Therefore a healthy eating habit among adolescent play a key role in their mental and physical development, and it promote growth and reduce many risks associated with both immediate and long-term health problem.*

*The eating patterns and behaviors of adolescents are influenced by many factors, including peer influences, parental modeling, food availability, food preferences, cost of foods, personal and cultural beliefs, mass media and body image.*

***Peer influences**, when I was an adolescent, during the lunch time I have a tendency not eat my bread that I prepare at home but instead I will buy the same type of food like my friend.*

***Parental Modeling:** At home, my parent was encouraging me to have a proper eating habit as my grandparent s were diabetic, for dinner I was forced to eat vegetables and legumes, and avoid fatty food and decrease the amount of oil in food preparation. Although my mother were encouraging me to eat fruits every day I bring a fruit and then return it back home and I did not find the time to eat the fruit.*

***Food availability:** This also play an important role in the food choice, in Mauritius when there is bad weather, the price of vegetables at the market will increase, or even some vegetables are not available at all. At home in those types of situation we eat mainly pulses and convenience foods and there is restriction of fruits and vegetables.*

***Food Preferences:** when I was an adolescent, I preferred to consume Fast food like Pizza, and hamburgers, it was mainly because of their taste. And also at home some vegetable I refused to eat such as bitter gourd and eggplant and this was because of their appearance and taste.*

***Cost:** when I was an adolescents the cost I food did not really affect me, I got sufficient amount of pocket money to buy whatever I want to eat.*

***Personal and Cultural belief:** In my religious there is no restriction of certain food so I can consume all types of foods, but during the 40 days of lent, especially on Friday where I had to eat only vegetarians foods, it was very difficult for me, and on that day I preferred not to eat at all.*

***Mass media:** The media play an important role, they easily influence people on some products, sometimes when KFC or Pizza Hut makes advertisement, and I was*

*easily tempted. I wanted to try its new products. And media encourage people to consume a lot of fast foods.*
***Body Image:*** *When I was an adolescent, I'm consider myself as underweight , and to have some weight I have a tendency to eat more fast food, carbohydrate food and less fruits and vegetable. But when I was in form 6 then I realize that I was fault.*
*To conclude, I can say that adolescent s are easily influenced by what they see and heard, they should have a proper education about the proper eating habits, as the adolescents will become an adult and they should be able to inculcate the good eating habits to their children and also this will decrease many risk factors related to foods.*

The nine position statements which reflected a deep level of information processing mainly contained indicators such as linking facts and ideas in order to interpret, infer or judge, offering new elements of information, and providing proof or supporting examples (see Appendix 10). The position statements of trainees A and G included solutions without clear justification.

> ***Trainee A****: …To conclude, I would say children should be encouraged to eat healthily from very early age so that they follow the same lifestyle when they grow up. Parents should be well aware of what is healthy and what is not. Unhealthy food, such as pastries, fried food can be consumed once in a while but not daily. Healthy food should be available at reasonable prices in the school canteen.*

> ***Trainee G****: … What Can Be Done To Improve Eating Habits?*
> - Ø *Don't let TV ads influence your good judgment*
> - Ø *Commit to choosing healthier foods (less fat, sugar and salt)*

> *Keep a bowl of fresh fruit on the counter, such as apples, bananas, pears, or grapes and choose one of them when you need a snack…*

The second part of the online task required trainee teachers to respond to the questions asked by their peers and their tutor. There were 39 follow-up postings from the trainee teachers in response to the questions asked, 34 (87.1 %) of which reflected deep level of information processing while the remaining five reflected surface level of information processing. The follow-up postings which reflected deep level of information processing mainly contained indicators such as linking facts and ideas in order to interpret, infer or judge, offering new elements of information, providing proof or supporting examples, and perceiving the problem within a larger perspective (see Table 18). A few deep level follow-up postings also contained solutions with justification, advantages and disadvantages of a situation or solution, and intervention strategies within a wider framework (see

Table 18). The extracts in Table 18 include the exact wordings used by the trainee teachers with no amendments to grammatical or typing errors.

**Table 18: Extracts from trainees' follow-up postings for the first online discussion illustrating indicators of a deep level of information processing**

| ***Indicators of a deep level of information processing*** | ***Trainees' postings*** |
|---|---|
| **Linking facts and ideas in order to interpret** | ***Trainee D*****:** *... I explain to the students about the quantity and types of foods that they must consume according to their age group, weight and height. This will definitely help them to develop a good conception of healthy eating.* |
| **Offering new elements of information/ Providing proof or supporting examples** | ***Trainee D*****:** *To attain this goal, in my classes of Food and Nutrition specially while teaching the chapter concerning Healthy eating, I will use realias as teaching aids (different types of balanced packed meals, breakfast, healthy snacks). I will also bring books illustrated with graphs and pictures of different types of balance meals...* |
| **Proposing solutions with justifications** | **Trainee B:** *... some ways to make adolescents aware of the dietary guideline could be:*<br>*• At home parents should inculcate good eating habits to their children. Parents should be the first ones to be aware of the dietary guidelines and healthy eating so that their children would also adopt these good eating habits...* |
| **Setting some advantages and disadvantages of a situation or solution** | ***Trainee E****: Let us look at both sides of the coin, to determine whether nutrient-dense foods are more expensive than low-nutrient dense foods. In my report I referred to nutrient-dense foods as being more expensive only in the school context, ... However, nutrient-dense foods may not always be more expensive than low-nutrient foods...*<br>*As conclusion, I would say that choosing nutrient-dense foods like fresh lean meats, low-fat dairy and fresh bakery goods may be more expensive than the energy-dense packaged foods, but we are buying, more nutrition for that price and we may consider it as a long term health investment...* |
| **Perceiving the problem within a larger perspective** | ***Trainee D***: *I will also try to persuade the school administration to organize campaigns on healthy eating where doctors and nutritionist could be invited to talk to students about the importance of eating healthily...* |
| **Developing intervention strategies within a wider framework** | ***Trainee B*****:** *At school level, in primary and secondary schools, teachers should educate their students about the dietary guidelines. The Ministry of Health should organize campaigns in schools to make students aware of the dietary guidelines and the different risk factors associated with bad eating habits. These ways would affect the eating habits of adolescents in the way that by being much more aware of the dietary guidelines and the risk factors associated with unhealthy eating they would consume healthy foods in order to stay healthy.* |

Surface level follow-up postings from trainee teachers included judgments without proper justification, repetition of what had already been said in the original posting without adding any new elements, simply stating that one shares the ideas or opinions stated without expanding on these or adding any personal comments, and reformulation of initial question asked to peers.

***Trainee B*** : *… Yes, we can generalize the fact that there are some habits that are changed from time to time but however, each person differs from each other and they have their own point of view about something. Taking an example of myself, there were many foods that I was very fond of eating when I was a child but now this has changed because now I am much more conscious about my health and these habits have changed when I have become an adult.*

***Trainee C*** *: … thanks for this excellent explanation. Now. I do understand how doped bananas are quite unhealthy.*

***Trainee D*** *: ... Thanks for your interesting response. It's good that you've quit such eating pattern otherwise you might have become a victim of the diseases you've mentioned.*

***Trainee H*** *: ... in order to have the will to eat healthily, one should be health conscious. For example if someone is not health concious, he/she won't know about the cause and effects of certain foods in the body. Hence, the latter won't have the will to eat healthily. On the other hand, if someone is health conscious, he/she will know about the chronic diseases related to bad eating habits, therefore will not be tempted to eat unhealthy foods which might cause several problems later on.*

The only surface level posting from the course tutor contained information to address the technical problem that Trainee K faced at the start of the discussion.

### 5.2.2 Interactive dimension of online postings

The interactive dimension focused on the tutor's and trainees' postings which contained questions connected to other postings in an attempt to extend and deepen the discussion, and at the same time promote online interaction and collaboration. One of the task requirements was that each trainee teacher had to ask at least two questions that would extend and deepen the discussion after posting their position statement. Thus, the trainee teachers and the tutor used the Socratic approach to ask questions after trainees had posted their position statements online.

Most of the trainee teachers limited themselves to two questions, except trainees C and K who had each asked three questions. Out of the 24 questions from the

trainee teachers, nine of the questions probed for clarification, eight questions probed for implications and consequences, four questions probed for viewpoints and perspectives, two questions probed for assumptions and only one question probed for reasons and evidence (see Table 19 for sample questions).

**Table 19: Sample of trainees' and tutor's questions based on the Socratic Approach**

| ***Questions that Probed for:*** | ***Examples of Questions from Trainees*** | ***Examples of Questions from Tutor*** |
|---|---|---|
| Clarification | • *Can you explain that further by giving some of the risk factors that are related to the consumption of certain foods?*<br>• *Can you give some examples how a parent can be a positive role model in this situation?*<br>• *Could you further explain the ecological factor please? How is it related to the consumption of foods that are in season?* | • *Can you explain why is it that you were not too much aware about nutrition and healthy eating despite being a student of Food and Nutrition/Food Studies?*<br>• *Can you give me specific examples to illustrate how certain food ads influenced your eating habits?* |
| Assumptions | • *When you say that "These habits are formed and change over a person's lifetime", can we generalize and say that this applies to every individual?*<br>• *By saying that "…", you seem to be assuming that unhealthy food is quite expensive. Do I understand you correctly?* | • *It seems that body image was a very important factor in your case. Is that correct or are there other factors that triggered you to change your eating habits during late adolescence?*<br>• *When you say that "…", are you assuming that healthy foods are NOT tasty?* |
| Reasons and Evidence | • *Who or what led you to believe that "banana is not easily digested"?* | • *Do you think this is a valid reason? Could there be other reasons to explain this change?*<br>• *Do you have any evidence in the local context about "…"?* |
| Viewpoints or Perspectives | • *But according to you, now you know about healthy eating, will you continue to eat such type of foods?*<br>• *Therefore as a future Home Economics teacher, how would you help your students to maintain healthy eating habits?*<br>• *Do you really think that by simply being health conscious adolescents will change their eating habits or do they also need the will to do it?* | • *When you'll be a Home Economics teacher, how do you think you could motivate your students to eat more healthily and develop a proper conception of healthy eating?* |
| Implications and Consequences | • *So can you please tell me what effects would that have in your friend's life later?*<br>• *How can the consumption of these foods be beneficial or harmful to you?* | • *When you say that "…", are you implying that nutrient-dense foods are expensive?* |

The tutor asked 13 questions, seven that probed for clarification, three that probed for assumptions, two that probed for implications and consequences and one that probed for reasons and evidence. I also analysed the postings to see if the trainee teachers responded more to the tutor's questions than to their peers' questions. This can reveal something about the vision of learning entertained by the trainee teachers and what they perceived the tutor's role to be. As pointed out by Henri (1992), if students place more value on a tutor's messages, learning is more likely to occur when the tutor is highly involved in the online discussion. In this study, it was noted that the trainee teachers responded to all the questions asked by their peers and the tutor.

### 5.2.3 Social dimension of online postings

Although the social dimension of the online postings was not a major focus of this study, it is an aspect that cannot be neglected. According to Henri (1992), socially-oriented statements are an important aspect of computer-mediated communication since they can support the learning process, and they can also serve as an indicator of social cohesion within a group. Garrison and Cleveland-Innes (2005) have found that the presence in online postings of positive socio-emotional elements such as praise, giving help, raising other's status, and greetings creates a non-threatening learning environment that provides the foundation for deep and meaningful learning.

Content analysis of the online messages showed that the tutor posted 5 messages which contained social cues and statements not related to the formal content of the discussion. These messages contained emoticons and socially-oriented statements only such as praise, giving help, and acknowledgments of trainees' postings. The trainee teachers had posted 8 such messages in response to their peers' postings and responses. Below are extracts of some of the socially-oriented messages from the tutor and the trainee teachers.

> ***Trainee*** C: *Hello 'Trainee I' yes don't you worry I have understood. Whatever you have mentioned above is clear. Thank you.*

***Trainee D***: *Hello'Trainee A', thanks for your interesting response. Thank God you've stop that drastic diet, otherwise the consequences would have been really bad.*

***Trainee E:*** *Hello 'Trainee B', thanks for answering my question and sharing with us the various ways in which students can be sensitized about the dietary guidelines.*

***Trainee H***: *Hello 'Trainee E', thanks a lot for this excellent explanation. You have clearly pointed out the ideas that will help to sensitise adolescents to adopt healthy eating habits*.

***Trainee K***: *Hello 'Trainee H', thanks for your answer. It was clear and you proposed good solutions for the question asked.*

***Trainee K***: *Hi 'Trainee J', thank you for your answer and just wanted to tell you that you're beautiful as you are today and you're slim also. So don't worry and hope that your wish will realize one day, that is being a fashion designer*.

***Tutor***: *Hi 'Trainee G', thanks for your clear, thoughtful and well illustrated response*.

***Tutor***: *Hi 'Trainee H' thanks for your response*.

***Tutor***: *Hi 'Trainee I', thanks for providing a clear and concise response. If I understood you right, your consumption of junk foods was influenced by….*

***Tutor***: *Hi 'Trainee J', thanks for your response. I'm glad to see that you are now more sensible and reasonable in the selection of foods that you include in your diet. If ever as a Home Economics teacher you come across students who are obsessed about thinness and dieting, do make it a point to help them.*

It is worth noting that some of the peers' and tutor's postings which contained questions to extend the discussion also contained emoticons and certain socially-oriented statements such as praise and acknowledgements. Given that the focus of these messages was more on the types of question asked using the Socratic approach, these messages were classified under the interactive dimension rather than the social dimension for the sake of analysis. Some examples of these messages are given below.

***Trainee G***: *Hello 'Trainee C' sorry for the lateness. It was a good piece of work, showing pertinent factors influencing eating habits. It is good that you have related each of the factors to your own experience. You mentioned that ……. What are the measures that can be taken to minimize these influences?*

**Tutor**: *Hi 'Trainee C', this was an interesting piece of work where you clearly supported your ideas with your own experience. When you say that ……, are your assuming ….?*

**Tutor**: *Hi 'Trainee G', well done for this good piece of work, even if the pictures are missing. You have mentioned in your conclusion that food advertisement……. Could you give me specific examples ……..?*

**Tutor**: *Hi 'Trainee J' I enjoyed reading your posting and I think what you've experienced is also very true of many other adolescent girls nowadays. Could you please tell us ……?*

Content analysis of online postings was supplemented with data from a questionnaire administered to all the trainee teachers one week after they had finished participating in the first online discussion. Findings from the questionnaire are presented in the next section.

## *5.3 Phase 3 student questionnaire*

The questionnaire (see Appendix 2) that was administered to all the students after the implementation of the first online discussion consisted of two parts. The first part gathered information about the trainees' perceptions of the online discussion task while the second part included the twenty items from the revised two-factor version of Biggs' Study Process Questionnaire (R-SPQ-2F) (Biggs et al., 2001) to determine whether trainees adopted a deep or surface approach to learning to complete the online task. Sections 5.3.1 and 5.3.2 provide direct interpretations of the responses from the two parts of the questionnaire. The implications of these findings are discussed in Section 5.4.

### 5.3.1 Perceptions of the first online discussion

All the trainee teachers responded to the 42 five-point Likert scale items included in the first part of the questionnaire.

Table 20 shows the responses for items that relate to the first design principle, that is, the need to establish a climate of trust and a safe learning environment.

**Table 20: Trainee's responses related to design principle 'Establish a climate of trust and a safe learning environment' (n = 11)**

| *Items* | *Unsure* | *Agree* | *Strongly Agree* |
|---|---|---|---|
| The goals and purpose of the online discussion were clearly communicated. | 0 | 0 | 11 |
| The online discussion environment was easy to use. | 0 | 2 | 9 |
| I tried my best to observe the ground rules and guidelines for effective online discussion. | 1 | 4 | 6 |
| The tutor's comments and suggestions were helpful. | 0 | 1 | 10 |
| I felt comfortable to add my postings online. | 1 | 4 | 6 |
| My postings and responses were treated respectfully by my peers. | 0 | 2 | 9 |
| The guidelines provided for the online discussion task facilitated my participation. | 0 | 4 | 7 |

Results show that the goals and purpose of the online discussion were clearly communicated to all the trainee teachers. They all felt that the online discussion environment was easy to use, the guidelines provided for the online discussion task facilitated their participation, and the tutor's comments and suggestions were useful. Moreover, they all felt that their postings were treated respectfully by their peers. Most of them (n = 10) tried their best to observe the ground rules and guidelines for effective online discussion and they felt comfortable to add their postings online. Only Trainee H was not sure whether she had observed the ground rules and guidelines, and Trainee F was not sure whether she felt comfortable to add her postings online.

According to the second design principle, the online task must have real-world relevance in order to facilitate deep learning. The results show that all the trainee teachers felt that the online discussion task focused on an issue that is of relevance to them as a prospective Home Economics teacher. They either agreed (n = 4) or strongly agreed (n = 6) that what they had learnt from the online task would be important for their career as a Home Economics teacher. Only Trainee A was

unsure about whether what she had learnt would be important for her career as a Home Economics teacher.

Table 21 presents the findings on items related to the third design principle, that is, the need to design online discussions that promote online interaction and collaboration.

**Table 21: Trainees' perceptions related to design principle 'Promote online interaction and collaboration' (n = 11)**

| | ***Strongly Disagree*** | ***Disagree*** | ***Unsure*** | ***Agree*** | ***Strongly Agree*** |
|---|---|---|---|---|---|
| I laid more emphasis on the quality of my ideas and arguments than on the quality of the language used. | 0 | 0 | 4 | 6 | 1 |
| I felt comfortable explaining my ideas to others. | 0 | 0 | 1 | 7 | 3 |
| I felt at ease to ask my peers to explain their ideas, assumptions, viewpoints or implications of ideas. | 0 | 0 | 0 | 10 | 1 |
| My peers' questions encouraged me to participate more actively in the online discussion. | 0 | 0 | 0 | 4 | 7 |
| When asking questions to my peers, I preferred to ask questions to those peers I get along with better. | 3 | 3 | 0 | 3 | 2 |
| I used the dictionary several times when composing my postings. | 1 | 7 | 2 | 1 | 0 |
| I used the dictionary several times when reading my peers' postings. | 3 | 7 | 1 | 0 | 0 |
| I would have preferred to discuss the issue selected for this task face to face. | 1 | 6 | 3 | 1 | 0 |
| I would prefer to work in pairs or in small groups for future online discussions. | 4 | 3 | 1 | 3 | 0 |

All the trainees felt at ease to ask their peers to explain their ideas, assumptions, viewpoints or implications of ideas. They also agreed that the questions from their peers encouraged them to participate more actively in the online discussion. Most of them, except Trainee A, felt comfortable to explain their ideas to others. It is

worth pointing out that from earlier analysis during Phase 2 of the study, Trainee A reported having never participated in an online discussion before and she was not sure whether she was keen to participate in online discussions in her teacher education courses. Five of the trainees (A, C, D, F and I) reported that they preferred to ask questions to those peers they get along with better while for the other six trainees their rapport with the peers was not an important factor. Three trainees (A, F and K) reported that they would prefer to work in pairs or in small groups for future online discussions and only one trainee (Trainee C) would have preferred to discuss the issue selected for the online task face to face.

The dictionary was hardly used by the trainee teachers to compose their online postings or to read their peers' postings. Only Trainee F reported using the dictionary several times when she was composing her postings. During Phase 2, Trainee F had mentioned that she was not sure whether she felt more comfortable to express herself in English in writing rather than orally.

Responses to the questionnaire items related to the fourth principle on the need to provide coaching and scaffolding are presented in Table 22.

**Table 22: Trainees' perceptions related to design principle 'Provide appropriate coaching and scaffolding' (n = 11)**

| | ***Strongly Disagree*** | ***Disagree*** | ***Unsure*** | ***Agree*** | ***Strongly Agree*** |
|---|---|---|---|---|---|
| The tutor asked questions that stimulated my thinking. | 0 | 0 | 0 | 3 | 8 |
| I felt more comfortable to question my peers than my tutor. | 0 | 4 | 2 | 4 | 1 |
| I would have preferred that my tutor asked questions rather than my peers. | 0 | 8 | 3 | 0 | 0 |
| I felt it was more important to respond to the tutor's questions than my peers' questions. | 2 | 9 | 0 | 0 | 0 |

All the trainees reported that the tutor asked questions that stimulated their thinking. Eight of the trainees would have preferred that the peers asked questions rather than their tutor while the remaining three trainees were unsure about that aspect. None of the trainees felt that it was more important to respond to the

tutor's questions rather than the questions from their peers. Five trainees (A, E, F, H, I) reported that they felt more at ease to question their peers rather than their tutor, while four (Trainees B, C, G, K) felt more at ease to question their tutor.

Responses to the questionnaire items related to the fifth principle on the need to promote critical thinking among trainee teachers are presented in Table 23.
All the trainees agreed that they improved their questioning skills and their ability to critically analyse information and reflect through participation in the online discussion. Eight of them felt that participation in the online discussion also required them to engage in higher order thinking rather than just state facts. Trainees C, J and K were unsure about this aspect. They all agreed that they were given enough time to complete the online task. At the time the trainees were required to participate in the online discussion, nine of them reported that they did not have a heavy workload for the other courses/modules they were enrolled in while only Trainee A thought she had a heavy workload. No one felt that composing the messages for the online discussion was time consuming. Reading peers' postings, however, was considered time consuming by Trainees A, E and H.

**Table 23: Trainees' perceptions related to the design principle 'Promote critical thinking' (n = 11)**

| | ***Strongly Disagree*** | ***Disagree*** | ***Unsure*** | ***Agree*** | ***Strongly Agree*** |
|---|---|---|---|---|---|
| Participation in the online discussion improved my questioning skills. | 0 | 0 | 0 | 8 | 3 |
| Participation in the online discussion improved my ability to critically analyse information and reflect upon assumptions. | 0 | 0 | 0 | 7 | 4 |
| I was given adequate time to complete the online task. | 0 | 0 | 0 | 4 | 7 |
| At the time I had to participate in the online discussion, my workload for the other modules was heavy. | 2 | 7 | 1 | 1 | 0 |
| Participation in the online discussion required me to | 0 | 0 | 3 | 5 | 3 |

| | | | | | |
|---|---|---|---|---|---|
| engage in higher order thinking (analysis, synthesis, evaluation) rather than just state facts. | | | | | |
| Composing messages for the online discussions was too time-consuming. | 0 | 8 | 3 | 0 | 0 |
| Reading peers' postings was too time-consuming. | 0 | 6 | 2 | 2 | 1 |

Responses to the questionnaire items related to the sixth principle on the need to provide opportunities for exploration of multiple perspectives are presented in Table 24. All the trainee teachers agreed that reading their peers' postings allowed them to see things from various perspectives and the online discussion created a "space" to allow for diversity of views and perspectives to be heard and appreciated. Most of them, except Trainee J, felt that the online discussion allowed comparison of ideas. Only 5 trainees agreed that reading their peers' postings helped them to change their own perspectives while one trainee disagreed and the remaining five were unsure.

**Table 24: Trainees' perceptions related to the design principle 'Allow exploration of multiple perspectives' (n = 11)**

| | ***Strongly Disagree*** | ***Disagree*** | ***Unsure*** | ***Agree*** | ***Strongly Agree*** |
|---|---|---|---|---|---|
| The online discussion allowed comparison of ideas. | 0 | 0 | 1 | 6 | 4 |
| Reading my peers' postings allowed me to see things from various perspectives. | 0 | 0 | 0 | 6 | 5 |
| Reading my peers' postings helped me to change my own perspectives. | 0 | 1 | 5 | 3 | 2 |
| The online discussion forum created a "space" to allow for diversity of views and perspectives to be heard and appreciated. | 0 | 0 | 0 | 2 | 9 |

Responses to the questionnaire items related to the seventh principle on the need to promote learner autonomy and ownership among trainee teachers are presented in

Table 25. All the trainees reported that they enjoyed the freedom of choosing relevant materials for the online discussion task and that participation in the online discussion encouraged them to take responsibility for their own learning. Only Trainees A, B and J stated that they relied on the tutor's readings as the main source of information to complete the online task and another three trainees (E, F and I) preferred assessment tasks in which they are expected to look for new materials and ideas on their own.

**Table 25: Trainees' perceptions related to the design principle 'Promote learner autonomy and ownership' (n = 11)**

| | ***Strongly Disagree*** | ***Disagree*** | ***Unsure*** | ***Agree*** | ***Strongly Agree*** |
|---|---|---|---|---|---|
| I enjoyed the freedom of choosing relevant materials for the online discussion task. | 0 | 0 | 0 | 1 | 10 |
| I relied on the tutor's readings as the main source of information. | 1 | 5 | 2 | 1 | 2 |
| Participation in the online discussion encouraged me to take responsibility for my own learning. | 0 | 0 | 0 | 8 | 3 |
| I prefer assessment tasks in which I am expected to look for new materials and ideas on my own. | 0 | 5 | 3 | 2 | 1 |

Responses to the questionnaire items related to the last principle on the need to provide meaningful assessment tasks are presented in Table 26. All trainee teachers agreed that participation in the online discussion allowed them to critically reflect on their own ideas and those of their peers and that the assessment criteria were clear. Moreover, they felt that the goals and purposes of the online discussion were in line with the objectives of the course.

**Table 26: Trainees' perceptions related to the design principle 'Provide meaningful assessment' (n = 11)**

| | ***Strongly Disagree*** | ***Disagree*** | ***Unsure*** | ***Agree*** | ***Strongly Agree*** |
|---|---|---|---|---|---|
| The weighting of 20% given for the online task was adequate. | 0 | 1 | 1 | 8 | 1 |
| Participation in the online discussion allowed me to critically reflect on my own ideas and those of my peers. | 0 | 0 | 0 | 8 | 3 |

| | | | | | |
|---|---|---|---|---|---|
| I laid more emphasis on the quality of my postings than on the number of postings or the length of my postings. | 0 | 0 | 0 | 6 | 5 |
| The assessment criteria were clear. | 0 | 0 | 0 | 2 | 9 |
| The goals and purposes of the online discussion. were in line with the objectives of the Independent Study module. | 0 | 0 | 0 | 3 | 8 |

All of the trainees reported that they had placed more emphasis on the quality of their postings than on the number of postings or the length of the postings. The weighting of 20% allocated for the online discussion task was deemed adequate by most of the trainees, except Trainee J who disagreed and Trainee G who was not quite sure.

The first part of the questionnaire also included two open-ended questions which required trainee teachers to state the things they liked best and the things they liked least about the online discussion. Table 27 lists the responses of the trainees. From the table, it can be seen that there were more positive points than negative points raised about the online discussion. The trainee teachers thought that the online discussion offered some practical advantages linked to the technological aspect such as its user-friendliness, the convenience to work at home at any time and the opportunity to submit the task online from the home PC; this saves time and money as the work does not need to be printed for submission.

Trainees reported other advantages linked to the pedagogical design considerations of the online discussion. The advantages included the ability to share ideas and opinions and to work collaboratively, increased opportunity to interact with peers, to freely express oneself and to think critically, exposure to a wide range of views and different perspectives about an issue, and the clarity of the assessment criteria. Trainees also felt that they learned more through the online task than a traditional written assignment since they could read their peers' postings and compare the different points of view. Trainee D also pointed out that reading everybody's ideas on the online discussion encouraged students to see things differently as they were exposed to different perspectives. She also liked that everyone's ideas were respected despite the fact that there might be diverging views.

**Table 27: What trainees liked and disliked most about the online discussion**

| *Trainee* | *Liked Most* | *Disliked Most* |
|---|---|---|
| A | Work can be done at home.<br>More learning takes place as we compare our postings with those of our peers. | Some may cheat and make others do their work, which is very unfair. |
| B | It allowed us to work from home.<br>It allowed me to know my friends' point of view on specific topics. | None |
| C | Sharing of ideas and opinions.<br>Developing higher order thinking skills. | Unclear questions asked; misunderstanding of questions. |
| D | There is freedom of expression; everybody's idea is shared and respected.<br>We are exposed to a wide range of perspective, thus encouraging us to see things differently. | We are not sure if the student is doing her work on her own and that's really unfair. |
| E | It is an easy, friendly and time-saving way to submit our works, express our views.<br>It stimulated higher order critical thinking.<br>It allowed the sharing of ideas and different views/opinions. | Access to the site is often unavailable. |
| F | No need to do printing of the work.<br>More communication among friends.<br>We can see different work and points of view of our friends. | If someone makes her posting the first on the due date another person can read her posting and make modification or copy her point of view before she makes her own posting. |
| G | I was able to read my peers' postings which have enriched my knowledge - this would not have been possible for written work.<br>The assessment criteria were clear.<br>I was able to express my views and opinions. | I only had problem with my internet as it is slow. |
| H | Easy communication with peers.<br>Use of advanced technologies.<br>Sharing of ideas, views and opinions. | Time consuming to read the questions and answers of all the peers. |
| I | Sharing of ideas.<br>Ability to think critically.<br>Cooperation of peers. | Sometimes our peers ask questions which we ourselves do not understand. |
| J | It is very easy if we have internet facility. It can be done at anytime, even at midnight.<br>We can share our ideas and also read other point of views. | Each time we have to check to see if we've got any question.<br>It is not so easy to connect on the online discussion - sometimes it takes too much time. |
| K | Not time-consuming.<br>Sharing of ideas with peers | Sometimes the site is not available when at home. |

Technical problems were noted among the negative aspects of the online discussion task by Trainees E, G, J and K, namely slow internet connection, inability to access the site at times, and the absence of email notifications when new postings were added. These problems were addressed during the implementation of the second online discussion. Trainees C and I also reported the formulation by their peers of unclear questions. Trainee H felt it was time consuming to read the postings and questions of all the peers. Trainees A and D expressed their concern about the authenticity of the postings. They felt that there was no guarantee that the postings reflected the original contribution of the student. Trainee F also felt that those who put up their postings first might be at a disadvantage because others could copy the ideas or make certain modifications to improve on the initial postings.

### 5.3.2 Learning approach for first online discussion

The learning approach adopted by each trainee teacher to tackle the online discussion was determined using the 20 items of the R-SPQ-2F (Biggs et al., 2001). A trainee was deemed to have adopted a deep approach if the sum of her five-point Likert responses to the 10 items that measure a deep approach to learning was higher than the sum of her responses to the 10 items that measure a surface approach. The motive and strategy scores were also calculated for deep and surface approaches for each trainee teacher. The scores of each trainee for learning approach, motive and strategy are shown in

Table 28.

The scores in

Table 28 show that all the trainee teachers adopted a deep approach to complete the online task. The mean score for deep approach for the entire group was 36.5 as compared to 17.5 for surface approach. The motive scores support the observation

that all the trainees completed the online task because they were intrinsically motivated rather than simply to avoid failure. Moreover, higher deep strategy scores for all the trainee teachers suggest that trainees used learning strategies to maximize understanding of the content rather than rote learning to reproduce factual information.

**Table 28: Trainee's scores for learning approach, motive and strategy**

| *Trainee* | *Score* | | | | | |
|---|---|---|---|---|---|---|
| | ***Deep Approach*** | ***Surface Approach*** | ***Deep Motive*** | ***Surface Motive*** | ***Deep Strategy*** | ***Surface Strategy*** |
| A | 26 | 15 | 10 | 7 | 16 | 8 |
| B | 40 | 17 | 15 | 6 | 25 | 11 |
| C | 34 | 24 | 16 | 11 | 18 | 13 |
| D | 34 | 19 | 18 | 8 | 16 | 11 |
| E | 42 | 15 | 21 | 8 | 21 | 7 |
| F | 41 | 17 | 20 | 7 | 21 | 10 |
| G | 40 | 16 | 19 | 5 | 21 | 11 |
| H | 32 | 16 | 16 | 5 | 16 | 11 |
| I | 33 | 16 | 16 | 11 | 23 | 5 |
| J | 39 | 21 | 15 | 9 | 18 | 12 |
| K | 41 | 16 | 19 | 5 | 22 | 11 |

## *5.4 Summary of findings and implications*

The purpose of the first iteration was to determine the effectiveness of the draft design principles and guidelines and to identify issues and problems related to the design and implementation of the online discussion using data from different sources (online transcripts, questionnaire, reflective log). Analysis of the online transcripts revealed that the trainee teachers participated actively in the discussion forum. They posted the majority of messages (81.8 %). Content analysis of the online transcripts also revealed that most of the trainees' initial postings (position

statements) and replies to the peers' and tutor's questions reflected a deep level of information processing. This finding concurs with the finding about trainees' learning approach to complete the task; all the trainee teachers adopted a deep learning approach. Although it appears that the online discussion task facilitated deep learning among the trainee teachers, some problems and issues were noted and these need to be addressed through revision of the first set of design principles and guidelines. The next section involves analysis, comparison and integration of data from different sources to confirm, reject or modify each of the design principles and guidelines.

**Principle 1: Establish a climate of trust and a safe learning environment**

Research has shown that it is important to create and sustain a sense of safety and trust within an online learning environment (Hill et al., 2009). The orientation sessions conducted during the first two weeks of the course largely helped to prepare and motivate the trainee teachers to use the online environment by highlighting the course expectations, goals and purposes of the online discussion, the ground rules for participation in online discussions, and by familiarizing the trainees with the online learning environment. Indeed, all the trainee teachers reported that the goals and purposes of the online discussions were clearly communicated to them, and the online discussion environment was easy to use (see

Table 20).

All the trainees, except Trainee F, felt comfortable to add their postings online. Defining clear guidelines and boundaries for participation in online discussions might have helped trainee teachers to feel more at ease to express their views and opinions in the discussion forum. In this study all the trainees agreed that their postings and responses were treated respectfully by their peers, and they also appreciated the fact that they could express and share their views (see

Table 20 and Table 27). Most of them (n = 10) reported that they tried their best to observe the ground rules and guidelines for effective online discussion.

The online tasks set during the first orientation session provided opportunities for trainees to familiarise themselves with the online discussion environment. There is evidence that adult learners who are more comfortable with online technologies have lower anxiety levels associated with learning via the online learning environment, and they tend to engage more actively in online discussion forums (Hill et al., 2009). Lower anxiety levels can also contribute to promoting deep learning (Entwistle, 2000; McGee & Wickershame, 2005). In this study, anxiety levels of trainees were also reduced by providing the required assistance for technical problems encountered by trainees (Schrum, 2004). Email was used as a private means to communicate problems to the course tutor.

Social interactions were also encouraged to establish a climate of trust and a safe learning environment. About 13% (13 out of 101) of the messages contained emoticons and only socially-oriented statements such as praise, giving help, and acknowledgements. Some of the tutor's and peers' postings that contained questions to extend the discussion also contained social cues. The social dimension of learning constitutes an integral part of web-based learning environments in order to provide and maintain a friendly and interactive environment in which learners feel safe and comfortable to interact with and learn from one another (Wang, 2009).

The questionnaire administered to trainee teachers after their participation in the first online discussion revealed that four of them (Trainees E, G, J and K) experienced technical problems such as slow Internet connectivity and inability to access the site at times, and two trainees expressed their concern about the authenticity of the postings (see Table 27). Ease of access for an online learning environment is critical for participation in online activities and to facilitate learning since the learning activities and processes are heavily dependent on the support of computer networks (Wang, 2009). The technical problems were addressed in the implementation of the second online discussion by providing trainees the opportunity to use the Internet facilities in the computer labs when they were on

campus. The concern about authenticity of trainees' postings was addressed under the second design principle 'Use authentic activities' as trainees were required to make the connections between the key ideas in the readings with their real-life experiences.

Analysis of data for the first design principle supports the notion that all the guidelines were appropriate. However, it was felt that the design principle should not only focus on establishing a trustworthy and safe learning environment, but it should also make provision for maintaining this environment throughout the duration of the course. Trainee teachers need to be prepared and motivated first to create a safe and trustworthy climate, and then encouraged to maintain such a climate. Thus, the design principle was reformulated as follows:

- *Principle 1*: Prepare and motivate learners to use the online learning environment.
- *Principle 2*: Maintain a climate of trust and a safe learning environment.

**Principle 2: Use authentic activities**

There is evidence that the nature of the discussion topics can greatly influence the depth of online discussions and knowledge construction. The topics selected for online discussions must be meaningful and relevant to students (Teo & Webster, 2008; Wang, Woo & Zhao, 2009; Yip, 2008). Thus, the use of authentic activities is appropriate since they involve exercises that have real-world relevance to students (Garrison & Cleveland-Innes, 2005; Lew, 2005; Richards & Schofield, 2005).

In the present study, the topic selected for the online discussion was negotiated with the trainee teachers during the first orientation session to ensure that it would be meaningful and relevant to the trainees. Data from the questionnaire showed that the trainees felt that the online discussion task focused on an issue that was meaningful and of relevance to them as prospective Home Economics teachers. Trainees were required to support their ideas with their previous personal experiences. This to some extent ensured that trainees would not simply copy the ideas of their peers who had put up their postings earlier, or would get someone

else to complete the online task, concerns which were raised by a few trainees in the questionnaire.

Although the topic selected was negotiated with the students to ensure its relevance and meaningfulness, it was felt that the online discussion might not have focused on a topic that is challenging and controversial enough to elicit different opinions and allow exploration of multiple perspectives. Content analysis of the online postings showed that few postings included solutions with clear justifications or included the advantages and disadvantages of a situation or solution, indicators that reflect a deep level of information processing. Consequently, the second design principle was reformulated as follows:

- *Principle 3*: Use authentic activities that focus on problematic situations and encourage exploration of multiple perspectives.

**Principle 3: Promote online interaction and collaboration**

Online interaction is crucial to the success of an online learning environment (Chou, 2003; Garrison & Cleveland-Innes, 2005). Student-student interaction and student-tutor interaction reflect beliefs of social constructivists while student-content interaction is essential in cognitive constructivist learning environment. In order to promote optimal learning, provisions must be made for both individual interaction with content and social interaction with people (Wang et al., 2009). In this study, the first posting (position statement) of each trainee teacher involved mainly learner-content interaction while the follow-up postings involved student-student as well as student-tutor interactions. Student-student interaction and student-tutor interaction encouraged information sharing, negotiation and knowledge construction and were related to the pedagogical design of the learning environment.

There is evidence that students' level of engagement with the learning materials is influenced by their conceptions about teaching and learning (Chan et al., 2007; Chin & Brown, 2000). Students who hold constructivist conceptions are more likely to engage actively in the learning process than those who hold transmissive conceptions. In this study, the TLCQ developed by Chan (2001) was used to determine whether trainees held transmissive or constructivist conceptions. There

was no difference in the quality and quantity of the online interaction between trainees with constructivist conceptions and those with transmissive conceptions (Trainees C, E, F). The pedagogical design considerations for the online discussion may have fostered the online participation of trainee teachers despite some of them holding transmissive conceptions. Some researchers have stated that even when students hold transmissive conceptions, tutors can fine tune these conceptions by carefully designing their course to draw out the desired beliefs that support an inquiring attitude and learning by analysis and reflection (Chan & Elliott, 2004; Chan et al., 2007). Moreover, Poole (2000) has pointed out that an online discussion can provide a means for students used to teacher-centred learning environments to adopt new roles, in line with constructivist approaches.

The use of English language by non-native speakers in an online learning environment can be a barrier to online interaction since students take more time to formulate their postings (Lai et al., 2008). This problem was minimized by placing more emphasis on the quality of ideas and arguments in the online postings than the quality of the language used (Campbell, 2007; Schallert et al., 2003) and it may explain the high level of online participation of the trainee teachers in this study. Trainees were not penalized for grammatical, spelling or punctuation errors, and only Trainee F reported using the dictionary several times when composing her postings. None of them placed more emphasis on the quality of the language when formulating their postings. Ten out of the eleven trainees reported that they felt comfortable explaining their ideas online to others. Furthermore, they all felt at ease to ask their peers to explain their ideas, assumptions, viewpoints or implications of ideas. Five of them, however, reported that they preferred to ask questions to those peers they get along with better.

Trainee teachers were encouraged to use the Socratic questioning technique to create an environment where posted online messages generated questions that probed for clarification, assumptions and implications and consequences. All the trainees reported that the questions from their peers encouraged them to participate more actively in the discussion. It was noted that most of the trainee teachers, except Trainees C and K, limited themselves to two questions as stated in the online discussion guidelines. I also asked questions that probed for clarification,

viewpoints and perspectives, assumptions, and implications and consequences. Although trainees responded to all the questions, the lapse of time between when a question was asked and a response was received and the irregular online interaction pattern of the trainees were causes for concern.

I acknowledged trainees' responses to the questions, praising those responses which significantly extended and deepened the discussion. To facilitate group forming, structure and dynamics, emphasis should be laid on both the cognitive and social dimensions of interactions in an online learning environment (Hill et al., 2009). In this study, only three of the trainees reported that they would prefer to work in pairs or in small groups for future online discussions. There is evidence that assigning students to work in groups does not necessarily guarantee that there will be collaboration among group members. At times students prefer to work individually because interaction with group members is difficult (Hill et al., 2009). Collaborative learning can still take place when students work individually if student-student interaction is encouraged; students will be working 'as a group' rather than 'in a group'.

Analysis of the data related to Principle 3 supports all the guidelines developed initially. To remedy the problem of irregular online interaction, a guideline was added on the need to participate actively and at a regular pace. Moreover, given that the study was conducted among non-native English speakers and based on the findings, it was felt that there should be one principle that specifically addresses language as a potential barrier to online participation. Consequently, principle 3 was renumbered as Principle 4 and the guideline on the quality of ideas and language was reformulated as a new principle.
*Principle 4:* Promote online interaction and collaboration.
*Principle 5*: Place more emphasis on the quality of ideas than the quality of language used.

**Principle 4: Provide appropriate coaching and scaffolding**

According to social constructivism, besides promoting social interaction, importance should also be laid on scaffolding instructions in order to promote learning (Chaiklin, 2003). Scaffolding and guidance by the tutor can foster a deep

approach to learning even among students with lower cognitive ability and among the novice online learners (Chin & Brown, 2000; Roper, 2007; Teo & Webster, 2008). In this study, during the orientation session, support was provided to the trainee teachers to guide them on how to write a clearly defined position statement that includes valid reasons for positions taken and views expressed and involve reflection of course readings, online resources and personal experiences. Trainees were also given guidance on how to use the Socratic questioning technique to craft appropriate questions aimed at deepening the discussion. Exemplars of position statements, questions and responses from a previous online discussion with another group of trainee teachers were also provided. These strategies have facilitated trainee teachers to adopt a deep approach to learning for the online discussion. There is evidence that when students are provided with examples of how to reflectively interact with others in an online learning environment through discussion boards, learning is more effective (Hill et al., 2009)

Tutors need to be aware of the classroom culture and students' beliefs and practices in order to encourage their students' thinking, facilitate and manage discourse, and determine their degree of participation in online forums (Andresen, 2009; Jetton, 2003; Teo & Webster, 2008; Windschitl, 2002; Yildiz & Bichelmeyer, 2003). Students who are more used to teacher-centred learning environments and who hold transmissive conceptions about teaching and learning expect the tutors to participate actively in the online discussions (Yildiz & Bichelmeyer, 2003). On the other hand, some researchers have found that the tutor's response can end the discussion because he or she is perceived as an authority, and he or she has the final answer (Jetton, 2003; Teo & Webster, 2008). Haavind (2005) suggests that tutors refrain from intervening during the first few days of an online discussion since the tutor's intervention can interrupt the flow of discussion.

In this study, the trainee teachers held mixed conceptions about teaching and learning and they were mainly exposed to teacher-centred learning environments during their primary and secondary schooling. Hence, I participated in the discussion, but mostly after trainees had posted their position statements and questions, although I was monitoring the trainees' postings on a daily basis to

address any technical problem or flaming messages. I intervened only once at the beginning of the online discussion to address a technical problem that one of the trainees was facing. My participation in the online discussion mostly involved providing feedback to trainees and crafting appropriate questions that probed for clarification, assumptions, viewpoints and perspectives, and implications and consequences. A high level of teacher presence combined with a course design that emphasized critical thinking has been found to promote deeper and more meaningful learning among students engaged in an online course (Garrison & Cleveland-Innes, 2005)

In this study, all the trainee teachers reported that the questions that I had asked stimulated their thinking, but none of them stated that they preferred the tutor to ask questions rather than their peers. The trainees gave equal importance to the questions of their peers and those of the tutor; no one felt that it was more important to respond to the tutor's questions than the peers' questions. Analysis of the interactive dimension of the online postings showed that trainees responded to all the peers' and all the tutor's questions. However, only four trainees reported that they felt more comfortable to question their tutor than their peers, possibly because they perceive the tutor as a figure of authority and think that the tutor has the final answer as reported in other studies (Jetton, 2003; Teo & Webster, 2008). In collectivist cultures, learners tend to accommodate the tutor's point of view and the tutor is usually treated as an unchallenged authority (Parrish & Linder-VanBerschot, 2010).

Analysis of the data related to Principle 4 supports all the guidelines developed initially. However, based on the study findings of trainee teachers' conceptions about teaching and learning, it is felt that there should be one principle that specifically addresses this aspect in relation to the degree of tutor's participation online. Consequently, a new principle was formulated and Principle 4 was renumbered as Principle 7.

*Principle 6:* Be aware of learners' conceptions about teaching and learning in determining tutor's degree of participation online.

*Principle 7*: Provide appropriate coaching and scaffolding.

**Principle 5: Promote critical thinking**

Critical thinking skills, often referred to as higher order cognitive skills, involve the ability to analyse, synthesize and evaluate information, and to cite evidence in support of a conclusion (Halpern, 1998). In this study, all the trainee teachers reported that they improved their questioning skills and their ability to critically analyse information and reflect upon assumptions after having participated in the online discussion (see Table 23). The online discussion was an open-ended activity that allowed the trainees to share their impressions, questions, or reactions on factors influencing the eating habits of adolescents, while at the same time grounding or situating their comments on specific experiences or evidence. Most of them reported that participation in the online discussion required them to engage in higher order thinking (analysis, synthesis, evaluation) rather than just state facts. Moreover, the trainees stated that the opportunity to develop their higher order thinking skills and to think critically was one of the aspects they liked most about the online discussion (see Table 27).

Content analysis of trainees' online postings supported the notion that the online discussion promoted trainees' critical thinking skills. Indeed, 9 out the 11 position statements, and 34 out of 39 follow-up postings of the trainees reflected deep levels of information processing. Furthermore, analysis of Biggs' R-SPQ-2F (2001) revealed that all the trainees adopted a deep approach to learning and used deep learning strategies to tackle the online discussion (see

Table 28). Previous studies have shown that students who use a deep approach are more likely to refer to their past and daily experiences and their ideas are more interconnected, reflecting a greater degree of cognitive processing rather than piecemeal thinking (Chin & Brown, 2000). In this study, the nine position statements which reflected deep levels of information processing mainly contained indicators such as linking facts and ideas in order to interpret, infer or judge, offering new elements of information, and providing proof or supporting examples. The follow-up postings which reflected deep levels of information processing mainly contained indicators such as linking facts and ideas in order to interpret,

infer or judge, offering new elements of information, and perceiving the problem within a larger perspective. A few of them also contained solutions with justification, advantages and disadvantages of a situation or solution, and intervention strategies within a wider framework.

The use of English language by non-native speakers in an online learning environment can be a barrier to in-depth information processing since students need more time to formulate their postings and to understand the reading materials and the postings of their peers and tutor (Lai et al., 2008; Redmond & Lock, 2008). Hence, adequate time should be provided to allow students to extract meaning from the reading materials and postings, make connections and reflect (Dutt-Doner & Powers, 2000; Gunawardena, 1998; Redmond & Lock, 2008; Rosie, 2000). An adjustment period is also needed to allow students to familiarize themselves with the technological aspect of the online learning environment (Garrison & Cleveland-Innes, 2005). In this study, an adjustment period of two weeks was given. Thereafter, trainee teachers were given two additional weeks to extract meaning from the learning materials, make connections with the key ideas and their real-life experiences before formulating their position statement. Trainee teachers were then given another three weeks to read and reflect on their peers' position statements, follow-up postings and questions from their peers and tutor. All the trainee teachers felt that they were given adequate time to complete the online discussion (see Table 23). Nonetheless, three of the trainees (A, E, H) felt that reading their peers' postings was a time-consuming activity. This could be due to technical problems those trainees faced at times to access the site and their workload at the time they had to engage in the online discussion. Trainee A was the only one who reported that she had a heavy workload at the time she had to participate in the online discussion. However, her position statement and most of her follow-up postings reflected a deep level of information processing (see Table 17). This may be explained by the fact that Trainee A had good time management skills. Roper (2007) has found that when tutors allow sufficient time for participation in an online discussion, students who can manage their times effectively can adopt a deep approach to learning despite their heavy workload.

Analysis of the data related to Principle 5 supports all the guidelines developed initially and thus the principle and the guidelines were maintained for the design of the second online discussion. It was renumbered as Principle 8:
*Principle 8*: Promote critical thinking.

**Principle 6: Allow exploration of multiple perspectives**

One of the benefits of online discussion is that it allows students and the course tutor(s) to gain multiple perspectives about an issue or topic through the sharing of ideas and experiences (Dutt-Doner & Powers, 2000; Jetton, 2003; Kumar, 2008; McLoughlin, 1999; Pena-Shaff et al., 2005). Exploration of multiple perspectives, which may involve producing arguments and counter arguments through the online discussion, promotes a deeper level of learning (Moore & Marra, 2005). Students need to confront situations that challenge their own beliefs and this can result in knowledge construction and knowledge restructuring to reach a compromise between the differing perspectives (Kanuka, 2005; Teo & Webster, 2008).

In this study, all the trainee teachers agreed that the online discussion forum created a "space" to allow for diversity of views and perspectives to be heard and appreciated, and most of them (n = 10) agreed that the online discussion allowed comparison of ideas (see
Table 24). Trainees also stated that one of the things they liked best about the online discussion was the opportunity to be exposed to a range of views and perspectives about an issue (see Table 27). The discussion forum started with an open-ended statement that allowed for exploration of multiple perspectives. All the trainees felt that were able to see things from various perspectives after reading their peers' postings, but only 5 trainees reported that they changed their own perspectives after reading their peers' postings. In order to change one's perspectives about the topic under discussion, trainees should have been asked questions to challenge their own views, perspectives and assumptions. A Socratic questioning technique was used to allow for comparison of ideas and alternatives and to promote argumentation. Content analysis of the interactive dimension revealed that there were few questions that probed for viewpoints and perspectives (4 questions out of 24 from the trainees and none from the tutor) or that challenged

trainees' assumptions (2 questions out of 24 from the trainees and 3 out 13 questions from the tutor). Most of the questions probed for clarifications or implications and consequences. It is also likely that the trainee teachers did not feel at ease to disagree online and challenge the assumptions or views of their peers online because of their collectivist cultural orientation where the tendency is to agree and support the views of others (Gunawardena, 2001).

Moreover, it is felt that the online discussion might not have focused on a topic that is challenging and controversial enough to elicit different opinions (Wang, 2009). In order to improve on this principle, it was merged with principle 2 ('Use authentic activities') and it was reformulated as principle 3 'Use authentic activities that focus on problematic situations and encourage exploration of multiple perspectives'. Tutors, thus, need to select topics that are of real-world relevance to students and at the same time focus on open-ended and ill-defined problems to which there are multiple solutions (Havard & Du, 2004; Lew, 2005; Richards & Schofield, 2005). The online discussion should be designed in such a way as to move the discussion from exploration to integration and then to resolution (Garrison & Cleveland-Innes, 2005).

Another modification to the principle was the removal of the guideline about the need to have heterogeneous groups in terms of race, community, age and ability. Although there is evidence that such grouping can foster diversity of views and exploration of multiple perspectives online (Kanuka, 2002), it was not applicable to this study because the study participants were not very different in terms of race, gender, age and ability. This is an area that needs to be further researched in other studies.

**Principle 7: Promote learner autonomy and ownership**

One of the factors that contributes to the success of an online course is the promotion of learner autonomy and ownership (Mimirinis & Bhattacharya, 2007). There is evidence that deep learning is promoted when students are given learner ownership and learner autonomy (Edwards, 1999; McGee & Wickershame, 2005). In this study, the trainee teachers were provided with two online learning resources and one-print-based material for the first online discussion. They were free to

choose additional resources on their own and acknowledge all the references in their postings.

All the trainees reported that participation in the online discussion encouraged them to take responsibility for their own learning and they enjoyed the freedom of choosing relevant materials for the online discussion (see
Table 25). Poole (2001) found that online discussions provided a means for students to take greater responsibility for their learning, in line with constructivist approaches, despite being used to teacher-centred approaches. Three trainees even reported that they preferred assessment tasks in which they are expected to look for new materials and ideas on their own. Although few trainees reported that they relied on the tutor's readings as the main source of information, all of them were given the opportunity to think for themselves by having to make connections between the key ideas they had read about and their previous real-life experiences. In a study among trainee teachers in Singapore, it was found that the trainees primarily relied on the suggested reading materials to complete their online assignment, although a few trainees used additional information resources (Wang, 2009).

In order to promote learner autonomy, it is suggested that tutors should avoid dictating the direction of the online discussion (Hara et al., 2000) and they should adopt a stance of collegiality and co-learning rather than a content expert and evaluator (Haavind, 2005). When the online discussion was implemented, I hardly intervened at the beginning and waited for all the trainee teachers to pose their two questions to their peers before I added my questions. As pointed out earlier, I participated in the online discussion mainly in a supportive role to praise students, provide feedback and ask questions that would extend and deepen the discussion.

Analysis of data related to this principle supports its relevance. Thus, the principle and the guidelines were maintained for the design of the second online discussion. It was renumbered as Principle 9.
*Principle 9*: Promote learner autonomy and ownership.

**Principle 8: Provide meaningful assessment**

Assessment of an online discussion has been found to be an important motivational factor for online participation. Some studies among Asian students have found that when participation in online discussion is assessed, it improves the rate of students' participation and the quality of the postings (Gerbic, 2005; Teo & Webster, 2008). Moreover, other studies have found that if online participation is not graded, students may never participate and those who start to participate and interact online may gradually lose interest (Moallem, 2003; Wang, 2009). In this study, the first online discussion was graded and was given a weighting of 20%. Most of the trainee teachers felt that the weighting was adequate.

When assessment methods encourage students to think collaboratively and they foster creativity, inquiry, analysis and synthesis, students are more likely to adopt a deep approach to learning (Havard & Du, 2004; Kanuka, 2005; Lew, 2005; Riley & Anderson, 2006). All the trainee teachers in this study felt that participation in the online discussion allowed them to critically reflect on their own ideas and those of their peers (see Table 26). Moreover, they all pointed out that they laid more emphasis on the quality of their ideas than the number of postings or the length of their postings. The assessment criteria that were provided at the beginning of the online discussion were clearly understood by all of them. The criteria were carefully developed to guide the trainee teachers towards deep learning (Yip, 2008). Deep learning might have also been facilitated because the goals and purposes of the online discussion were congruent with the learning outcomes of the course (McGee & Wickershame, 2005). All the trainees agreed that the goals and purposes of the online discussion were in line with the objectives of the course.

Analysis of the findings for this principle supports all the guidelines. Thus, no change was effected. The principle was renumbered as the tenth principle:
*Principle 10*: Provide meaningful assessment.

### 5.4.1 Revised design principles and guidelines

Analysis, comparison and integration of data gathered from the questionnaire, online transcripts and reflective log during the first iterative cycle of Phase 3 were used to confirm, reject or modify the draft design principles and the guidelines (see

Table 13). The basis for confirmation, rejection or modification of each principle and the related guidelines has been addressed in Section 5.4.

Table 29 presents the revised set of design principles and guidelines.

**Table 29: Revised design principles and guidelines**

| ***Principles*** | ***Guidelines*** |
|---|---|
| 1. Prepare and motivate learners to use the online learning environment | • Clearly communicate course expectations, goals and purposes of online discussions.<br>• Familiarise students with the online learning environment.<br>• Establish ground rules (netiquette) and lay out clear boundaries for participation in online discussions. |
| 2. Maintain a climate of trust and a safe learning environment. | • Provide timely feedback and constructive criticism to students.<br>• Use a guiding tone rather than a leading tone.<br>• Provide assistance for technical problem.<br>• Guide students towards acceptable online behaviours..<br>• Encourage social interaction.<br>• Be consistent and fair in assessing students' work.<br>• Offer private means to communicate with students. |
| 3. Use authentic activities that focus on problematic situations and encourage exploration of multiple solutions and perspectives. | • Involve students in exercises that have real-world relevance.<br>• Use open-ended and ill-defined problems that require learners to explore and work collaboratively to propose solutions.<br>• Promote argumentation, and comparison of ideas and alternatives.<br>• Move discussion from exploration to integration and then to resolution. |
| 4. Promote online interaction and collaboration. | • Develop online discussions that are not a replication of face to face discussions (in blended learning environments).<br>• Encourage reciprocal exchanges of ideas.<br>• Point out to learners that they need to participate actively and at a regular pace in the online discussion.<br>• Create an environment where posted messages generate questions that probe for clarification, assumptions, viewpoints, implications and consequences. |
| 5. Place more emphasis on the | • Give more credit to the quality of ideas than the quality of the language used. |

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|---|---|
| quality of ideas than the quality of language used. | • Do not penalize students for grammatical, spelling and punctuation errors. |
| 6. Be aware of learners' conceptions about teaching and learning in determining tutor's degree of participation online. | • Participate more in online discussions if learners hold predominantly traditional conceptions about teaching and learning.<br>• Participation to a lesser extent in online discussion if learners hold predominantly constructivist conceptions about teaching and learning. |
| 7. Provide appropriate coaching and scaffolding. | • Support individual needs and provide feedback.<br>• Assist students to develop personal understanding by crafting appropriate questions and using task prompts.<br>• Use high-level questions that extend and deepen the discussion.<br>• Demonstrate good moderating and chairing skills.<br>• Model appropriate postings and/or provide exemplars. |
| 8. Promote critical thinking. | • Allocate adequate amount of time for task completion, including an adjustment period.<br>• Create open-ended activities that foster reflection and critical thought. |
| 9. Promote learner autonomy and ownership. | • Provide freedom of choice of learning materials.<br>• Create activities that allow students to think for themselves rather than rely on their tutor as the main source of information.<br>• Avoid dictating the direction of the online discussion.<br>• Adopt a stance of collegiality and co-learning rather than a content expert and evaluator. |
| 10. Provide meaningful assessment. | • Use assessment methods that encourage students to think collaboratively and to foster creativity, inquiry, analysis, and synthesis.<br>• Put more emphasis on the quality than the quantity of postings.<br>• Provide clear assessment goals and criteria that guide students' towards deep learning.<br>• Plan assessment congruent with learning outcomes of the course. |

The first draft design principle 'Establish a climate of trust and a safe learning environment' was modified to formulate two separate design principles ( Principles 1 and 2 in Table 29). This would allow students to be prepared and be motivated to create a safe and trustworthy environment, before being encouraged to maintain such a climate. The second draft principle 'Use authentic activities' was reformulated as Principle 3 'Use authentic activities that focus on problematic

situations and encourage exploration of multiple solutions and perspectives'. This would provide trainee teachers more opportunities to express different opinions and to propose solutions with clear justifications.

The draft principle 'Promote online interaction and collaboration' was confirmed and a new guideline to encourage students to participate actively and at a regular pace was formulated. The study findings also supported the formulation two new principles (revised Principles 5 and 6 in Table 29). Principle 5 focused on the need to place more emphasis on the quality of ideas than the quality of the language. Principle 6 focused on the need to give due consideration to learners' conceptions about teaching and learning in determining tutor's degree of participation in an online discussion. The draft principle 6 'Allow exploration of multiple perspectives' was integrated with the revised Principle 3. The remaining draft principles (and the related guidelines) 'Provide appropriate coaching and scaffolding', 'Promote critical thinking', 'Promote learner autonomy and ownership' and 'Provide meaningful assessment' were confirmed and renumbered as Principles 7, 8, 9 and 10 respectively. The ten revised principles and guidelines were used to develop the second online discussion as described in the next chapter.

# CHAPTER 6: FINDINGS AND DISCUSSION OF SECOND CYCLE OF PHASE 3

The second iterative cycle of Phase 3 of the study involved the design and implementation of another online discussion using the revised design principles and guidelines from Chapter 5 (see Figure 6). Chapter 6, in the first instance, describes how the revised design principles and guidelines have been taken into consideration in the development and implementation of the second online discussion. Data collected from transcripts of the online postings and semi-structured interviews are then presented. The data are further analysed in Phase 4 for confirmation, rejection or modification of the second set of design principles and guidelines.

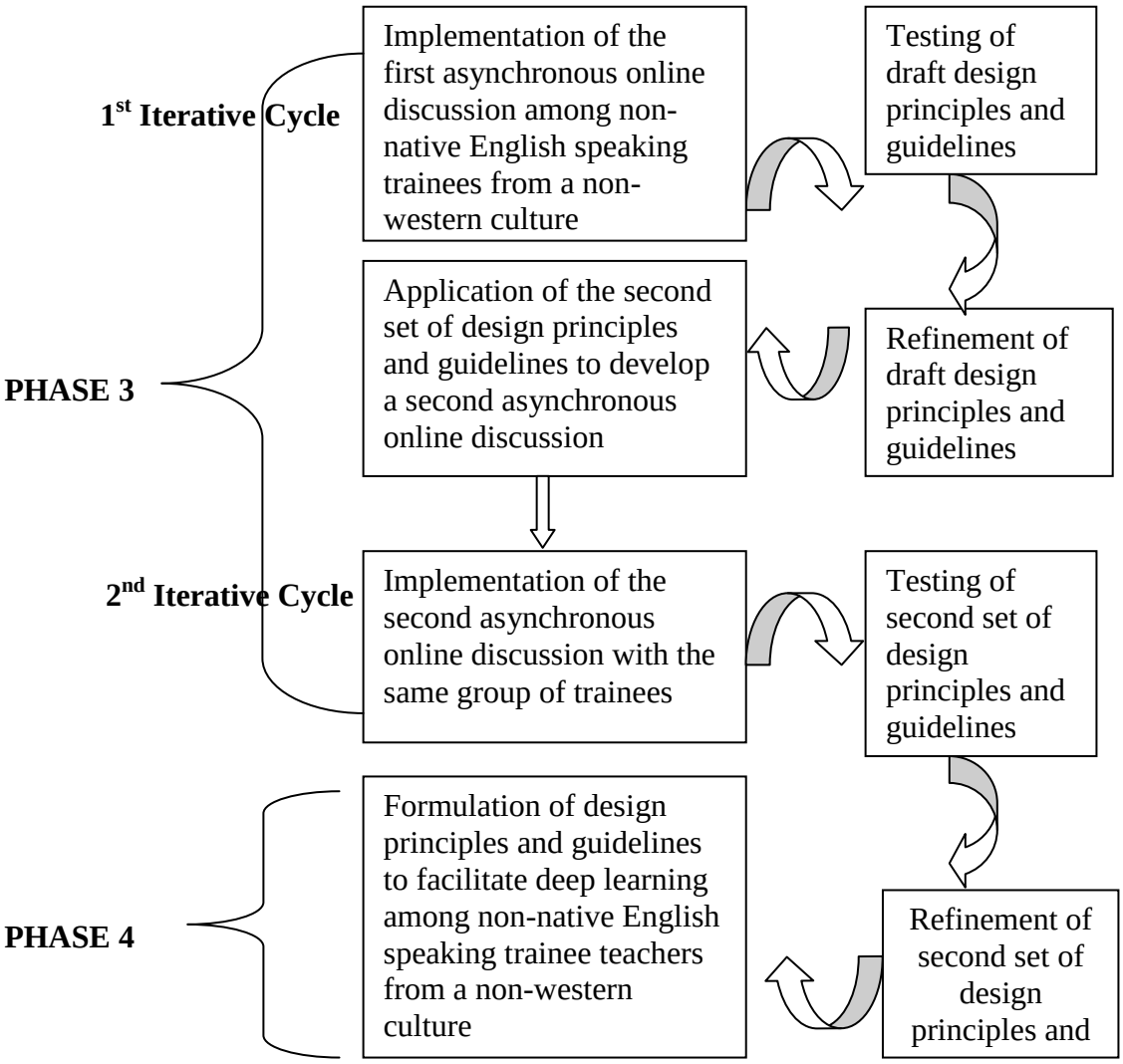


**Figure 6: Diagrammatical representation of study phases 3 and 4**

## *6.1 Design and implementation of the second online discussion*

The second online discussion was developed and implemented based on the revised principles and guidelines and to address the problems trainee teachers had faced during the implementation of the first online discussion. The online discussion again focused on a topic which had been suggested by the trainee teachers during the brainstorming session carried out at the beginning of the semester (see Figure 7).

**Problem Statement**

Research has shown that teaching of Food and Nutrition topics (in lower and upper secondary classes) is more effective when students are frequently engaged in practical activities/classes. However, there are some constraints that can hinder the effectiveness of Food and Nutrition practical classes. As prospective Home Economics teachers, it is important for you to have a thorough understanding of these problems and to develop the skills and knowledge to cope with or tackle these problems.

**Instructions**

PART A (last day to add posting – Monday 26 October 2009; word limit – 600 words)

- Each of you will need to identify and describe one major problem related to Food and Nutrition practical classes that you observed during your school-based experience (SBE) this year.
- In your discussion, you will also need to include:
    - The likely causes of the problem
    - The impact of the problem on the effectiveness of the teaching and learning process.
    - Plausible solutions to address the identified problem.

PART B (Ongoing until Monday 16 November 2009; postings should be a minimum of one paragraph and a maximum of two paragraphs.)
Respond to your peers' postings by:

- Asking questions to extend or deepen the discussion.
- Supplementing or commenting on the suggested causes, impact or solutions.

Make a summary of the different solutions proposed by you and your peers for the problems that were described in the initial postings. Your tutor will assign ONE problem to each of you as from Monday 09 November.

**Figure 7: Design of the second online discussion**

A topic that was of real-world relevance to the trainees and that involved an open-ended and ill-defined problem was selected in order to promote critical thinking and reflection as well as to encourage students to think for themselves rather than rely on the tutor as the main source of information (Garrison & Cleveland-Innes, 2005; Havard & Du, 2004; Lew, 2005; Richards & Schofield, 2005; Yip, 2008). Care was also taken to select a topic that had neither been addressed in previous classes nor was going to be addressed in forthcoming face to face sessions in a bid to encourage online interaction and collaboration (Ferdig & Roehler, 2003).

The online discussion required each trainee teacher to explore one significant problem related to the conduct of Food and Nutrition practical classes that they had observed during their placement in a school (school-based experience) and the likely impact of the problem on the teaching and learning process. They also had to come up with plausible solutions to address the identified problem. They were given two weeks to complete the first part of the discussion. Three online resources were provided as reading materials to help trainee teachers to get started with the discussion. The trainees were expected to explore and use other online or print-based materials.

After each trainee had explored a problem, she needed to suggest additional solutions for problems encountered by her peers, and finally she had to make a summary of all the proposed solutions for one of her peers' problems. Since I was moderating and chairing the online discussion throughout, one week before the closure of the discussion I allocated one specific problem to each of the trainees, a problem that one of the peers had faced. The trainee needed to make a summary of the proposed solutions for that particular problem and post it on the discussion forum under the thread 'Wrapping up the online discussion'. Provision was made for appropriate coaching and scaffolding (Haavind, 2005; Kanuka, 2002) and to move the discussion from exploration to integration and then to resolution (R. D. Garrison & Cleveland-Innes, 2005). The online discussion was designed to encourage trainees to work collaboratively to propose solutions and to foster creativity, inquiry, analysis and synthesis (Entwistle, 2000; Havard & Du, 2004; Kanuka, 2005; Riley & Anderson, 2006; Yip, 2008). The trainees were given three

weeks to complete the second part of the online discussion. In order to maintain a climate of trust and a safe learning environment, I adhered to the guidelines stipulated for the second design principle. Guidelines and assessment criteria were provided to all the trainees at the start of the online discussion (see Figure 8) to ensure consistency and fairness when assessing the postings of the trainees and also to guide the trainees towards deep learning (Yip, 2008).

NOTE: You are all required to participate actively and consistently in the online discussion throughout the discussion period. Although, I may not intervene so much, I will be checking the online forum at least once daily. Your follow-up postings (after your initial posting for Part A) should be evenly distributed during the discussion period (not concentrated all on one day or at the beginning and/or end of the period).

The following points will be taken into consideration when grading the online discussion task:
- Thoughtful and informed response for Part A that addresses all aspects of the problem and includes accurate and appropriate reflection of readings and personal experiences.
- Regular and consistent online interactions with peers and your tutor throughout the discussion period (after your initial posting for Part A).
- Follow-up postings:
    - demonstrate analysis of others' postings ad reflection of readings and personal experiences;
    - extend meaningful discussion by building on previous posts and asking insightful questions;
    - include comments that help clarify or synthesize peers' ideas; and
    - respond to peers'/tutor's questions effectively.
- If disagreeing with any peers' ideas, disagreement or objections are stated clearly and politely.
- Concisely expressed responses with consistent referencing system in-text and bibliography.
- Logical flow and organisation of ideas.
- Adherence to timeframe allotted for online discussion.

**Figure 8: Guidelines and assessment criteria for the second online discussion**

The guidelines and assessment criteria highlighted the need to participate actively and consistently in the online discussion throughout the discussion period (Lew, 2005). Besides asking questions using the Socratic approach, online interaction and collaboration was encouraged by pointing out to trainees that their follow-up postings could include comments that help to clarify or synthesize peers' ideas. The assessment criteria laid more emphasis on the quality of ideas than the quality

of the language used, and trainees were not to be penalized for grammatical, spelling and punctuation errors. More importance was also given to the quality of postings rather than to the quantity.

Given that the trainee teachers held mixed conceptions about teaching and learning, I did participate in the online discussion, but I refrained from participating at the start of the discussion in order to avoid dictating the direction of the online discussion (Hara et al., 2000). I provided feedback and asked questions to deepen and extend the discussion after trainees had completed part A. One week before the closure of the online discussion, I posted the list of all the problems raised by the trainees and invited each trainee to provide a summary of the solutions to one specific problem. In short, my participation in the second discussion mainly involved monitoring of the online discussion throughout to ensure that a climate of trust and a safe online learning environment was maintained, and encouraging online participation and critical thinking by crafting appropriate questions and by providing feedback.

The different strategies that were used for the second online discussion to address each of the revised design principles are summarised in Table 30. Some of the strategies were implemented at the start of the first online discussion rather than at the start of the second discussion, but are included in the table because they are relevant to the revised principles. The strategies include the orientation sessions (Principle 1), use of Chan's TLCQ to determine the trainee teachers conceptions about teaching and learning (Principle 6), provision of exemplars of questions and responses from a previous online discussion with another group of trainee teachers (Principle 7), guidance for the use of Socratic questioning technique (Principle 7), and provision of an adjustment period at the start of the course (Principle 8).

**Table 30: Strategies to address the revised principles**

| **Principles** | **Strategies** |
|---|---|
| 1. Prepare and motivate learners to use the online learning environment | • Two 3-hour face to face orientation sessions with all the trainee teachers at the beginning of the semester to:<br>o Communicate course expectations and the goals and purposes of online discussion.<br>o Familiarise trainee teachers with the |

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| | online learning environment through hands-on tasks (two group tasks and one individual task).<br>o Develop collaboratively ground rules and guidelines for effective use of the online discussion forums.<br>o Discuss the tutor's roles in the online discussion. |
| 2. Maintain a climate of trust and a safe learning environment. | • Use of private means of communication (email, SMS, telephone)<br>• Provision of timely assistance to trainee teachers for technical problem.<br>• Acknowledgement of responses of trainees' responses to tutor's questions.<br>• Praising trainee's responses to tutor's questions when the posting made a significant contribution to extend and/or deepen the discussion.<br>• Use of an assessment rubric to ensure consistency and fairness in the grading of trainees' online postings.<br>• Communicating to trainee at the end of the discussion period the general strengths and weaknesses of the online task. |
| 3. Use authentic activities that focus on problematic situations and encourage exploration of multiple solutions and perspectives. | • Consultation and negotiation with trainee teachers for the choice of topic for the discussion through a brainstorming session at the beginning of the course.<br>• Selection of a topic of real-world relevance and that involves an open-ended and ill-defined problem.<br>• Developing guidelines for the discussion that require trainee teachers to support their ideas in their postings with their recent experiences during school placement and to propose solutions to the identified problem.<br>• Inviting trainees to suggest additional solutions to their peers' problem.<br>• Prompting trainees to make a summary of the proposed solutions for one of the peers' problems. |
| 4. Promote online interaction and collaboration. | • Selection of a discussion topic that was not going to be discussed in face to face sessions.<br>• Use of the Socratic questioning technique by trainee teachers after their first online posting (position statement) to ask insightful questions to their peers in order to deepen and extend the discussion.<br>• Use of an open-ended and ill-defined problem to start the discussion and opportunities provided to trainee teachers to share their solutions online |

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| | with their peers.<br>• Dividing the online discussion into different sections and provision of guidelines for each section.<br>• Inclusion of guidelines to encourage trainees to respond to questions from peers and the tutor and to post comments that help to clarify or synthesize peers' ideas.<br>• Inclusion of assessment criteria and guidelines on the need for regular and consistent online interaction with peers and the tutor throughout the discussion period.<br>• Inviting trainee teachers to comment on their peers' ideas. |
| 5. Place more emphasis on the quality of ideas than the quality of language used. | • Provision of assessment criteria that lay more emphasis on the quality of ideas than the quality of the language.<br>• No penalty for grammatical, spelling and punctuation errors.<br>• Provision of feedback that lay emphasis on the quality of the ideas and arguments rather than on the quality of the language used |
| 6. Be aware of learners' conceptions about teaching and learning in determining tutor's degree of participation online. | • Use of Chan's TLCQ to determine the trainee teachers' conceptions about teaching and learning.<br>• Minimal participation in the discussion at the beginning.<br>• Greater participation in the discussion after all trainees had completed the first part of the discussion by crafting high level questions and providing feedback. |
| 7. Provide appropriate coaching and scaffolding. | • Indication of approximate word length for the online postings to deter trainee teachers from adding postings that are too long and not reader-friendly.<br>• Provision of exemplars of position statements, questions and responses from a previous online discussion with another group of trainee teachers.<br>• Guidance to trainee teachers on how to use the Socratic questioning technique; established list of questions that probe for clarification, assumptions, reasons and evidence, viewpoints or perspectives, and implications and consequences given to trainee teachers.<br>• Daily monitoring of online discussion by the tutor.<br>• Provision of feedback on first postings of all trainees.<br>• Weaving relevant threads of discussion together |

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| | and prompting trainees to make a summary of the proposed solutions for one of the peers' problems to wrap up the discussion.<br>• Jotting down the main strengths and weaknesses for each trainee teacher.<br>• Provision of a copy of the assessment rubric with individual feedback to all trainees at the end of the discussion. |
| 8. Promote critical thinking. | • Provision of an adjustment period of two weeks after orientation session to allow trainee teachers to familiarise themselves with the online learning environment.<br>• Use of an open-ended and ill-defined problem to start the discussion.<br>• Provision of two weeks for trainee teachers to extract meaning from the learning materials, make connections with and reflect on the key ideas and real-life experiences before articulation formulating their first posting.<br>• Provision of three weeks to allow trainee teachers to read and reflect on their peers' initial postings. |
| 9. Promote learner autonomy and ownership. | • Trainee teachers encouraged to ground or situate their comments in specific real-life experiences encountered during school placement rather than rely on their tutor as the main source of information.<br>• Freedom given to trainee teachers to look for relevant print-based and online learning materials other than the three learning materials provided by the tutor.<br>• Minimal posting from the tutor at the beginning of the discussion, except in case of flaming messages or technical problems.<br>• Posting of questions by tutor after all trainee teachers had completed the first part of the discussion.<br>• Adoption of a stance of collegiality and co-learning rather than a content expert or evaluator. |
| 10. Provide meaningful assessment. | • Consideration given to the learning outcomes of the *Independent Study* course in the design of the online discussion.<br>• Development of assessment criteria for the two main parts of the discussion to guide trainee teachers towards deep learning.<br>• Communicating pre-defined assessment criteria to all trainee teachers at the beginning of the discussion.<br>• Use of pre-defined assessment criteria to grade trainee's postings at the end of the discussion. |

The next section focuses on the quantitative and qualitative analysis of my postings as well as those of the trainee teachers.

## *6.2 Analysis of online postings*

Online postings for the second discussion were analysed in the same way as for the first discussion to determine to what extent the revised design principles and guidelines were effective in facilitating deep learning. Postings were first analysed quantitatively for the participative dimension (over all and individual participation) before being analysed for the cognitive dimension (depth of postings), the interactive dimension and the social dimension (see Table 31).

**Table 31: Analysis of online postings for second online discussion for depth of information processing, interactive and social dimensions**

| *Participant* | *Number of Postings* | | | | |
|---|---|---|---|---|---|
| | *Deep processing* | *Surface processing* | *Questions to extend discussion* | *Socially-oriented statements* | *Total* |
| ***Trainee A*** | 6 | 1 | 0 | 0 | 7 |
| ***Trainee B*** | 8 | 0 | 5 | 0 | 13 |
| ***Trainee C*** | 6 | 3 | 4 | 2 | 15 |
| ***Trainee D*** | 12 | 5 | 3 | 1 | 21 |
| ***Trainee E*** | 11 | 2 | 5 | 2 | 20 |
| ***Trainee F*** | 5 | 2 | 4 | 1 | 12 |
| ***Trainee G*** | 5 | 1 | 0 | 0 | 6 |
| ***Trainee H*** | 9 | 2 | 1 | 0 | 12 |
| ***Trainee I*** | 5 | 4 | 2 | 3 | 14 |
| ***Trainee J*** | 7 | 4 | 6 | 1 | 18 |
| ***Trainee K*** | 5 | 3 | 1 | 0 | 9 |
| ***Tutor*** | 4 | 2 | 6 | 10 | 22 |
| ***Total*** | 83 | 29 | 37 | 20 | 169 |

Table 31 shows that the second online discussion generated 169 postings, mostly from the trainee teachers. There were 147 postings (87.0 %) from the trainees while there were only 22 postings (13.0 %) from the course tutor. The number of postings per trainee ranged from 6 to 22, with the average number of postings per trainee being 13.4. Observational notes from my reflective log revealed that trainee teachers regularly checked the forum and participated consistently throughout the discussion period.

### 6.2.1 Depth of online postings

All the online postings for the second online discussion were analysed for deep or surface level information processing using the same indicators that were used for the first online discussion (see Appendix 8). The entire message was the unit of analysis. For lengthy postings containing indicators of both surface and deep information processing, the researcher chose the information processing level which was most consistent with the entire posting (Meyer, 2004). The researcher started with the analysis of the first part of the online discussion which required each trainee teacher to explore the likely causes, impact and plausible solutions of one major problem related to Food and Nutrition practical classes that they had observed during their school-based experience.

Analysis of the postings for the first part of the discussion revealed that all eleven postings of the trainee teachers reflected a deep level of information processing. They contained mostly indicators such as linking facts and ideas in order to interpret, offering new elements of information, proposing solutions with proper justification, and providing proof or supporting examples. A few postings also included indicators such as setting some advantages and disadvantages of a situation or solution, perceiving the problem within a larger perspective and developing intervention strategies within a wider framework. Extracts from trainees that illustrate the different indicators of a deep level of information processing are shown in Table 32. The exact wordings of students have been used, thus making no amendments to grammatical errors. However, for ethical reasons, details such as schools' names or the names of the study participants have been removed.

**Table 32: Extracts from trainees' initial postings illustrating indicators of a deep level of information processing**

| ***Indicators of a deep level of information processing*** | ***Trainees' postings*** |
|---|---|
| **Linking facts and ideas in order to interpret** | ***Trainee E***: *For teaching to be effective, proper classroom management, which implies having complete control over all the activities going on in the class, is of paramount importance. My biggest problem with the classroom management was due to ... This point can be supported by a survey carried out by Ofsted which found out that "The quality of teaching was often restricted* |

| | |
|---|---|
| | *by: …large group sizes…" (Ofsted, 2006, p 2).* |
| **Offering new elements of information** | ***Trainee E***: *In addition, this would have led to over handling of the fruit, which we all know should be strictly avoided, and also the time it would have taken for each student to dice would definitely have lead to browning of the fruit!* |
| **Proposing solutions with justifications** | ***Trainee E***: *… one solution which can solve the above problems would be to split the practical Food & Nutrition classes and this would give both teacher and students ample time to monitor and participate. Another solution, would be proper planning and organisation of practical classes, as mentioned in the Ofsted report, "A few exceptionally well organised teachers working with very cooperative pupils and adequate technical support were able to manage a variety of practical tasks in the 50 or 60 minute lessons." (Ofsted, 2006, p 15.* |
| **Providing proof or supporting examples** | ***Trainee E***: *Usually, at 'School X', for practical classes, only a demonstration by the teacher is given to the students. As I wanted to apply all what I learnt at the MIE into practice, I wanted to use a student centered approach and thus grouped the students and it was very difficult to monitor and keep a watch on all the groups at the same time... For example, while preparing the fruit salad, each group brought an apple to be diced. It was not practical at all to ask all the ten students to try dicing the apple to learn the skill.*<br>***Trainee H****: As there were lack of resources, teachers were not able to do a proper demonstration in order to facilitate teaching and learning. Students should wait for their turn to use the special equipments which lead to loss of time as there are only two periods of eighty minutes allocated for practical classes for lower secondary levels at 'School Y'.* |
| **Setting some advantages and disadvantages of a situation or solution** | ***Trainee E***: *In my opinion, effective teaching and learning in practical classes would have been when the students are given the opportunity to use their creativity to present the dishes and also have a sensory evaluation of the dishes prepared by the other groups. However, due to restricted time … To overcome this problem, it is common practice at 'school X' to have the equipments removed and the cleaning and washing up done by the attendant. In the report by Ofsted, it is recommended that this action is "...well intentioned but deprived pupils of a chance to practise this skill. Washing up done by technicians after cooking also meant that pupils did not exercise responsibility for the equipment they used (Ofsted, 2006, p 14-15)…* |
| **Perceiving the problem within a larger perspective** | ***Trainee D****: One of the major constrain concerning Food and Nutrition Practical classes that was present at 'School Y' was that lower secondary students did not have classes of food and nutrition practical. The reason is that … Therefore, the students do not get the opportunity to develop their culinary skills nor can the teacher assess this criterion… This particular problem eventually has an impact on the teaching and learning process as the students of form two and form three were having problems to understand the chapters concerning cakes and biscuits which are* |

| | |
|---|---|
| | *normally mastered during practical classes. Reliable assessment criteria could not be used to assess the culinary skills of the students, thus the teacher could not assess whether teaching and learning was successful.* |
| **Developing intervention strategies within a wider framework** | ***Trainee D**: I would also suggest the government to ensure that there are permanent teachers in schools so that the students do not lack in their education and do not have adaptation problems with supply teachers which keep on changing every two or three months.*<br>***Trainee H**:*<br>*It is very important for the school administration to make sure that there are all the necessary equipments needed for the practical classes to take place effectively.* |

The second part of the online discussion required the trainee teachers to respond to their peers' postings. Responses involved asking questions to extend or deepen the discussion, supplementing or commenting on the suggested causes, impact or solutions, and, towards the end, making a summary of the different solutions proposed for one problem raised by their peers in their initial posting. There were 95 follow-up postings from the trainee teachers and 6 from the tutor that were analysed for the level of information processing. These postings contained supplementary information, comments on the suggested causes, impact or solutions, and a summary of proposed solutions. Postings which contained only questions to extend or deepen the discussion were analysed for the interactive dimension rather than for the level of information processing. Moreover, postings which contained only socially-oriented statements were analysed for the social dimension rather than the level of information processing.

Out of the 95 follow-up trainee's postings that were analysed for the level of information processing, 68 (71.5%) postings reflected a deep level of information processing. These postings contained indicators such as linking facts and ideas in order to interpret, offering new elements of information, proposing solutions with proper justification, providing proof or supporting examples, setting some advantages and disadvantages of a situation or solution, perceiving the problem within a larger perspective, and developing intervention strategies within a wider framework (see Appendix 11).

Trainees made the link to ideas and notions already mentioned in earlier postings of their peers and the tutor, or facts and ideas from the course reading materials. Moreover, extracts from trainees E and J revealed that the trainees also made the link to ideas and notions that they had learnt about in other courses.

***Trainee E***: *… I would like to say that I completely agree with 'Trainee D' on the fact that much consideration must be given to planning of the school time table. After completing our curriculum modules we have all noted how effective planning helps us to meet our aims and objectives.*

***Trainee J***: *Well 'Trainee D' I have learned that in assessment and evaluation module. If the majority of students did not understand then re-teaching is done, if only one or two students did not understand then remedial and finally if everyone understood the topic scaffolding should be done. In the case I mentioned it would be remedial, which means that complete teaching and learning did not take place for these one or two students.*

Four of the six tutor's postings reflected a deep level of information processing. They included indicators such as offering new elements of information, providing supporting examples or perceiving the problem within a larger perspective (see Appendix 12). There were 27 follow-up postings from the trainee teachers that reflected a surface level of information processing. These postings contained indicators such as repetition of what has already been said without adding any new elements, stating that one shares the ideas or opinions stated, without taking these further or adding any personal comments, asking questions which invite information not relevant to the problem or not adding to the understanding of it, and making judgements without offering justification (see Appendix 13).

### 6.2.2 Interactive dimension of online postings

The interactive dimension focused on the tutor's and trainees' postings which contained questions connected to other postings in an attempt to extend and deepen the discussion as well as to promote online interaction and collaboration. For the second online discussion, the guidelines and assessment criteria included the need to ask insightful questions to extend and deepen the discussion. Unlike the first discussion, the minimum number of questions to ask was not specified. Questions were asked using the Socratic approach after all the trainees had posted their first posting.

As the course tutor, I asked six questions after the trainee teachers had posted at least two questions to their peers. I asked four questions that probed for clarification and two questions that probed for viewpoints and perspectives. There were 31 questions from the trainee teachers and the questions were evenly distributed throughout the discussion period. The number of questions per trainee ranged from nil (Trainee A) to six (Trainee J) (see Table 31). Out of the 31 questions from the trainees, 17 of the questions probed for clarification, 13 questions probed for viewpoints and perspectives, and only one question probed for implications and consequences (see Table 33).

**Table 33: Selected trainees' and tutor's questions based on the Socratic approach**

| ***Questions that Probed for:*** | ***Examples of Questions from Trainees*** | ***Examples of Questions from Tutor*** |
|---|---|---|
| Clarification | • *As a future teacher, what can you do to remedy to this problem of limited recipes?*<br>• *As a Home Economics teacher, how are you going to manage a practical class with 35-40 students?*<br>• *Moreover as a Home Economics educator, how are you going to include practical classes in your own time table for Home Economics?*<br>• *Could you please tell me as a future Home Economics teacher, how would you or what are the strategies would you use to meet a mixed ability class in a practical class?* | • *Is there anything that can be done by the Food and Nut teacher to overcome such situations?*<br>• *Could you please give us some examples of how a Food and Nut teacher can encourage the creativity of his/her students for practical classes?*<br>• *Since in this discussion we are focusing mainly on the Food and Nut practical classes, can you please elaborate how the presence of a supply teacher can affect the smooth running of practical classes?*<br>• *Could you please elaborate what different responsibilities could be allocated to a group of 6 members doing a fruit salad?* |
| Viewpoints or Perspectives | • *You mention that "form I and the form II students don't get the opportunity of doing practical". As a Home Economics Educator, don't you think that these students are penalized, in that case how are you going to manage a practical class of 40 students?*<br>• *But in that case, do you think that you would be able to do a demonstration* | • *I feel in case of teacher shortage, the school can split classes for practical sessions only; no need to split for theory classes. What are your views?*<br>• *As a new recruit and if you are dynamic and creative you can discuss the idea with your Head of Department, and as a team you can then implement the fund raising activity. How do you feel about this?* |

| | | |
|---|---|---|
| | *before 40 students? And will you be able to control them (taking into consideration that they are in lower classes) during the practical class?*<br>• *But according to my point of view, weighing of ingredients is a very important process during a practical class….. Do you agree with me 'Trainee C'?*<br>• *Do you think that only doing a demonstration in front of students is enough for that student to use the equipment in exams?*<br>• *Do you think that ignoring that student will solve the problem? Is the teacher doing justice to his/her profession and to his/her student?*<br>• *Moreover, it may be that not all students have even the basic equipments at home, what is your point of view?*<br>• *May be they can consider replacing all the gas stoves by electric ones, what are your views?* | |
| Implications and Consequences | • *In your report you write that the form I and II students did no practical class at all, according to you, what is the impact on the students' performance later on when they will be in form 3 or 4?* | |

Analysis of the interactive dimension also revealed that the trainees responded to all the tutor's questions. There were three questions from the trainees that remained unanswered, two of which were addressed to Trainee A and one which was addressed to Trainee J. These three questions were posted about one week before the forum was due to close.

### 6.2.3 Social dimension of online postings

I posted 10 messages which contained only social cues and socially-oriented statements. My messages contained praise, acknowledgements and feedback on trainees' postings.

- *Hi 'Trainee D', you have provided some very pertinent points in your posting. Well done* 😎*!*

- *Hi 'Trainee E', well done for this first posting which provides a comprehensive description of the problem, supported by frequent reference to relevant literature.*

- *…you have clearly detailed out how different roles and responsibilities can be allocated to various group members. You have also rightly pointed out that these roles and responsibilities need to rotate. I can only hope that you and your peers will be able to put these suggestions into practice when you start teaching.*

Moreover, besides praise and acknowledgement, some of my socially-oriented messages contained comments and instructions to guide the students towards completion of the task as well as to make my social presence online visible to students.

- *Hi 'Trainee A', well done for this first posting. I will be asking you questions and/or comment further after all your peers have added their first posting.*

- *Hi' Trainee C' well done for this first posting. I will be asking questions in relation to specific points you've raised in the posting at a later stage. I'll wait for your peers' postings and questions.*

- *Hi everyone, it has been a real pleasure and an enriching experience to read all your postings. Several problems and the relevant solutions have been proposed.*
  *By Wednesday, I will make a list of all the problems that you have mentioned and with your input we will post a summary of the solutions for each of the problems. So, I suggest that you reply to any unanswered questions (from your peers and/or tutor) by Tuesday.*
  *At this point in time and given that your are all taken up with your assignments and exam revisions, please refrain from asking additional questions. You may nonetheless provide comments and suggestions until Tuesday. Good luck with your revision* 😎*.*

- *Hi everyone, as we're getting closer to the closure of this online discussion on Practical classes, your final task will involve enumerating the different solutions proposed by you and your peers for each of the problems that were described in your initial postings.*
  *The table below lists the problems that you have mentioned in the first column. The second column identifies the person who needs to summarise or enumerate the solutions for a specific problem. For instance, 'Trainee K' will have to …*
  *You will have noticed that each of you have been assigned a problem other than what you mentioned in your initial posting.*
  *In case you:*
  *1. need to clarifications for completion of the task and/or*
  *2. feel that you will not be able to complete this task by Nov 16, because of*

*your current workload,*
*please let me know at the earliest.*
*Good luck with all your assignments and written exams.*

The trainee teachers also posted 10 messages which contained only social cues and socially-oriented statements in response to their peers' postings and responses. Examples of social messages from trainees are given below. The exact wordings of students have been used, thus making no amendments to grammatical errors. The messages included greetings, praise, acknowledgements.

***Trainee C:*** *Hello 'Trainee D', thank you for your reply. Yes it is clear enough (smiley face emoticon).*

***Trainee D:*** *Hello 'Trainee G', I think your idea about catering extra for students in need is a brilliant one! I am in fact impressed! I think that all our friends including me should have such attitude towards our students.*

***Trainee E:*** *Dearest 'Trainee B', I really appreciated your idea of sharing the recipes thus having variations and it also helps being better equipped for exams. Take care, all my love to you and baby-to-come.*

***Trainee E:*** *Hi 'Trainee D', I am very glad that u've liked my idea and it will help you in your classes. Thanks. Best of luck with your revision dear.*

***Trainee G***: *Hello 'Trainee D', I got inspired by what you say above. You mentioned some important points that w can adopt when we become teachers*.

***Trainee I:*** *Hello 'Trainee A', thank you for your answer and well done you have responded to my question accordingly*.

***Trainee J:*** *Thank you 'Trainee I', that was very interesting idea. I am sure that you will be a great and helpful teacher of Home Economics.*

There was one message from Trainee C that was sent as a reminder.

> *Hello 'Trainee G, I've sent you a post quite a long time back, may be you did not notice. Thank you. Take care. 'Trainee C'.*

It was also noted that some of the tutor's and trainees' messages analysed under the interactive dimension or under the cognitive dimension, also contained socially oriented statements such as greetings, praise, acknowledgements, and apologies for late replies. The presence of positive socio-emotional elements in the trainees' and the tutor's online postings helped in creating a non-threatening learning environment. Such an environment is needed to encourage students to interact

with and to learn from one another, and it provides the foundation for deep learning (Garrison and Cleveland-Innes, 2005; Wang, 2009).

At one instance during the second online discussion, I felt that there was some tension created by a posting most likely due to the tone used and misinterpretation of that posting (see Appendix 14). I intervened towards the end of the discussion after the trainees had clarified their misunderstandings. Reformulation of the question by the trainees seemed to have helped in clarifying the misunderstanding.

## *6.3 Comparison of postings for the first and second online discussion*

The total number of postings for the second online discussion was considerably higher than the total number for the first online discussion (169 vs. 101). Trainees' participation rate was also higher for the second online discussion; their postings accounted for 87% of the total number of postings (n = 147) in the second discussion as compared to 81.2 % in the first discussion (n = 82). Conversely, I (the tutor) participated to a lower extent in the second online discussion. Besides trainees A and G, the remaining trainees had posted more messages in the second online discussion. Trainees D and E had the highest number of postings with 21 and 20 postings respectively compared to nine and seven postings respectively for the first online discussion. The average number of postings per trainee was 7.5 for the first online discussion while the average number per trainee was 13.4 for the second online discussion. It was also noted that trainees' online participation was more regular and consistent in the second discussion.

**Table 34: Comparison of the level of information processing of the postings for the first and second online discussion**

| *Participant* | *Number of Postings for First Online Discussion* | | *Number of Postings for Second Online Discussion* | |
|---|---|---|---|---|
| | ***Deep processing*** | ***Deep processing*** | ***Deep processing*** | ***Surface processing*** |
| ***Trainee A*** | 5 | 5 | 6 | 1 |
| ***Trainee B*** | 3 | 3 | 8 | 0 |
| ***Trainee C*** | 4 | 4 | 6 | 3 |
| ***Trainee D*** | 5 | 5 | 12 | 5 |
| ***Trainee E*** | 3 | 3 | 11 | 2 |
| ***Trainee F*** | 3 | 3 | 5 | 2 |
| ***Trainee G*** | 4 | 4 | 5 | 1 |
| ***Trainee H*** | 5 | 5 | 9 | 2 |
| ***Trainee I*** | 4 | 4 | 5 | 4 |
| ***Trainee J*** | 4 | 4 | 7 | 4 |
| ***Trainee K*** | 3 | 3 | 5 | 3 |
| ***Tutor*** | 0 | 0 | 4 | 2 |
| ***Total*** | 43 | 43 | 83 | 29 |

Analysis of the level of information processing of the online postings for the two discussions revealed that the trainees had more postings which reflected deep processing in the second online discussion (see

**Table 34**). Moreover, in the second discussion there were more postings which included solutions with justifications, advantages and disadvantages of a situation or solution, perceiving the problem within a larger perspective, and developing intervention strategies within a wider framework. The second online discussion also included postings which linked facts, ideas and notions from other courses that the trainee teachers had already completed besides making the link with the course reading materials, peers' and the tutor's postings.

Comparison of the two discussions for the interactive dimension showed that trainees posted more questions in the second online discussion (24 vs 31) questions while the tutor posted fewer questions for the second online discussion (13 vs 6). In the first online discussion, nine of the trainees posted two questions each and two trainees posted three questions each. The number of questions per trainee for the second discussion varied more, ranging from nil (trainees A and G) to six questions (Trainee J). Differences were also noted in the frequency of the different types of questions asked by the trainees and by the tutor (see Table 35). Questions that probed for clarification and viewpoints or perspectives were more frequent in the second online discussion.

**Table 35: Comparison of types of questions for first and second online discussion**

| ***Questions that probed for:*** | ***Number for first online discussion*** | | ***Number for second online discussion*** | |
|---|---|---|---|---|
| | ***Trainees*** | ***Tutor*** | ***Trainees*** | ***Tutor*** |
| Clarification | 9 | 7 | 17 | 4 |
| Viewpoints or Perspectives | 4 | 0 | 13 | 2 |
| Implications and Consequences | 8 | 2 | 1 | 0 |
| Assumptions | 2 | 3 | 0 | 0 |
| Reasons and evidence | 1 | 1 | 0 | 0 |

Comparison of the social dimension of the postings for the two discussions showed that in the second online discussions there were slightly more postings which contained only socially oriented statements, that is messages which contained social cues and statements not related to formal content of the discussion in the

form of praise, greetings and acknowledgements – 20 vs 13. In both discussions, it was noted that several of the follow-up postings that contained questions, responses to questions or comments also contained socially oriented statements. Although there was not any flaming message in either discussion, there was evidence that some tension was created among the trainees most likely due to the tone used and misinterpretation of one of the postings (Appendix 14). This issue is further explored in the next section which focuses on the analysis of the semi-structured interview transcripts of the trainee teachers.

## *6.4 Analysis of semi-structured interviews*

Towards the end of the second cycle of Phase 3 of the study, that is, shortly after the closure of the second online discussion, a semi-structured interview was conducted with seven of the trainee teachers (trainees A, C, D, E, F, G, J). The trainees were purposefully selected to represent different levels of participation in the online discussions, both qualitatively (depth of postings) and quantitatively (total number of postings) as shown in Table 36.

**Table 36: Summary of participation of trainees for the two online discussions**

| ***Participant*** | ***Number of Postings for First Online Discussion*** | | | ***Number of Postings for Second Online Discussion*** | | |
|---|---|---|---|---|---|---|
| | *Total* | *Total* | *Total* | *Total* | *Deep processing* | *Surface processing* |
| ***Trainee A**** | 8 | 8 | 8 | 7 | 6 | 1 |
| ***Trainee B*** | 6 | 6 | 6 | 13 | 8 | 0 |
| ***Trainee C**** | 9 | 9 | 9 | 15 | 6 | 3 |
| ***Trainee D**** | 9 | 9 | 9 | 21 | 12 | 5 |
| ***Trainee E**** | 7 | 7 | 7 | 20 | 11 | 2 |
| ***Trainee F**** | 6 | 6 | 6 | 12 | 5 | 2 |
| ***Trainee G**** | 7 | 7 | 7 | 6 | 5 | 1 |
| ***Trainee H*** | 9 | 9 | 9 | 12 | 9 | 2 |
| ***Trainee I*** | 7 | 7 | 7 | 14 | 5 | 4 |
| ***Trainee J**** | 6 | 6 | 6 | 18 | 7 | 4 |
| ***Trainee K*** | 8 | 8 | 8 | 9 | 5 | 3 |

*Trainees selected for interview

The interviews captured the online experiences of the trainees, their perceptions of the educational value of the online discussions, how they tackled the online discussions, enabling and disabling factors to their participation online, and suggestions to improve the use of online discussions in teacher education programmes.

All the interviews were conducted within a week with each trainee. The recorded interviews were transcribed within two weeks after they were conducted. A hard copy of each transcript was read through carefully several times, and then the data were coded manually using a deductive approach (Holloway, 1997). The deductive approach of data analysis starts with an idea or theoretical framework and uses the data to verify or disprove the idea. In this study, the coding scheme was informed by the design principles and guidelines that were initially developed based on the review of the extant literature and subsequently revised based on findings from the first cycle of Phase 3. Thus, ten categories were established to match each of the ten design principles:

1. Prior preparation and motivation of learners
2. Safe and trustworthy learning environment
3. Authentic activities
4. Online interaction and collaboration
5. Quality vs. quantity of language
6. Learners' conceptions about teaching and learning
7. Provision of coaching and scaffolding
8. Critical thinking
9. Learner autonomy and ownership
10. Meaningful assessment

Data analysis involved breaking down the interview transcripts into chunks with the purpose of classifying them under each of the ten coding categories. A 'cut-and-paste' approach was adopted whereby 'chunks' of text from transcripts were continuously regrouped under each code (Ritchie & Spencer, 1994). This approach enabled me to identify the issues pertaining to the design principles and along with the analysis of the online transcripts analysis provided a basis for confirming, modifying or rejecting each of the principles and the related guidelines.

**Principle 1: Prepare and motivate learners to use the online learning environment**

The orientation sessions to a large extent prepared and motivated the trainees to use the online learning environment by familiarising them with the technological aspect and guiding them on how to respond online. The trainees reported that if there had not been any orientation session, they may not have been able to use the online forums and they may not have participated in the same way.

***Trainee A***: *We had a better idea on how to respond online. May be for those who did not have Internet access before that, they came to know how to use the online forum…*

***Trainee C***: *Without the sessions, my participation would have been different. May be we would have been at a lost, not knowing in which direction to go.*

***Trainee D***: *… Adequate details were given on the technical aspect. If there were no orientation sessions, I will not have been able to use the online forums. I would have felt at a complete loss because I have never participated in an online discussion before…*

***Trainee E***: *They were helpful, especially in the beginning when we were not quite used to the online learning environment. It helped me to feel more at ease to access the online forum…*

***Trainee J***: *…Without the sessions, it would have been difficult to participate because as I told you before, I have never before participated in an online discussion. And also the sessions encouraged us to participate.*

The ground rules for online participation that were highlighted during the orientation sessions helped the trainees to better formulate their postings. They learnt about the key things to consider and avoid when putting a posting online or when replying to peers' postings. Trainee A paid much attention to formulating her postings such that she would not hurt the feelings of her peers.

***Trainee A***: *…If we did not have these orientation sessions, I may not have been able to reply properly. They helped me to better formulate my postings online, paying particular attention not to hurt someone's feelings.*

***Trainee D***: *… I learned about how to put up a posting and what are the key things to consider.*

***Trainee E***: *…It helped me to … and how to formulate my postings…*

***Trainee F**: The sessions guided us about how to proceed online and how to respond to peers' postings. Emphasis was also laid on things to avoid, e.g., avoid the use of bold characters, not to criticize peers. If we did not have these sessions, maybe we would not have interacted in a similar manner.*

**Principle 2: Maintain a climate of trust and a safe learning environment**

The trainees reported that the online discussion provided a more relaxed atmosphere, unlike written assignments or face to face oral presentations where they tend to feel the pressure more. They also felt that the online discussion allowed them to work at a more leisurely pace than written assignments; for written assignments, they tend to wait till the last few days to complete the task.

***Trainee A***: ***...****Online, the atmosphere is more relaxed…Normally when I get an assignment, I do it two days before the due date and I feel the pressure more..*

***Trainee D***: ***...****I felt less tense to do the online task…*

***Trainee F***: *…We could work at a more leisurely pace and the postings were not too long…*

***Trainee J**: …I felt more at ease for the second discussion. … And also we feel more tense during oral presentations, especially if we are presenting on that day. We tend not to pay too much attention to what our peers are saying.*

It was found to be easier to pose questions to peers online than in face to face discussions, especially for the second online discussion. The fact that some trainees are less at ease to ask questions to peers in face to face discussions was not an issue when they had to discuss online.

***Trainee E**: If we know that some friends are not too at ease to answer questions in f2f classes, I will refrain from asking her a question. In an online environment, it was easier to ask questions to that same person…*

***Trainee F***: ***...****I felt at ease asking questions online from my home PC. May be I will feel less at ease to ask questions f2f because I am already used to asking questions to my peers online through chat and Facebook……In my case, I would not participate in a f2f discussion. I would feel a bit shy.*

***Trainee G**: … In the online set up, I felt more at ease to ask questions to my peers than in a f2f class. In a f2f class, if the person feels that the question is difficult to answer, then I will feel somewhat bad for having asked such a question. This is not so much of an issue online because…*

The tutor's feedback online and during the face to face session (after the first online discussion) also proved to be beneficial in maintaining a climate of trust and a safe learning environment.

***Trainee D***: *…May be I've put up something, and when the tutor gives her comments it reassures me whether I am on the right track or not…*

Few technical problems were noted during the implementation of the online discussions, namely slow Internet connectivity at home for a few trainees and the inability to add images to postings. The tutor had addressed both these problems by making arrangements for trainees to use the MIE computer labs and by showing them how to add images during a face to face session shortly after the start of the first online discussion.

***Trainee E***: *… You also mentioned that facilities for PC and Internet access were available at the MIE because some students had dial-up connection and they pay per minute…*

***Trainee G***: *You showed us how to add images to our postings. So now, I know how to use this feature. You gave us instructions on how to proceed, and this helped me…*

The tutor paid particular attention to using a guiding tone rather than a leading when intervening online. However, the tone used by the trainee teachers for the follow-up postings of the second online discussion posed some problem. The trainees felt that at times some of their peers did not use an appropriate tone to express their disagreements or divergence of views, despite the fact that the guidelines for the second online discussion did stress on that aspect.

***Trainee D***: *I enjoyed it, but did not quite like the way some of my peers responded to the postings. They were somewhat sarcastic. I did not like the way they responded.*
*…Students also need to be more careful about the tone and wordings they used in their online postings, especially when they disagree with someone. This was already in the discussion guidelines, but not everyone respected it. May be more emphasis should be laid on that aspect.*

*Trainee E: … At times, some peers did not use a correct tone to express their disagreement, although I did not experience this… Peers just need to be polite to others when responding or adding their comments or disagreeing*

Trainees A and J felt that not all their peers readily and positively accepted new ideas and divergence of views and opinions. This can be a deterrent to the maintenance of a safe and trustworthy online learning environment. According to

the trainees, everyone participating in the online discussion should be more receptive, accepting new ideas and divergence of views and opinions, rather than being on the defensive side.

***Trainee A***: *Not to be on the defensive side, always trying to defend oneself. Be more receptive and accept new ideas.*

***Trainee J***: *Peers should more readily accept divergence of views and opinions. They should take it more positively because this helps a lot.*

Moreover, some trainees were of the opinion that their peers wrongly interpreted some of their comments and suggestions, taking these personally. Such postings created some tension, and trainees even felt that at times their peers tried to get back at them by asking 'irritating' questions.

***Trainee A***: *Some peers took the comments and suggestions personally as if we were getting at them. Then there were replies which hurt the feelings of some peers. … To avoid such problem, we should reply in a more polite way and also we should not take the comments personally because we are commenting on the ideas.*

***Trainee C***: *When there are conflicts and tension between peers, one of the peers can ask questions to the others, questions that are not very relevant. That person may try to pester her peers by asking irritating questions. And it was like a fight going on. For me it was not the case, but some of my peers felt it. It's a bit difficult to overcome or suggest a recommendation for this type of problem. As an external observer, I found the whole scene funny.*

***Trainee E***: *The only thing is that sometimes when we asked a question or gave our opinion, the other person took it wrongly... If they were not right, then I would say why I don't think what they say is right. I would justify why I think she may not be right, but I will do it in a polite way.*

Some disagreements among the trainees B, D, E and J were noted (see Appendix 14) following questions asked by Trainee J. After that incident, Trainee J mentioned that she refrained from posing questions to her peers.

> *Well, not when asking the questions. But when I met my peers in class afterwards, then they told me that they were not happy when I had asked so many questions. But I had asked only question per student. This happened at the beginning of the second online discussion. So, what I did afterwards, I refrained from asking additional questions. Rather I waited for the peers' responses to my questions and then I would comment on the responses. I don't quite know why my peers were not too happy…*

As the course tutor, I was responsible for guiding trainee teachers towards acceptable online behaviours. I intervened only once towards the end of the

second online discussion to make sure that the misunderstanding between trainees B, D, E and J had been clarified.

> *Hi 'Trainee J', you have provided some thoughtful response. I hope that the misunderstanding has now been cleared* 🙂.

Otherwise, I felt that there was no significant problem with the tone used by the trainees and I did not receive any complaints from the trainees either by email or face to face. Trainees may have wrongly interpreted some of their peers' comments. The problem could also have been that trainees were not used to discussions where peers could freely comment upon their ideas or express their disagreement and views. As the course tutor, I could have been more observant when reading peers' postings to pick up such issues.

**Principle 3: Use authentic activities that focus on problematic situations and encourage exploration of multiple solutions and perspectives.**

The trainees who were interviewed reported that they preferred the second online discussion mainly because of the topic on which it focused, except Trainee J who had a slightly greater preference for the first online discussion. They felt that the topic was more enriching and of greater real-world relevance to them as prospective Home Economics teachers. They could better share their personal experiences recently encountered during their school placement, and they could also better relate to the experiences of their peers.

***Trainee A***: *Second one. It related to what we did in school during our placement…*

***Trainee C***: *…It is something that will happen later on as we will be teaching… And the title of the discussion was also very interesting because it is something that we will be experiencing in the near future. In a way it helps us in our career.*

***Trainee D***: *… It was more personal, that is I could share my personal experiences… For me, it was easier to participate and respond because we had to talk about our experiences… They helped me to learn new things, things that I was not aware of before and that will help me in my future career as a Home Economics teacher…*

The topic for the second discussion influenced trainees' choice and number of questions asked to their peers, and it encouraged them to comment on their peers' postings. Trainees were more likely to interact with their peers online when they could relate to their peers' school-based experiences.

***Trainee E****:… And then we went to school and had similar experiences. So when others talked about their school-based experiences and problems we could relate to them. So we could comment more on these.*

***Trainee G***: *…I think the topic/content of the posting influenced the number of questions asked. We did not choose whom to ask questions. It's only after reading the posting that I would ask questions…*

***Trainee J***: *…When I gave suggestions, they were about things I had also experienced during my SBE…*

As pointed out earlier, only Trainee J mentioned that she preferred the first discussion, because she felt that the questions asked by her peers for the first discussion were more interesting and the topic of the discussion was related to one's personal life. Her preference for the first discussion, especially the questions, can also be explained by the fact that she had encountered some problems with her peers' questions in the second discussion (as discussed previously). She further stated that she was encouraged to read the postings of her peers, despite that fact that she does not like reading, especially reading from a PC, as she found both topics interesting.

> *…But the questions were more interesting for the first discussion. I preferred the first topic. It was more interesting. It related to our personal life. We were asked about our personal life … And also I think for the first discussion, I really enjoyed reading the postings because then you know about the personal life and it was out of curiosity. I read the postings over several days. Both topics were very interesting. I also enjoyed reading the postings for the second online discussion ...If the topics were not interesting, I may not have read the postings. I don't like reading and especially reading on a PC. But in this case, I did enjoy reading all the postings.*

Unlike Trainee J, others in the group reported that they did not like the topic of the first discussion because it did not relate to their recent past experiences and was either too 'bookish' or 'theoretical'. Consequently, they were less motivated to read the postings and interact with their peers.

***Trainee A***: *We had to think of what we used to eat during our adolescence and we don't remember too well.*

***Trainee D***: *I feel it was too "bookish". I had to restrict myself to lecture notes and online readings… and also I did not quite like the topic of the first discussion. I very much liked the second online discussion. … For the second one, I read almost*

*all the postings. For the first one, I had a look at some postings and then I did not bother reading all the postings because I found them boring…*

***Trainee F**: …the topic for the second for the second discussion was more interesting because we felt more concerned about the issues discussed. The first topic was more theoretical.*

The topic for the second online discussion was open-ended and trainees' responses indicated that they had adequate opportunities to explore the identified problem deeper as well as to propose solutions collaboratively.

***Trainee A***: *We came to know about the different problems that our friends encountered and the solutions as well. It was more helpful to us for our future teaching career… We have an opportunity, like for example for the second online discussion, to get to know about the different problems we can face…*

***Trainee D***: *The postings for the second discussion were more interesting. I could read about the problems and how to tackle these problems… When reading the postings of my peers, I even got to learn about the problems that can crop up in a classroom situation, problems that I had never thought of before. I can apply some of the solutions provided by my peers to address these problems if ever they crop up in class when I start to teach.*

***Trainee E***: *… and the problem which were encountered by one person, we also faced the same problem. So we came to know that we were not the only one who faced that particular problem. We were also made aware of new problems which might crop up when we proceed onto teaching…if there was a particular problem, and that said they tackled it this way, we can share more ideas on how they can tackle the problem in different ways.*

***Trainee G***: *There were certain things I did not know or would not have thought about on my own. For instance, there were suggestions from 'Trainee D' on the splitting of classes where she talked about her own experiences. These inspired me and could help me in my teaching career later. I also got to know about the school-based experiences of others and the problems they had faced.*

***Trainee J**: ….I also enjoyed reading the postings for the second online discussion because I could know about the problems my peers faced…*

Trainees felt that the second online discussion promoted argumentation, comparison of ideas and alternatives and to a greater extent than the first online discussion. Some trainees even felt that as compared to a written assignment, the online discussion provided greater opportunities for comparison of ideas and alternatives.

***Trainee A***: *May be it was her point of view. Sometimes I agreed and sometimes I did not quite agree with what they were saying. It was their idea. We can have different ways of thinking. I respected their point of view. If I did not agree, I*

*asked my peers to provide explanation. In some cases, their way of thinking was good, in some cases mine. It depends on the situation. But if they say something that make me feel that my idea is not good, I can agree, I can change my point of view… If we had done it like a traditional assignment, we wouldn't have come to know what our friends encountered, the problems they faced. In this way, it was more helpful to us because we came to know about many problems and the solutions…*

***Trainee C***: *It was a topic where everyone was having different views… Of course different people have different ideas, so it is important to share our ideas and discuss about it, whether we accept this view or we have another perception. …When we are writing an assignment, we give only our perceptions. We won't be knowing about other's perceptions. Like this, we are interacting; it helps you better respond to others ideas and add you own views. And then we are much more free to express ourselves and sometimes the topic can be much more elaborated…*

***Trainee D*** (question on preference for online discussion): *Second one because I could see the different ideas of my peers… We were more free to express ourselves. We have been able to see different views, instead of being exposed to only one view.*

***Trainee E****: In the first one, it was about something more personal. We could not share our opinion on that. We could only ask questions rather. In the second one we were free to give our ideas and share our opinion on a particular thing. … And then as I said for the first discussion, it was something more personal. If someone says they don't like this, we cannot say that you should like this…For a written assignment, we are not able to read what others have said in their assignment while in this case with the online discussion we could read what our peers had said…*

***Trainee G***: *…When I read some postings and found something interesting I gave suggestions on how to improve or I would express my views and opinions, for example, I like this or I agree or disagree. I can also share my experiences with others… We can read the different ideas and opinions of others, unlike for written assignments. We do not have access to the written assignments of others.*

***Trainee J***: *For written assignments we think that whatever we have written about is correct. They are individual tasks and we do not know what others have written about. For the discussions, we could read others postings and ideas – this was very interesting…*

Trainee C felt that given that everyone is different, one should readily accept the differing views of others, rather than taking them badly or personally. Trainees D and E felt that diverging views and opinions should be taken positively as these could help them to see a situation/problem from a different perspective.

***Trainee C****: Noone really disagreed with my ideas and postings, but if it were to happen, I won't take it badly because of the fact that everyone is different. May be their point of view or perspective is different, and I will agree with them…*

***Trainee D**: Not everyone must agree with what I say. But I also expect some justification from the person who disagrees with my ideas and points. I will try to see other people's perspectives when they do not agree.*

***Trainee E**: I took it positively because I might be seeing the problem from a particular angle and then they see it from another perspective. So I view this as something positive. I realize that she could also be right if I look at the problem in the same way…*

Trainee J was also supportive of diverging views, despite the problem she had encountered during the second online discussion.

***Trainee J**: I was expecting my peers to disagree with my ideas. For me this would help me to learn new things. I took that positively. We must realize that we are not always correct. So it's good to have this discussion. We learn about both the positive and negative aspects of an issue. …When we were arguing with peers, we learn more.*

**Principle 4: Promote online collaboration and interaction**

Another beneficial aspect of the online discussions, especially the second one, is related to the fact that interaction with peer and exchange of ideas was encouraged.

***Trainee C***: *… it was more interactive and we could give our opinion…*

***Trainee D***: *There was also better peer interaction…I feel the online discussions are more useful because I could read my friends' work. For a written report, there will be no sharing of ideas. Here we could have access to everyone's work and we have learnt a lot from that. So in that sense, the online discussions have been very fruitful.*

***Trainee E***: *…it was more interactive… And then each one shared her ideas… We have the opportunity to share our knowledge and ideas and then at the same time we respected others ideas.*

***Trainee F**: …there were more interaction and exchange of ideas among peers. I could read the work of my peers, ask questions and make comments… we could share our experiences online. This was a plus.*

***Trainee G**: …the second one was more interactive and somewhat deeper. We responded to peers' questions and this encouraged interaction. We would also make suggestions. I have learned a lot about this topic…*

***Trainee J**: We've had many opportunities to share our ideas.*

Trainees pointed out that they had asked more questions in the second online discussion than the first one because in the first online discussion I had specified a minimum number of questions to ask and the date limits. So, most trainees

restricted themselves to the specified number of postings and they did not add any other questions past the date limit.

***Trainee F***: *In the first discussion, we were asked I believe to ask only 2 questions and to respond to questions asked. The number of questions and responses were specified. While for the second discussion there was a deadline for asking questions, responding to questions and making comments, but the number of questions to be asked was not imposed. I feel when we impose the number of questions, students will strictly adhere to the stated number of questions. It is better not to impose the number of questions, but rather simply has a closing date for the discussion. This will allow for smoother flow of the discussion.*

***Trainee J****: For the first one, there was a date limit for everyone to ask questions… I did not like the fact that there were date limits for asking questions…There was no set deadline for asking questions in the second online discussion.*

Moreover there was greater interaction in the second discussion because the guidelines for online participation for the follow-up postings did not only emphasize asking questions and then responding to these questions, unlike the guidelines for the first online discussion. Besides asking questions and responding to them, trainees could also comment on their peers' postings and make suggestions. In fact, even if a trainee did not get too many questions from her peers or tutor, she could still participate actively in the online discussion by commenting on her peers' postings and proposing additional solutions.

***Trainee A***: *I did not ask any question in the second discussion. I only gave suggestions because I had seen that there were already too many questions asked, and at that particular time we had many assignments. So I did not want to put too much pressure on my peers. I did not ask any question. I just gave suggestions and I just participated in the discussion.*

***Trainee C***: *…One thing that the others did not quite understand was that it was not just necessary to ask questions. You could also give your own ideas and opinions. Giving our ideas and opinion is equally important because of the topic which we were discussing…I did not have many questions; it was about average. Even though I did not have many questions, I was asking questions to my peers, or adding comments. I would find other ways to interact with my peers.*

***Trainee G***: *… for the second discussion, the requirements were more open. We did not only have to ask questions or respond to them. We could also comment on peers' postings and make suggestions…*

Trainee J refrained from asking questions after she had encountered some problem when she asked questions at the beginning of the second online discussion, but this

did not limit her participation. She still participated by making comments and suggestions.

> *What I did after reading my peers' postings, if I would have noticed that some of them did not get any question, I would make some comments to encourage them to participate. In my case given the problem I had at the beginning of the second discussion, I preferred to make suggestions. But may be if it was for another online discussion, I would also ask questions.*

Comments from the trainees indicate that having negative experiences when asking questions and having a heavy workload can interfere with the degree of online participation, but if the online discussion is designed to promote various ways of online interaction, trainees can still participate actively in the online discussion. Trainee C reported that when her workload was heavy, at times she forgot that she should check the online discussion.

***Trainee C***: *It was only that at that time we had a lot of work to do. There were lots of assignments to do. Sometimes we forgot about it, and when we were talking among ourselves, then we remembered that we had to go online to have a look.*

If an online discussion is to facilitate deep learning, it should foster an environment where posted messages generate questions that probe for clarification, assumptions, viewpoints, implications and consequences (Toledo, 2006). Trainees generally read their peers' postings before asking questions that would extend the discussion and to seek clarifications. Trainees mentioned it is important to avoid repetition of questions and 'yes/no' types of questions. One should also ensure that the question asked is relevant, specific and not too challenging. For Trainee F, familiarity with the subject matter also influenced her choice of questions.

***Trainee C***: *If you have to ask a question, you should make sure that you are not asking the same question, whether someone else has not already given the ideas or solutions for something. So obviously, it is very important to check all the postings ..And sometimes there were things, repetitions in some postings. So it was necessary to find another question. I would try to avoid repeating the same question…*

***Trainee D***: *The content of the posting was a very important factor. If I had not quite understood something, I would then ask questions…I had thought about some questions, then I did not ask because I felt they were not very good questions. Also there were some questions that my peers may not have been able to answer because they were out of context or may be too challenging.*

***Trainee E*** : *I chose questions that would be pertinent to others as well. I avoided questions which were too broad or vague and "yes/no" questions …*

***Trainee F***: *I would ask questions which I myself would feel more at ease to answer. Also, I would ask questions on matters that were not clear to me or if I wished to get additional information.*

***Trainee G***: *When I was reading the postings and would come across things that were not clear to me, then I would ask questions. I would ask my friends to clarify the matter…*

***Trainee J***: *May be things that were not clear or if my peer had mentioned something and I wanted to find out more about a specific aspect, then I would ask questions…*

Nonetheless, trainees A and C felt that not all questions were meaningful. There was repetition of a few questions and in some instance, questions were asked for which the answers could already be found in the original posting.

***Trainee A***: *Some peers asked questions for which the answers could already be found in the posting. Also at times, some peers asked the same question to other peers. May be they just typed one question and asked it to different peers.*

***Trainee C***: …. *Just that at time some peers were asking the same question to different peers. May be that's because they did not have any other question to ask or they do not know what to ask. Yes it seems that they did not really read the postings. They were just asking the same question to everyone.*

According to trainees C and E, the online environment was more conducive to asking questions than a traditional face to face class.

***Trainee C***:…*I was feeling free to ask questions and interact with my peers. In f2f classes, we may not have enough time to think about the question. Like as I was telling you I was reading the postings at night. Sometimes even in the morning I would be having some questions and ides on the postings.*

***Trainee E****: …If we know that some friends are not too at ease to answer questions in f2f classes, I will refrain from asking her a question. In an online environment, it was easier to ask questions to that same person…*

Although, the online environment for the discussions had generated several questions, unequal distribution of questions among trainees was thought to be problematic by trainees E and F. Trainee F felt that those who got fewer questions would gain less from the forum while Trainee E felt it would be unfair to penalize trainees who had more questions to answer, but did not answer all of them.

***Trainee F***: …*The problem that I noted with the second online discussion was that the participation was not equally distributed. Some peers were interacting more with one another, while not interacting with others at all. They would be asking*

*several questions or making comments to the same person. The number of questions and comments received from peers were not equally distributed. As such peers who had more questions had more to do while those with fewer questions had little to do. I feel that the persons with more questions would have gained more from the online discussion.*

***Trainee E***: *In my case it did not happen. However, it would be good to equally distribute questions because I feel that some peers had too many questions to respond to and they did not have the time to respond to all the questions. It's unfair if they get penalized for not answering all the questions.*

**Principle 5: Place more emphasis on the quality of ideas than on the quality of language used**

Trainees generally felt that more emphasis should be laid on the content matter and the quality of ideas in the postings rather than the quality of the language used. Some trainees mentioned that the tutor should not penalize trainees for grammatical, spelling and punctuation errors to encourage online interaction, especially among those who are not good in written English and for those who have not had prior experiences with online discussions, and also because they are not English teachers.

***Trainee D***: *Yes, because there are students who are not good in written English but have very good ideas. For me it's the content that matter. So, we should not penalize students for their language. After all, we are not English teachers…*

***Trainee F****: More emphasis should be laid on the quality of the ideas because the ideas are more important. We are trying to convey a message through our ideas. If we are penalized on language errors, we may not participate as much.*

***Trainee G***: *It was fair because this was only my second participation in an online discussion forum. I'm not really familiar with this type of learning experience. I felt more at ease to interact online when I knew that I did not have to focus so much on typing errors and grammatical mistakes…*

***Trainee J***: *Yes, especially when we are responding to questions, I find it easier to type directly my question. So it happens at time that we leave mistakes while typing. It is better to focus on the ideas.*

Although all trainees generally agreed that the quality of ideas was more important than the quality of language, not everyone felt that the quality of the language should be totally ignored. Trainee A paid much attention in the formulation of her follow-up postings to make sure that she would not hurt the feelings of her peers.

She also felt that at tertiary education level due consideration ought to be given to the quality of the language.

> *…I used to always change my wordings and reformulate my comments. Sometimes I would type something and then retype it to improve it, especially trying to avoid hurting the feelings of my peers…I think language also plays an important role because we are not at a stage where we can be allowed to do mistakes. We are not at primary or secondary school level where some errors are acceptable.*

For Trainee E, given that they would soon be teaching in school, as teachers, they should start to adopt the habit of writing words and tenses correctly. Moreover, she felt that she spent much time proof reading her posting before uploading it and as such her effort should be recognized.

> *For example, in these discussions no marks were allocated to language…. Some peers did not bother to go back and check what they had written. For instance there was an 's' missing or the verb tense was wrongly used. I took the time to read and spot grammatical mistakes in my postings. So it's my time which I have used and which I feel has been wasted compared to others. Quality is more important though. Because we are going to be teachers, we have to take the good habit of writing the words and tense correctly.*

Lack of attention to the quality of language when formulating one's postings may have resulted in a few postings that created some misunderstandings and some tension among peers. The postings were wrongly interpreted due to the tone and the poor choice of words.

***Trainee A***: *The way some peers replied or made suggestions may have created some tension and misunderstanding.*

***Trainee E***: *The disadvantage is that at times we may misinterpret students' postings……It created some misunderstanding because of the way some comments or questions were formulated. But it could also be that the person wrongly interpreted what we say.*

***Trainee J***: *I think it was not the fact that they disagreed with me, rather they did not understand me well. And finally I had to refer to notes from another module on assessment and evaluation to back up my arguments. Then I think they understand well.*

As pointed out by trainees, online postings may at times be misinterpreted due to the way comments and questions have been formulated. Trainee J felt that misinterpretation of her postings most likely created some tension between her and some of her peers (Trainees B, D and E) rather than the fact that her peers

disagreed with her ideas. She reported that upon referring to her lecture notes from a module on assessment and evaluation to back up and to substantiate her arguments, the misunderstanding was cleared.

If marks were to be allocated for the quality of language, trainees mentioned that the weighting should be less than for the quality of ideas. Allocation of marks might encourage trainees to express themselves more clearly, thus avoiding misunderstandings and tense situations.

***Trainee D:*** *May be we can allocate marks to encourage students to express themselves clearly, but the weighting should be minimal.*

***Trainee E***: *For example, in these discussions no marks were allocated to language, but I think some marks should be allocated. Not five, but at least 3 marks…*

Trainee G also suggested that tutors should consider trainees' familiarity with online discussions prior to allocating marks. Marks may not be allocated for quality language if trainees are not familiar with online discussions. However, as they feel more at ease to use the online forums, the tutor could consider allocating marks to the quality of the language used.

> *May be as we get more used to online discussions, we can put emphasis on the language as well.*

**Principle 6: Be aware of learners' conceptions about teaching and learning in determining tutor's degree of participation online.**

During Phase 2 of the study using Chan's TLCQ (Chan, 2001), it was found that the trainee teachers did not exclusively hold traditional or constructivist conceptions about teaching and learning. There seems to be an intermingling of the two conceptions and this was somewhat reflected in the comments made by the trainees during the interview with regards to the degree of participation of the tutor in the online discussion and the relative importance of the tutors' postings as compared to trainees' postings.

Some trainees felt that tutor's and peers' postings were equally important. Peers' postings allowed trainees to know more about the different problems faced by their peers while tutor's postings helped them to know what was expected from them

and how they could improve their postings. Responding to peers' postings also encouraged trainees to interact online.

***Trainee A:*** *Both were equally important. Tutor's postings provided ... Peers' postings were also useful as...*

***Trainee C****: No, both are equally important. Peers' postings allowed us to know more about themselves and what they have been doing in their SBE, what problems they faced…*

***Trainee F:*** *Both were equally important. The students' postings are also important because I think they are expecting others to respond to their postings… we can know what the tutor think of our postings and to know how we can improve on our postings.*

***Trainee G***: *When I read the postings, I proceeded in a sequential manner, reading them in the order they were posted. As such, I did not give greater consideration to the tutor's postings.*

***Trainee J***: *No both are equally important in order to interact with peers. I read the tutor's postings in order to know what the tutor was expecting from us…*

Trainee E was, however, of the opinion that the tutor's postings were more important than the peers' postings. Reading about tutor's expectation was more important than reading or responding to peers' postings.

> *…we have to know what the tutor was expecting from us. Whereas for the peers' postings, it can wait. If for instance, I had only 5 minutes to spend online, I would rather look at my tutor's postings than my peers' postings.*

Trainees A and G did not give more importance to the tutor's postings when reading the online postings, but they expected the tutor to comment on or respond to most of the trainees' postings. According to them, tutor's comments and responses would indicate that the tutor is reading the trainees' postings, thus giving due consideration to postings and valuing them. Consequently, this encouraged trainees to participate online actively.

***Trainee A***: *It is important in the way that this will encourage them to work. They will know that the tutor is seeing what they are doing and what they are replying. It encourages participation.*

***Trainee G***: *I think it will be somewhat difficult for the tutor to comment on all the postings, but the tutor could respond to most of the postings. In this way, the student will know the tutor is reading the postings. This may encourage the student to respond to postings… I expect the tutor to read all our postings because this will show that she cares for our work.*

Trainee J felt that the tutor's online presence was important although she may not intervene while Trainee C felt that it was best that the trainees discussed among themselves first and the tutor could then intervene to add her comments and suggestions.

Trainee C: …*May be you want to let only the peers discuss among themselves, then at the end you would add something or comment…*

Trainee J: *The tutor should be there all the time, even though she may not intervene…*

Trainees' expectations about the tutor's nature and degree of participation in the online discussions are further discussed next.

**Principle 7: Provide appropriate coaching and scaffolding**

The trainees reported that tutor's postings were important because they provided feedback on whether they were on the right track. The tutor's comments helped to clarify certain points and to guide them. Praise motivated trainees to participate in the online discussions.

***Trainee A***: *Tutor's postings provided certain ideas to know if we are replying in a proper way or if we should go deeper and give more explanation. It helped us to see if we are on the right track.*

***Trainee C***: *The tutors; posting were kind of a guide. May be if there is something that we have not quite mentioned in our posting, the tutor will provide clarification…Sometimes if you think that some of us are going off track, you may guide us*

***Trainee D***: *Like what you did, you provided clear expectations. Tutor should be there as a guide all the time. She should monitor the postings. The tutor should also provide feedback, because this will help students...*

***Trainee E*****:** *Tutors should respond to give feedback and tell us whether we are going in the right direction.*

***Trainee G***: *Tutor also need to praise students to motivate them…*

Some of the feedback provided to the trainees face to face, after they had completed the first online discussion, on their online participation was translated into guidelines for the second online discussion (see Figure 8). The feedback and

guidelines helped trainees to participate more consistently in the second online discussion.

***Trainee C:*** *Because in the first one we had not done so much effort and after the first discussion you told us that there should be a time limit to post and we should stick to it, that is the instructions were well mentioned. And you said that at least every two day we should have a look at others postings. You had placed much emphasis on this aspect…*

Besides feedback and acting as a guide, some trainees also mentioned that the tutor can provide additional information on the topic under discussion. The exemplars that were uploaded prior to the start of the online discussion were found to be very useful in guiding the students to structure their postings. Trainees were also better able to structure their postings when the online discussion was divided into different parts.

***Trainee D***: *I found it interesting and enriching when you added new elements to 'Trainee H's' postings. You mentioned that... This was something that I was not aware of.*

***Trainee J****: For me it was also very important that tutor's postings provided additional information…. The tutor can also intervene to provide additional information.*

***Trainee E***: *The examplars you uploaded were also very useful…*

***Trainee A***: *When it was broken in different parts, it became easier for us…*

When moderating and chairing the discussion, trainees felt that the tutor should intervene if there are constant disagreements between peers or one trainee is disagreeing with everyone else. The tutor may also need to remind trainees to check the online discussion if they have not been doing so for a few days since it did happen that at times when trainees were taken up with other assignment work, they completely forgot about the online discussion . As noted earlier, unequal distribution of questions was an issue for some of the trainees. Consequently, trainees suggested that the tutor could help to balance out the number of peers' questions that each trainee got to answer.

*Trainee F: We can ask students not to add questions where there are already questions asked by others. We should think of the person who has put up the posting also. They should try to make the work balanced among their peers…*

Trainee F also mentioned that it was important for the tutor to consider the order in which the initial postings were added.

**Principle 8: Promote critical thinking**

Trainees generally felt that an adequate amount of time was allocated for completion of the online tasks. As compared to written assignments, they had more time to do research work and could work at a more regular pace.

***Trainee A***: *Normally when I get an assignment, I do it two days before the due date … And also I think it was a bit easier than traditional assignments because we got more time to do it…*

***Trainee C***: *But on the whole online discussion is much more better than a written assignment. We have the time to do some research work.*

***Trainee D***: *For me personally, the online discussion were not as bulky as other assessment tasks because we were asking questions and responding at regular intervals. It's not like a written report where you tend to keep everything for the end and then work on it in one stretch over a few days. We do not have to rush through the work…*

***Trainee G***: *… and you provided enough time for us to interact online.*

Nonetheless, trainees felt that reading and responding to postings in a meaningful way to extend and deepen the discussion was a time-consuming activity. At the time when trainees needed to complete assignments for other courses, they could not read all the peers' and tutor's postings or read them thoroughly at regular intervals before reflecting on them and adding their comments. Once their workload for other modules became lighter, they managed to devote more time to the online discussions.

***Trainee A****: …it was time-consuming. We had to comment on what others had written and we needed to give suggestions.*

***Trainee E***: *...in the middle when I had lots of assignments to submit, I just went through the postings quickly. I did not have much time to read then thoroughly. But then later, when I finished the assignments, I read them all thoroughly…*

***Trainee G****: The problem with the second discussion is that in parallel I had many other assignments to do and so I did not have so much time to devote to the online postings – reading, commenting, asking questions…I participated less… I read all the postings towards the end of the closing date, after I had already submitted all my other assignments…*

***Trainee J****: The online discussions took too much of my time to read all the postings and reflect on them. If I was doing the discussion now that I don't have any assignments, it will not pose so much of a problem.*

Although reading and responding to postings was perceived as a time-consuming activity, trainees felt that the online discussions promoted their critical thinking skills. They could justify their point of view, and they could do some research work to carefully structure their postings prior to responding to questions and making comments on peers' ideas. As compared to written assignments, they felt that they had more opportunities to reflect on the ideas of others.

***Trainee A****: …it was more helpful to us because we were able to comment on what our peers had written. This is not possible with other types of assignments.*

***Trainee D***: *It encouraged us to do research work before responding to a question. We cannot add comments or respond to questions just like that. We need to do some research and carefully plan our responses. It also developed our critical thinking skills.*

***Trainee E***: *In an online environment… she would have the time to do some research work and then answer. In a f2f class, she might just give an answer like "I don't know".*
*If they were not right, then I would say why I don't think what they say is right. I would justify why I think she may not be right…*

***Trainee F***: *We could make comments and critically reflect on our peer's postings…*

***Trainee J***: *In written assignments, we have fewer opportunities to reflect on others ideas…*

The second online discussion might have fostered trainees' critical thinking skills to a greater extent than the first online discussion because the requirements were more open- trainees did not only have to ask questions and respond to them, but they could also comment on their peers' postings and make suggestions.

***Trainee G***: *...for the second discussion, the requirements were more open. We did not only have to ask questions or respond to them. We could also comment on peers' postings and make suggestions.*

**Principle 9: Promote learner autonomy and ownership**

Given that the discussion required trainees to work online, it was felt that research work was facilitated since it was easier to look for online materials – '*For research work, given that we were already working online, that helped…*' (Trainee H). The trainees got the opportunity to explore and research new topics while reading their

peers postings and before asking questions – '*The online discussion also gave us the opportunity to explore other topics when reading others' postings. We had to research on other topics also when asking questions. We were not restricted to our topic only like for written assignmen*t' (Trainee E). Thus, trainees felt free to look for other learning materials and they did not have to rely on their course tutor as the main source of information. Peers' postings for the second online discussion were an important source of new and relevant information for the trainees - information about real-life experiences that is not available in books.

***Trainee C***: *I personally came to know about certain things which I did not know about, because all schools are not the same. So for me I have an idea about different types of schools. Like for example.... So I got more information about these things.*

***Trainee J***: *…We learnt a lot in the second discussion, especially about school-based experiences, about school situations that we may not be able to read about in books.*

**Principle 10: Provide meaningful assessment**

Trainees generally thought that the online discussion constituted a meaningful and innovative method of assessment that allowed them to think collaboratively. Trainee J felt that it might be more effective than oral presentations in fostering collaborative thinking since not everyone needed to be present online at the same time to be exposed to peers' ideas.

***Trainee C****: We have to wait for others' postings and questions and then we will add our ideas and make comments.*

***Trainee E****: Well, it was very interesting to do the assignment online. It was a different mode, faster and more innovative…*

***Trainee J***: *…For oral presentations, although we do get the opportunity to listen to others ideas, it's not the same as for online discussions because sometimes not everyone is present during the oral presentation session, especially when the oral presentation is scheduled over more than one day or some students may leave earlier…*

Trainee A pointed out that she looked forward to having such discussions integrated in her forthcoming teacher education courses – '*It was really very interesting. I would look forward to have such discussions in forthcoming courses…'*. Trainee A also mentioned that she preferred to have the discussion graded. Indeed, the allocation of marks to both the online discussions was viewed

positively by all the trainees. It significantly encouraged them to participate actively in the discussion. Moreover, the provision of clear assessment goals and criteria guided the trainees towards more meaningful and deeper contributions.

***Trainee A***: *...it was a good thing because otherwise some only will participate, not everybody. The assessment criteria were important. They helped us to know how we will be getting the marks and on what aspects we should place more emphasis.*

***Trainee C****: If marks were not allocated, we won't be putting in so much time and effort. The assessment criteria helped by guiding us. We know what you are expecting from us.*

***Trainee D***: *…one of the criteria required us to ask questions and comment on peers' postings. So I tried my best to stick to that criterion. Secondly we were told that we would be given marks for our questions and responses… It encouraged us to participate. If no marks were given, then students may not take it seriously…*

***Trainee E****: Good thing because otherwise we would not have taken the time to write and put up our postings. The assessment criteria enabled us to know what was expected from us and on which areas to lay more emphasis. And then, when we do our work and we have the assessment criteria in front of us, we do not go out of subject. We can better structure our work.*

***Trainee F***: *…if we are given extra marks for responding to all questions, then I would put in more effort to respond to the questions.*

***Trainee G***: *It was a good thing and the weighting was OK. This encouraged us to participate. If we were not graded, some of us would not even read the postings or would not participate. The assessment criteria were helpful as we know that we have to put emphasis on these things and we can better structure our postings.*

It is worth pointing out once more that although one of the assessment guidelines laid emphasis on the fact that disagreements or objections should be stated clearly and politely, trainees did not feel that everyone adhered to this guideline. This needs to be looked into when reviewing the design principles and guidelines.

## *6.5 Summary*

Chapter 6 focused on the second iterative cycle of Phase 3 of the study. The second cycle involved the design and implementation of an 'improved' online discussion using the revised design principles and guidelines presented in Chapter 5 (see Table 29). Data collected from the transcripts of the online discussion and semi-structured interviews of study participants were analysed. Analysis of the online transcripts revealed that trainee teachers participated more actively and at a more regular pace in

the second online discussion. Differences were noted in the number of postings and the depth of the postings. The trainees had posted more messages, including more questions, unlike the tutor who participated more in the first discussion. There were more postings from the trainees in the second discussion that reflected a deep level of information processing. Moreover, the second discussion generated more postings which contain positive socio-emotional elements such as praise, acknowledgements and greetings.

Analysis of the interview transcripts showed that the orientation sessions contributed significantly in preparing and motivating the trainee teachers to use the online learning environment. Trainees reported that they felt more at ease to pose questions to their peers online than in face to face discussions. The tutor's comments and feedback proved to be beneficial in maintaining a climate of trust and a safe learning environment. However, the tone used by few trainees to express their disagreements or divergence of views for their follow-up postings in the second online discussion created some tension. Unwillingness to positively accept new ideas and divergence of views from peers can be a deterrent to the maintenance of a safe and trustworthy learning environment.

Trainees preferred the second online discussion because they felt that the topic was of greater relevance to them as prospective teachers. The topic allowed them to explore problematic situations that they are likely to encounter once they start teaching, and to propose solutions collaboratively. The second online discussion promoted argumentation to a greater extent than the first discussion; there were more opportunities for comparison of ideas and alternatives. There was more student-student online interaction in the second online discussion. This can be explained partly by the fact that the online participation guidelines for follow-up postings did not solely emphasize posing questions and responding to peers' questions, unlike the guidelines for the first online discussion. In the second online discussion, trainees could also comment on their peers' postings.

Heavy workload was noted as a potential barrier to online participation. Although, trainees reported that adequate time was allocated for completion of the online tasks, they felt that reading and responding to postings in a meaningful way were

time-consuming. Trainees generally felt that more emphasis should be placed on the content matter and the quality of ideas in the postings than the quality of the language used. Nonetheless, they reported that the quality of the language cannot be totally ignored. Lack of attention to the quality of language can increase the risk of misunderstandings and misinterpretations. Trainees perceived the tutor's and peers' postings to be equally important. Peers' postings were an important source of information about real-life experiences, information that is not available in books. The tutor was expected to have a high online presence through constant monitoring of the online discussion and through provision of regular feedback.

The trainees reported that the online discussions constituted a meaningful and innovative method of assessment that allowed them to think collaboratively. The discussions also promoted their critical thinking skills. The provision of clear assessment goals and guidelines guided the trainees towards deeper contributions. The allocation of marks for online participation was viewed positively by the trainee teachers. It encouraged them to participate actively in the online discussion. The implications of the findings in this chapter, along with the findings from chapters 4 and 5, are further explored under Phase 4 in the next chapter to support the confirmation, modification or rejection of the revised design principles and guidelines.

The next chapter concludes this dissertation. It involves the identification of a set of contextually sensitive design principles and guidelines for the development and implementation of online discussions such that deep learning is facilitated among non-native English speaking trainee teachers from a non-western culture. Areas of further research that emerged from the integrated analysis of data and the limitations in the scope of the study are also identified in the final chapter.

# CHAPTER 7: PHASE 4 AND CONCLUSION

## *7.1 Introduction*

The purpose of this study was to formulate contextually sensitive design principles and guidelines for the development and implementation of online discussions such that deep learning is facilitated among non-native English speaking trainee teachers from a non-western learning context. Culture and language are important factors to be considered in the design and effective implementation of online discussion (Gerbic, 2005; Gunawardena et al., 2001; Moghadam & Assar, 2008; Pisutova-Gerber & Malovicova, 2009; Schallert et al., 2003; Yildiz & Bichelmeyer, 2003). DBR was used to guide the research design since it is particularly appropriate for the development, implementation and evaluation of online learning (Anderson, 2005; Design-Based Research Collective, 2003; Hill et al., 2009; Wang & Hannafin, 2005).

The study involved four phases (see Figure 3) based on Reeves model of DBR (Reeves, 2006) and it was conducted in a teacher education institution among non-native English speaking trainee teachers with collectivist cultural orientations. The first phase of the study involved the identification of a practical problem and a review of the literature to determine the significance of the problem. It was noted that tutors at the local teacher education institution were not aware of how to use online discussions to facilitate deep learning. Moreover, there was some concern that previous research on the use of online discussions to facilitate deep learning may have overlooked the influence of culture and language since most studies have been conducted among native English speaking students from western cultures. Hence, this study attempted to determine how the design principles known to facilitate deep learning through online discussions could be improved or adapted for non-native English speaking learners from a non-western culture.

The research questions for the study emerged from the identified problem and the literature review. The first research question, "What are students' characteristics and tutors' practices that facilitate deep learning, as reported in extant literature?" was addressed during the second phase of the study. Phase 2 of the study also

addressed the second research question, "According to extant literature, what are the design principles and guidelines for the development and implementation of online discussions such that deep learning is facilitated among non-native English speaking trainee teachers from a non-western culture?" The second phase of the study concluded with the design and development of an online discussion based on the first set (draft) of design principles and guidelines. The third research question "How can the design principles and guidelines addressed in research question # 2 be refined to better facilitate deep learning among non-native English speaking trainee teachers from a non-western culture?" was addressed during the two iterative cycles of Phase 3 of the study. Phase 3 involved the implementation of two online discussions and the revision of the draft design principles and guidelines.

The third research question was also addressed in Phase 4 of the study in this chapter. Data gathered and analysed through various sources (questionnaires, online postings, interviews and a reflective log) during the earlier phases of the study are reflected upon in Phase 4 to further refine the second set of design principles and guidelines developed during Phase 3. This chapter also identifies some areas of further research that emerged from the integrated analysis and from the limitations in the scope of the study.

## *7.2 Phase 4: Implications of study findings for the refinement of design principles and guidelines*

This section focuses on the need to confirm, modify or reject each of the design principles and their related guidelines based on the data gathered and analysed during earlier phases of the study. Generic principles rather than content specific principles were developed so that they can be used across various fields. The guidelines for the design principles increase the adaptability and applicability of each of the principles.

**Principle 1: Prepare and motivate learners to use the online learning environment**

In this study, five of the trainees had not previously participated in an online discussion. Hence, it was important to familiarize them with the online learning environment and prepare them to use the online discussion. The first orientation session was used for that purpose. Teo and Webster (2008) pointed out that students who have never participated in an online discussion need to be guided and prompted on the procedures to take to facilitate and encourage their participation. The novice online learners are likely to lack the know-how to tackle online discussions that require reflection and critical thinking. Trainees' responses during the interview and their relatively high online participation in both online discussions are evidence that the orientation session adequately prepared them to use the online learning environment.

The orientation session familiarized the trainees with the technological aspect of the online learning environment and provided opportunities for them to learn how to interact and respond online. During the interview, the trainees mentioned that if there had not been any orientation session, they may not have been able to use the online forums and they may not have participated in the same way. After having participated in the first online discussion, all the trainees mentioned that the online discussion environment was easy to use. It has been reported that adult learners who are more comfortable with online technologies have lower anxiety levels associated with learning via the online learning environment, and consequently, they tend to engage more actively in online discussions (Hill et al., 2009). The first orientation session was also used to communicate the course expectations, goals and purposes of online discussions and to highlight the ground rules and guidelines for effective use of online discussions. At the end of the first iterative cycle of Phase 3, all the trainees had reported that the goals and purpose of the online discussion were clearly communicated to them and the guidelines provided for the online discussion task facilitated their participation. Trainees reported during the interview that the ground rules and guidelines helped them to better formulate their online postings. They learnt about the key things to consider when posting online or when replying to peers' postings.

Findings gathered during Phase 2 of the study suggest that the trainee teachers were already motivated to use the online discussions at the start of the course. Most of them (n = 10) were either very keen or keen to participate in online discussions in courses offered in their teacher education programme. Only one trainee (Trainee A) had reported that she was not sure whether she was keen to participate in online discussions in her teacher education courses. However, after having participated in both online discussions, Trainee A, during the interview, reported that she looked forward to having such discussions integrated in her forthcoming teacher education courses – '*It was really very interesting. I would look forward to have such discussions in forthcoming courses…'.* The higher deep motive score of all the trainee teachers obtained from the R-SPQ-2F (Biggs et al., 2001) after trainees had participated in the first online discussion further supports that they completed the online task because they were intrinsically motivated rather than to avoid failure.

Analysis of the data related to the first principle confirms the relevance of the principle and supports all three guidelines. Nonetheless, given that findings from the Phase 3 questionnaire and interview show that some trainees found participation in the online discussions to be time-consuming and they already had a heavy workload at the time they were required to participate in the online discussion, it is suggested that opportunities should be provided to foster the time management skills of trainees. The orientation sessions could be used to introduce or reinforce trainees' time management skills. Hence, a new guideline should be added on the need to foster time management skills of students.

**Principle 2: Maintain a climate of trust and a safe learning environment**

It is important to create and maintain a sense of safety and trust within an online learning environment (Hill et al., 2009). Several guidelines were developed to facilitate the application of the second principle. Trainees' responses during the interview show that the tutor's feedback online and during the face to face session (after the participation in the first online discussion) helped in maintaining a climate of trust and a safe learning environment. The trainees felt that the online discussions provided a more relaxed atmosphere, unlike written assignments or

face to face oral presentations where they tend to feel the pressure more. They also reported that they were more at ease to pose questions to their peers online than face to face.

The trainees also appreciated the practical advantages of the online discussion linked to the technological aspect such as its user-friendliness, the ability to work at home at any time and at a more leisurely pace, and the convenience to submit the work online without having to print. Nonetheless, trainees did experience a few technical problems (slow Internet connectivity, inability to add images online and access the site at times, absence of email notifications when new postings were added). These problems were of greater significance for the first online discussion than the second online discussion. Measures taken by the tutor after the first online discussion such as providing Internet facilities on campus, activating the email notification feature of the online discussion, and providing assistance for adding images online, largely contributed to alleviating these technical problems. Slow Internet connectivity and inability to access the site at home still posed a problem for a few trainees for the second online discussion. Adding, reading and commenting upon postings can be more tedious when such problems persist or are recurrent. When tutors develop online discussions with a view to facilitate deep learning, besides focusing on the pedagogical design, assistance should also be provided for technical problems in order to maintain a sense of safety and trust within the online learning environment.

The tutor paid particular attention to using a guiding tone rather than a leading approach when intervening online for both discussions. For the first online discussion, the trainees felt that their postings were treated respectfully by their peers. The tutor did not intervene to guide trainees towards acceptable online behaviours for both discussions as she did not note any flaming message. Nonetheless, trainees reported that the tone and wordings used by some of their peers for the follow-up postings of the second online discussion posed some problems. The trainees felt that at times some of their peers did not use an appropriate tone and wordings to express their disagreements or divergence of views, despite the fact that the guidelines for the second online discussion did focus on that aspect. As the tutor, I was reading trainees' postings everyday and I

personally did not feel that this was a major problem which required my prompt intervention. Moreover, none of the trainees informed me through emails or SMS that the tone in some of the postings was problematic. I left it to the trainees to negotiate among themselves, clarify their misunderstandings and come to a consensus. Therefore, I intervened only towards the end of the discussion.

Trainees' collectivist cultural orientations, where the tendency is to agree and support the views of others (Gunawardena et al., 2001), and the fact they were not used to discussions where others can freely comment upon their ideas to express their disagreements, objections or divergence of views can explain why they did not appreciate some of their peers' postings. It has been observed that students from collectivist cultures feel uncomfortable in challenging their peers and tutors in group situations (Lai et al., 2008). During the first orientation session, trainees had pointed out that two important points to consider for effective online discussion are respecting everyone's opinion and being careful not to hurt anyone's feelings. When working with culturally diverse students and those who are more used to teacher-centred learning environments, greater consideration ought to be given to the tone and wordings used to express disagreements, objections and divergence of views. Hence, in order to facilitate the application of the second principle, a guideline should be added on the need to encourage and guide trainees to express their disagreements and objections clearly and politely. The tutor can encourage and guide trainees by placing emphasis on that aspect when highlighting the ground rules for effective online discussions during the orientation session. Tutors can also provide exemplars, encourage the proper use of emoticons, and inform trainees that they can privately communicate sensitive issues to them through emails or SMS.

Garrison and Cleveland-Innes (2005) have found that the presence in online postings of positive socio-emotional elements such as praise, giving help, raising other's status, and greetings in online contexts creates a non-threatening learning environment that provides the foundation for deep and meaningful learning. Hence, social interaction was encouraged for both discussions. Positive socio-emotional elements were present in the tutor's and trainees' postings for both online discussions, although it was noted that during the first online discussion,

trainees did not always acknowledge replies of their peers to their questions. This weakness was highlighted when trainees were given feedback after their participation in the first online discussion. Consequently, trainees paid more attention to that aspect in the second online discussion. Comparison of the social dimension of the postings for both online discussions showed that in the second discussion there were more postings which contained positive socio-emotional elements.

At the start of each of the online discussions, all the trainees were provided with the assessment criteria and guidelines. The use of assessment rubrics ensured consistency and fairness in assessing the postings of the trainee teachers. To maintain a climate of trust and a safe learning environment, it is important that trainees feel that their work will be assessed in a fair and consistent manner. Analysis of the data related to the second principle confirms the relevance of the principle and supports all the guidelines. In order to improve the applicability and effectiveness of the principle, a guideline was added on the need to encourage and guide trainees to express their disagreements and objections clearly and politely.

**Principle 3: Use authentic activities that focus on problematic situations and encourage exploration of multiple solutions and perspectives.**

Both online discussions focused on topics that were selected in consultation with the trainee teachers at the beginning of the course during the first orientation session to ensure the relevance and meaningfulness of the topics. The first discussion started with an open-ended statement posted by the tutor to encourage exploration of multiple perspectives about factors influencing the eating habits of adolescents. All the trainees wrote a position statement about the factors which most influenced their eating habits during their adolescence. Thereafter, each trainee asked at least 2 questions to their peers and replied to their peers' questions. In the second online discussion each trainee teacher explored one significant problem related to the conduct of Food and Nutrition practical classes that they had observed during their placement at school and the likely impact of the problem on the teaching and learning process. They also had to propose plausible solutions to address the identified problems. Thus, it was a topic that was again of real-world

relevance to the trainees. Trainees explored open-ended, ill defined problems and worked collaboratively to propose solutions.

At the start of the course, the trainees had already mentioned that they looked forward to working collaboratively in the online discussion forums, although during the first iterative cycle of Phase 3, only a few of them had indicated that they preferred to work in pairs or small groups for the discussion. There is evidence that collaborative learning can still occur when students work 'as a group' rather than 'in a group', that is they work individually in an online learning environment where student-student interaction is promoted (Hill et al., 2009). After having participated in the first online discussion, trainees mentioned that increased opportunity to work collaboratively was one of the benefits of an online discussion. Moreover, trainees' interview responses after having participated in both discussions indicate that they had adequate opportunities to explore the identified problem deeper as well as to propose solutions collaboratively.

Although the trainee teachers reported that the first online discussion task focused on an issue that is of relevance to them as a prospective Home Economics teacher, during the interview most of them mentioned that they preferred the second online discussion mainly because of the topic on which it focused. The trainees felt that the topic for the second discussion was more enriching and of greater real-world relevance to them as prospective Home Economics teachers. It better prepared them to tackle challenging situations that can crop up during their Food and Nutrition practical classes as prospective teachers. Moreover, they could better share their personal experiences that they had recently encountered during their school placement, and they could also better relate to the experiences of their peers. The trainees did not quite like the topic of the first discussion because it did not relate to their recent past experiences and was either too 'bookish' or 'theoretical'. Consequently, they were less motivated to read the postings and interact with their peers. The above findings highlight the need to choose topics that are of real-world relevance and that deal with open-ended, ill-defined problems. In addition, the selected topic should involve recent experiences or situations that will be experienced in the near future as a prospective teacher. Hence, the first guideline needed to be amended such that the trainees are involved

in exercises that are of real-world relevance and career-related. It has been found that students are more likely to actively engage with the learning materials when they perceive the concepts to be learned as relevant to their own experience, the real world and their career (Teo & Webster, 2008; Yip, 2008).

Only Trainee J had mentioned that she preferred the first discussion. She felt that the questions asked by her peers for the first discussion were more interesting and the topic of the discussion was related to one's personal life. Her preference for the first discussion, especially the questions, can also be explained by the fact that she had encountered some problems with her peers' questions for the second discussion as discussed previously. She did not appreciate the tone used by a few of her peers to challenge her ideas. Such negative online experiences can be a deterrent to students' online interaction and collaboration, despite having selected a highly meaningful and relevant topic for the discussion. Hence, these experiences should be minimised by encouraging and guiding trainees to express their disagreements and objections clearly and politely, as highlighted under the second principle.

After participating in the first online discussion, all the trainees agreed that reading their peers' postings allowed them to see things from various perspectives and the online discussion created a "space" to allow for diversity of views and perspectives to be heard and appreciated. Most of them felt that the online discussion allowed comparison of ideas. However, only five trainees reported that reading their peers' postings helped them to change their own perspectives while one trainee disagreed and the remaining five were unsure. Trainees felt that the second online discussion promoted argumentation, comparison of ideas and alternatives to a greater extent than the first online discussion. Some trainees even reported that as compared to a written assignment, the online discussion provided greater opportunities for comparison of ideas and alternatives. It was also pointed out that reading everybody's ideas on the online discussion encouraged them to see things differently as they are exposed to different perspectives.

There is evidence that simply stating individual perspectives in an online discussion without integrating the ideas of peers may not be enough to promote

deep learning (Kim & Bateman, 2010). Students should be encouraged to reflect on and challenge ideas rather than solely collect and add ideas. In the second online discussion, trainees made the link to ideas and notions already mentioned in earlier postings of their peers and the tutor. Moreover, a few postings revealed that the trainee made the link to ideas and notions that they had learnt about in other courses. Trainees' responses during the interview show that they acknowledged the importance of having diverging views and opinions in an online discussion and being receptive to them. They felt that such divergence allowed them to see a situation from a different perspective, given that everyone is different. However, some of them did not appreciate the tone and wordings used to challenge ideas and to express disagreements. This again highlights the importance of the new guideline proposed for the second principle on the need to encourage and guide trainees to express their disagreements and objections clearly and politely.

Moving the discussion from exploration to integration and then to resolution was encouraged by getting the trainee to post a summary of the proposed solutions for the different problems that were explored by the group. As compared to the first discussion, the second one generated more postings which included solutions with justifications, advantages and disadvantages of a situation or solution, perceiving the problem within a larger perspective, and developing intervention strategies within a wider framework. On the whole, analysis of data related to the third principle confirms the relevance of the principle and supports all the guidelines. In order to further improve the applicability and effectiveness of the principle, the first guideline was modified such that students are involved in exercises that are career-related in addition to being of real-world relevance.

**Principle 4: Promote online collaboration and interaction**

The online participation of the trainee teachers was high in both discussions. The topics that were selected for both discussions had been proposed by the trainees at the beginning of the course, rather than imposed by the tutor. Moreover, the topics had neither been addressed in previous classes nor were going to be addressed in forthcoming face to face discussions. Trainees' expectations about the online discussion at the start of the course might have also promoted online collaboration and interaction. During Phase 2, they had mentioned that they were keen to

participate in online discussions integrated in their course and they looked forward to working collaboratively with their peers in the online discussion forums. They felt that the online discussions could be used to explain their ideas to others, share their views and ideas, and they could also ask their peers to explain their ideas.

Although there was a high level of trainees' participation in both discussions, the second online discussion was found to be more successful in promoting online interaction and collaboration. The total number of postings from the trainees was higher for the second discussion (147 vs 82). The higher participation rate for the second online discussion may be explained partly by the fact that trainees felt more comfortable with the online learning environment after having participated in the first online discussion. Research has shown that once learners develop the skills to function and feel comfortable in an online environment, they tend to participate more actively and meaningfully in online discussions (Hill et al., 2009; Teo & Webster, 2008).

The topic selected for the second online discussion was another important factor that contributed to the higher level of online interaction and collaboration. During the interview, most of the trainees mentioned that they preferred the second discussion topic. It encouraged them to ask questions and comment on their peers' postings. The guidelines for follow-up postings in the second discussion did not only emphasise asking questions and then responding to these questions, unlike the guidelines for the first discussion. In the second discussion, besides asking questions and responding to them, trainees were also encouraged to comment on their peers' postings and to make suggestions. Thus, reciprocal exchange of ideas was encouraged through questioning, comments and suggestions. The first posting of all the trainees in both discussions fostered mainly student-content interaction, while the follow-up postings involved student-student interaction. Thus, provision was made for individual interaction with the content and student-student interaction in line with beliefs of cognitive constructivists and social constructivists respectively.

An improvement was also noted in the second online discussion in the consistency of online interaction. The trainees did not post their questions, replies, comments

and suggestions close to the due dates, unlike for the first discussion. They regularly checked the forum and their postings (questions, replies, comments and suggestions) were evenly distributed throughout the discussion period. The assessment criteria and guidelines for the second discussion highlighted the need for regular and consistent online interactions with peers and the tutor throughout the discussion period.

Both online discussions generated questions that probed for clarifications, assumptions, viewpoints, reasons, implications and consequences based on the Socratic approach. Trainees did not post any "what" and "when" questions that produce dead-end answers and favour a surface approach to learning (Toledo, 2006; Vaughan, 2008). Thus, the second orientation session on the use of the Socratic questioning technique helped trainees to formulate questions that fostered a deep approach to learning. After having participated in the first online discussion, all the trainees reported that they had improved their questioning skills. Comparison of the interactive dimension of the two discussions tends to support the notion that the second discussion was more successful in creating an environment where posted messages generated questions from the trainees that extended and deepened the discussion. The first discussion generated 24 questions from the trainees while the second discussion generated 31 questions from the trainees. The tutor did not feel the need to ask as many questions in the second discussion (6 vs 13 in the first discussion) because the trainees were actively participating. The topic of the second discussion was one of the factors that contributed to the higher number of questions. Moreover, trainees mentioned during the interview that they had asked more questions in the second online discussion because in the first discussion the tutor had specified date limits and a minimum number of questions to be asked. As such, most trainees restricted themselves to the minimum of two questions and they did not ask any additional question past the date limit. In the second discussion, there were no date limits for asking questions and no restrictions on the number of questions to ask. The guidelines and assessment criteria highlighted the need to ask insightful questions to extend and deepen the discussion.

Although the second online discussion generated more questions from the trainees as a group, a few problems were noted with the number of questions asked by a few trainees. Trainees A and G did not post any question in the second discussion. Trainee A reported during the interview that she felt that her peers had already asked many questions. So, she did not want to add pressure on her peers by asking more questions given that they had a heavy workload at the time they had to participate in the second online discussion. However, she still participated in the online discussion by commenting on her peers' postings and making suggestions. Trainee G faced a problem with Internet connectivity and she could not regularly check the postings at the beginning. Once her problem was resolved, she felt that her peers had already asked several questions. So, she did not ask any additional question. Rather, she participated in the online discussion by commenting on her peers' postings and making suggestions.

The above findings show that it is important to encourage trainees to exchange ideas through comments and suggestions besides replying to questions. In the second discussion, online interaction and collaboration were encouraged by pointing out to trainees that their follow-up postings could include comments that help to clarify or synthesize peers' ideas. The findings also reveal that heavy workload and technical problems are deterrents to online interaction and collaboration, and they can be addressed by the application of the guidelines on the need to foster time management skills of the trainee teachers (Principle 1) and the need to provide assistance for technical problems (Principle 2).

The pertinence of a few questions also posed a problem in the second online discussion. Trainees felt that a few questions were not meaningful and were repetitive. The answers to some questions asked could already be found in the original postings. It is likely that some trainees did not thoroughly read their peers' postings prior to asking questions. To address this problem, the last guideline for Principle 4 can be revised such that emphasis is laid on the need to ask pertinent questions and avoid repetition. It can be formulated as "Create an environment where posted messages generate **different and pertinent** questions that probe for clarification, assumptions, viewpoints, implications and

consequences". The study findings confirm the relevance of the fourth principle and the related guidelines, with some minor modification to the last guideline.

**Principle 5: Place more emphasis on the quality of ideas than on the quality of language used**

This principle is of particular relevance given that the study was conducted with non-native English-speaking trainee teachers. To encourage trainees to participate actively in the online discussions and to facilitate deep learning, more credit was given to the quality of the ideas than the quality of the language (Campbell, 2007; Schallert et al., 2003). Trainees were not penalised for grammatical, spelling and punctuation errors since the tutor did not want trainees to spend too much time formulating and proof-reading their postings in a bid to ensure the quality of the language at the expense of the quality of their ideas. The tutor's feedback focused on the quality of the ideas rather than the quality of the language. Trainees agreed that more emphasis should be laid on the quality of the ideas in their postings. During the interview, trainees mentioned that they felt more at ease to interact online when they knew that were not going to be penalised for grammatical, spelling and punctuation errors. They could better concentrate on the quality of their ideas. The fact of not having to pay too much attention to the grammar, spelling and punctuation also helped the novice online learners.

Although the trainees generally accepted that it was a good thing not to be penalised for grammatical, spelling and punctuation errors, they felt that the quality of the language should not be completely overlooked. During the orientation session, trainees mentioned that the use of appropriate, clear and simple language was an important point to consider for effective online discussions. Trainees also reported during the interview that as students at tertiary education level and as prospective teachers in an educational system where English is the official medium of instruction, the quality of the language cannot be totally ignored. Tutors can consider allocating marks to the quality of the language once all students feel at ease with the technological aspects of the online learning environment. The weighting should be less than the weighting allocated for the quality of ideas. Furthermore, the focus should be more on clear formulation of ideas, using the appropriate wordings and tone rather than on the grammar, spelling and

punctuation. The new guideline for the second principle on the need to encourage and guide trainees to express their disagreements and objections clearly and politely should help to minimise misunderstandings and tense situations that were observed during the second discussion.

In light of the findings from the study, the fifth principle and the two related guidelines are confirmed. The quality of the language can be assessed once all students feel comfortable using the online discussion and to encourage clear formulation of ideas. The assessment guidelines and criteria for the online discussion should give due consideration to clear formulation of ideas. Thus, a third guideline is being proposed on the need to consider students' familiarity with online discussion and clear formulation of ideas when assessing the quality of the language.

**Principle 6: Be aware of learners' conceptions about teaching and learning in determining tutor's degree of participation online.**

Tutors need to be aware of their students' prevailing conceptions about teaching and learning and take these into consideration in the design of their courses. Tutors can then determine their degree of participation in online discussions and try to draw out the desired beliefs to foster a deep approach to learning among their students. Previous studies have found that students who hold transmissive conceptions expect the tutor to participate more actively in an online discussion and are less likely to adopt a deep approach to learning than those who hold constructivist conceptions (Chan et al., 2007; Yildiz & Bichelmeyer, 2003). In this study, the TLCQ developed by Chan (2001) was used to determine whether trainees held transmissive or constructivist conceptions. Although analysis of the TLCQ revealed that the trainees generally were more inclined towards constructivist conceptions, they did not exclusively hold constructivist conceptions. There was an intermingling of the two conceptions which is likely the result of trainees' prior exposure to a teacher-centred learning environment at school and recent exposure to constructivist learning experiences and perspectives in education in their Teacher's Diploma programme.

Given that trainees held mixed conceptions about teaching and learning, the tutor's online presence was important. Garrison and Cleveland-Innes (2005) have observed that high online presence of tutors combined with a course design that emphasizes critical thinking promote deep learning. Tutors' interventions in an online discussion during the first few days, however, can interrupt the flow of the discussion (Haavind, 2005). This is of greater significance among students who are used to teacher-centred learning environments and who are from collectivist cultures as they perceive the tutor as an unchallenged authority who has the final answer (Jetton, 2003; Lai et al., 2008; Parrish & Linder-VanBerschot, 2010; Teo & Webster, 2008). In this study, the tutor refrained from adding postings at the start of the online discussions, except to address a technical problem faced by one of the trainees in the first discussion. Trainees were informed prior to the start of the discussions that the tutor would be monitoring their postings daily, but she would not intervene much at the beginning. During the interview, the trainees reported that the tutor's online presence was important even if she did not intervene.

Most of the trainees considered peers' and tutor's postings equally important. None of them felt that it was more important to respond to the tutor's questions than the peers' questions. The trainees reported during the interview that their peers' postings helped them to learn more about the different problems and the solutions. The tutor's postings served as a guide to inform them what was expected and how they could improve on their postings. Although, the trainees generally did not give more importance to the tutor's postings, they expected her to comment on or respond to most of their postings. This encouraged them to participate in the online discussion as they felt that the tutor was giving due consideration to their postings and valuing them. One trainee, who held transmissive conceptions about teaching and learning, mentioned during the interview that she gave more importance to the tutor's postings; when she did not have too much time to spend online, she would rather read her tutor's postings to know about the tutor's expectations.

The above findings confirm the need for high online presence of the tutor through monitoring of the online discussion right from the start and through the provision of regular feedback. In this study, the tutor's participation in both discussions

mainly involved monitoring of the online discussions, providing feedback to encourage participation, and asking questions to extend and deepen the discussion. The findings suggest that student conceptions about teaching and learning can influence the nature of the tutor's online interaction besides the degree of online interaction. Analysis of the TLCQ revealed that all the trainees felt that the major role of a teacher is to transmit knowledge to students. Moreover, nine of them felt that a teacher's major task is to transmit information. This concurs with what was reported by trainees during the interview; the trainees had mentioned that it was important that the tutor's postings provided additional content-related information. In a study conducted by Lim and Chea (2003), it was observed that students expected the tutor to provide content-focused feedback rather than feedback solely on their online participation. These findings support the modification and reformulation of the sixth principle as follows:

*"Be aware of learners' conceptions about teaching and learning in determining the degree* ***and nature*** *of the tutor's participation online".*

The guidelines should also be amended to highlight the need for the tutor to assume various roles online depending on the students' conceptions about teaching and learning. The tutor's roles can include that of monitoring, coaching, facilitating and providing content-related information. Some of these roles are further explored under the next principle.

**Principle 7: Provide appropriate coaching and scaffolding**

Coaching and scaffolding are important roles of the tutor in a constructivist learning environment (Murphy, Mahoney, Chen, Mendoza-Diaz & Yang, 2005). Tutors are expected to observe learners' performance, provide encouragement and feedback, and guide learners on the steps to take to think and reflect critically. In both discussions, the tutor monitored the online postings daily and trainees were informed about that during the orientation session. The tutor acknowledged trainees' responses to her questions and praised those postings which had significantly deepened and extended the discussion. The trainees reported that praise was an important motivator for participation in the online discussion. They also mentioned that the tutor's comments and suggestions were useful as they provided feedback on whether they were on the right track, clarified certain points

and guided them. The online forum, assessment rubrics and a face to face session (for first discussion only) were used to provide feedback to trainees. Feedback on inconsistency in online interaction pattern for the first online discussion was provided to all the trainees, as a group, during the face to face session and, individually, through the assessment rubric. The feedback and its translation into a guideline in the design of the second online discussion guided the trainees towards more consistent online participation for the second discussion.

Guidance and scaffolding may be of greater significance among novice online learners and among learners of lower cognitive ability (Teo & Webster, 2008). The novice online learners first need to develop the technical skills to function and feel comfortable in the online environment before the tutor can assist them in meaningfully engaging with the online discussion. The learners of lower cognitive ability, on their own, may find it difficult to actively engage with strategies that support deep learning. Findings from this study indicate that the first orientation session was successful in familiarising all the trainees with the online learning environment, while the second session helped the trainees to formulate meaningful questions and to structure their postings. For both discussions, the following strategies helped the trainees to better structure their postings such that deep learning was facilitated:

- The use of the Socratic questioning technique by the trainees and the tutor.
- Having the online discussions divided into different sections.
- The provision of guidelines for the different sections.
- Online access at the start of the course to exemplars of position statements, questions and responses from another teacher education course.

After participating in the first online discussion, all the trainees agreed that the tutor's questions stimulated their thinking. Towards the end of the second discussion, the tutor weaved relevant threads of discussion together and prompted the trainees to summarise the important points raised. There is evidence that the use of task prompts and high level questions that match the learners' level of understanding can facilitate the adoption of a deep approach to learning even among students of lower cognitive ability (Chin & Brown, 2000; Offir et al., 2008).

Haavind (2005) suggests that when tutors chair and moderate an online discussion, they should refrain from intervening during the first few days since their intervention can interrupt the flow of the discussion. Nonetheless, they need to read and monitor the online postings of students almost daily to provide regular feedback and to see if there is a need to steer the discussion back on target. In this study, the trainees mentioned that the tutor needs to intervene if there is constant disagreement between peers or if one trainee is disagreeing with someone else. Analysis of the TLCQ (Chan, 2001) showed that nine of them reported that the tutor should have control over what the students do all the time. It did happen at times that trainees completely forgot about the need to go online to participate in the discussion as they were taken up with other assignments. Thus, tutors may need to remind trainees to check the online discussion if they have not been doing so for a few days in order to maintain the pace and flow of the discussion. This can be done through private means of communication such as emails or SMS. Unequal distribution of questions among peers was perceived as a problem by some of the trainees in this study. It was suggested that the tutor could help to balance out the number of questions each trainee got to answer. This would also ensure more equitable distribution of workload. In light of the findings from the study, the relevance of the seventh principle and the related guidelines are confirmed.

**Principle 8: Promote critical thinking**

When critical thinking skills are promoted, learners are more likely to adopt a deep approach to learning (Halpern, 1998). They develop the skills to identify key ideas, analyse, synthesize and evaluate information, and cite evidence in support of a conclusion. In an online discussion, adequate time should be provided to allow learners to extract meaning from the learning materials, make connections, plan their postings and reflect. Prior to adding their posting, students, especially the novice online learners, require an adjustment period to get used to the technical aspects and processes required for online interaction (Garrison & Cleveland-Innes, 2005; Teo & Webster, 2008). When learners face time constraints, they are more likely to adopt a surface approach to learning (Redmond & Lock, 2008).

In this study, allowance was made for an adjustment period of two weeks prior to the start of the first online discussion. Both discussions ran over a period of 4 to 5 weeks, with the first 2 weeks being used by trainees to read and interpret learning materials, make connections with key ideas and real-life experiences and reflect upon them before articulating the first posting. Trainees were given another 2 to 3 weeks to read their peers' postings, reflect upon them, ask questions, and respond to the peers' and tutor's questions. During the last week of the second online discussion, the trainees were also required to do a wrap-up of the important points raised by their peers, under the guidance of their tutor. Findings from the Phase 3 questionnaire and interview show that the trainees generally agreed that an adequate amount of time was allocated for completion of the online tasks. They even felt that, as compared to the traditional written assignments, they had more time to do research work. Nonetheless, the trainees reported that reading and responding to postings in a meaningful way to extend and deepen the discussion was time-consuming. Given that they are non-native English speakers, it might have taken them more time to understand and interpret the postings of their peers and tutor, thus increasing their workload (Lai et al, 2008). Moreover, the trainees pointed out at the time they were engaged in the second discussion, their workload for other courses was also high, such that they could not thoroughly read all the postings at regular intervals to reflect upon them and to add their comments and suggestions. Once their workload for the other courses became lighter, they managed to devote more time to the online discussion.

The above findings support the need to provide adequate amounts of time to promote critical thinking among trainees. Previous research has shown that a period of 2 to 3 weeks is appropriate to discuss a topic when students go online at least once (Gunawardena, 1998; Rosie, 2000) every two days. In a non-native English speaking learning context, an additional week or two may be needed to allow learners to thoroughly read and understand the postings. Due consideration should also be given to the workload of students. The problem of students' heavy workload is addressed by the new guideline proposed for the first principle on the need to foster time management skills.

Although reading and responding to postings was perceived as a time-consuming activity, trainees generally felt that the online discussions promoted their critical thinking skills. The opening statement for both of the online discussions was open-ended to foster critical thinking. After participating in the first online discussion, all the trainees reported that they had improved their ability to critically analyse information and to critically reflect. Moreover, most of them stated that participation in the online discussion provided them with an opportunity to engage in higher order thinking rather than just state facts. As compared to written assignments, they mentioned during the interview that the online discussions provided them with more opportunities to reflect on the ideas of others.

The relevance and effectiveness of the principle and related guidelines in facilitating deep learning are further confirmed by the scores obtained from the Revised two-factor version of Biggs' Study Process Questionnaire (Biggs et al., 2001) and the analysis of the level of information processing of the online postings. The learning approach scores revealed that all the trainees adopted a deep approach to complete the first online discussion using learning strategies to maximise understanding of the content rather than rote learning to reproduce factual information. Moreover, for both online discussions there were more trainees' postings that reflected a deep level of information processing than a surface level. Analysis of the online postings also indicates that the second online discussion might have fostered trainees' critical thinking skills to a greater extent than the first online discussion. In the second discussion, there were more trainees' postings which provided evidence that links were made to ideas and notions mentioned in earlier postings or to ideas and concepts from other courses. Furthermore, there were more postings which included solutions with justifications, advantages and disadvantage of a situation or solution, perceiving the problem within a larger perspective, and developing intervention strategies within a wider framework. Trainees reported during the interview that the requirements of the second discussion were more open; besides asking questions and responding to them, they could also comment on their peers' postings and make suggestions. In light of the above findings from the study, the relevance of the eighth principle and the related guidelines are confirmed.

**Principle 9: Promote learner autonomy and ownership**

Deep learning is fostered when students are given learner ownership and provided with opportunities for independent thinking and reflection (Edwards, 1999; McGee & Wickershame, 2005). Learner autonomy and ownership are important factors that contribute to the success of an online course (Mimirinis & Bhattacharya, 2007). Unlike face to face courses, online courses are characterised by less reliance on the course tutor. Learners are expected to seek relevance or purpose from the learning materials under the guidance of their tutor (Gill & Halim, 2007). In this study, findings indicate that the online discussions were effective in promoting learner autonomy and ownership, in line with constructivist approaches. Poole (2001) found that online discussions provided a means for learners to take greater responsibility for their learning, despite being used to a teacher-centred learning environment.

After participating in the first online discussion, all the trainees agreed that the online task encouraged them to take greater responsibility for their own learning and they enjoyed the freedom of choosing relevant materials for the online discussion. For both discussions, the trainees were directed to a few online and print-based learning resources, but they were expected to explore and use other relevant learning resources. Most of the trainees did not rely on the tutor's resources as the main source of information. During the interview, the trainees reported that they got the opportunity to explore and research new topics while reading their peers' postings and before asking questions. Given that the discussion required trainees to work online, the trainees felt that research work was facilitated; it was easier for them to look for additional online materials. The trainees also reported during the interview that their peers' postings for the second discussion were an important source of new and relevant information, information about real-life experiences that is not available in textbooks. These findings suggest that the trainees felt free to look for other relevant learning materials and their course tutor was not the main source of information.

For both online discussions, the tutor refrained from intervening at the beginning to avoid dictating the direction of the online discussion. The tutor mainly participated in a supportive role to praise students, acknowledge their responses,

provide feedback and ask questions that would extend and deepen the discussion. Research shows that learner autonomy is promoted when tutors avoid dictating the direction of an online discussion (Hara et al., 2000) and they adopt a stance of collegiality and co-learning rather than as a content expert and evaluator (Haavind, 2005). The above findings from the study confirm the relevance of the ninth principle and the related guidelines.

**Principle 10: Provide meaningful assessment**

After having participated in both online discussions, trainees' interview responses demonstrate that they perceived the online discussion as a meaningful and innovative method of assessment that gave them the opportunity to think collaboratively. They felt that the online discussion was more effective in promoting collaborative thinking than oral presentations since not everyone needed to be present online at the same time to be exposed to peers' ideas. They had also reported, after their participation in the first online discussion, that the online discussion allowed them to critically reflect on their own ideas and those of their peers. Studies have shown that learners are more likely to adopt a deep approach to learning when assessment methods encourage students to think collaboratively and they foster creativity, inquiry, analysis and synthesis (Havard & Du, 2004; Kanuka, 2005; Lew, 2005; Riley & Anderson, 2006).

Trainees had paid more attention to the quality than the quantity of their postings. This is likely due to the nature of the assessment criteria and guidelines which placed emphasis on the qualitative aspects of the postings rather than the quantitative aspects in order to foster deep learning. The provision of clear assessment goals and criteria guided the trainees towards more meaningful and deeper contributions. Prior to trainees' participation in the graded online discussions, seven of them reported that they were not quite sure whether the allocation of marks would increase their online participation. However, after having participated in both online discussions, all the trainees viewed the allocation of marks positively. It motivated them to devote more time and to participate more actively and meaningfully in the online discussion despite their heavy workload. Assessment of an online discussion has been found to be an important motivational factor for online participation. Some studies among Asian

students have found that when participation in online discussion is graded, it improves the rate of students' participation and the quality of the postings (Gerbic, 2005; Teo & Webster, 2008). Moreover, other studies have found that when online participation is not graded, students may never participate and those who start to participate and interact online may gradually lose interest (Moallem, 2003; Wang, 2009). Another factor that most likely contributed to facilitating deep learning is the alignment of the goals and purposes of the online discussion with the learning outcomes of the course, in line with Biggs' model of constructive alignment (Biggs, 1999). McGee and Wickersham (2005) have observed that when an assessment task is congruent with the learning outcomes of the course, deep learning is more likely to result.

Analysis of findings related to the tenth principle and its guidelines confirm their relevance. In order to further improve the effectiveness of the principle, it is suggested to modify the guideline on assessment goals and criteria and reformulate it as "**Allocate marks for online participation** and provide clear assessment goals and criteria that guide students towards deep learning **and adherence to netiquette**". The modified guideline highlights the need to allocate marks to online participation in a bid to promote active and meaningful interactions. In addition, allocating marks for adherence to netiquette should encourage trainees to be more careful with the tone and wordings used to express their disagreements and objections such that misunderstandings and tense situations are minimized.

The study findings confirm the relevance of all ten principles with minor modification to the sixth principle. The sixth principle was reformulated such that tutors give consideration to learners' conceptions about teaching and learning in determining the nature of their participation in online discussions, besides their degree of participation. A few modifications were also made to the guidelines for Principles 1, 2, 3, 4, 5, and 10. The refined set of contextually sensitive design principles and guidelines are given in

Table 37.

**Table 37: Revised set of contextually sensitive design principles and guidelines**

| ***Principles*** | ***Guidelines*** |
|---|---|
| 1. Prepare and motivate learners to use the online learning environment | • Clearly communicate course expectations, goals and purposes of online discussions.<br>• Familiarise students with the online learning environment.<br>• Establish ground rules (netiquette) and lay out clear boundaries for participation in online discussions.<br>• Provide opportunities to foster time management skills of students. |
| 2. Maintain a climate of trust and a safe learning environment. | • Provide timely feedback and constructive criticism to students.<br>• Use a guiding tone rather than a leading tone.<br>• Encourage and guide trainees to express their disagreements and objections clearly and politely.<br>• Provide assistance for technical problems.<br>• Guide students towards acceptable online behaviours.<br>• Encourage social interaction.<br>• Be consistent and fair in assessing students' work.<br>• Offer private means to communicate with students. |
| 3. Use authentic activities that focus on problematic situations and encourage exploration of multiple solutions and perspectives. | • Involve students in exercises that have real-world relevance and are career-related.<br>• Use open-ended and ill-defined problems that require learners to explore and work collaboratively to propose solutions.<br>• Promote argumentation, and comparison of ideas and alternatives.<br>• Move discussion from exploration to integration and then to resolution. |
| 4. Promote online interaction and collaboration. | • Develop online discussions that are not a replication of face to face discussions (in blended learning environments).<br>• Encourage reciprocal exchanges of ideas.<br>• Point out to learners that they need to participate actively and at a regular pace in the online discussion.<br>• Create an environment where posted messages generate different and pertinent questions that probe for clarification, assumptions, viewpoints, implications and consequences. |
| 5. Place more emphasis on the quality of ideas than the quality of language used. | • Give more credit to the quality of ideas than the quality of the language used.<br>• Do not penalize students for grammatical, |

| | |
|---|---|
| | spelling and punctuation errors.<br>• Consider students' familiarity with online discussion and clear formulation of ideas when assessing the quality of the language. |
| 6. Be aware of learners' conceptions about teaching and learning in determining tutor's degree and nature of participation online. | • Participate more in online discussions and post some content-related information if learners hold predominantly traditional conceptions about teaching and learning.<br>• Participate to a lesser extent and assume mainly the roles of monitoring, coaching and facilitating if learners hold predominantly constructivist conceptions about teaching and learning. |
| 7. Provide appropriate coaching and scaffolding. | • Support individual needs and provide feedback.<br>• Assist students to develop personal understanding by crafting appropriate questions and using task prompts.<br>• Use high-level questions that extend and deepen the discussion.<br>• Demonstrate good moderating and chairing skills.<br>• Model appropriate postings and/or provide exemplars. |
| 8. Promote critical thinking. | • Allocate adequate amount of time for task completion, including an adjustment period.<br>• Create open-ended activities that foster reflection and critical thought. |
| 9. Promote learner autonomy and ownership. | • Provide freedom of choice of learning materials.<br>• Create activities that allow students to think for themselves rather than rely on their tutor as the main source of information.<br>• Avoid dictating the direction of the online discussion.<br>• Adopt a stance of collegiality and co-learning rather than a content expert and evaluator. |
| 10. Provide meaningful assessment. | • Use assessment methods that encourage students to think collaboratively and that foster creativity, inquiry, analysis, and synthesis.<br>• Put more emphasis on the quality than the quantity of postings.<br>• Allocate marks for online participation and provide clear assessment goals and criteria that guide students' towards deep learning and adherence to netiquette.<br>• Plan assessment congruent with learning outcomes of the course. |

It is anticipated that the design principles and guidelines in Table 35 would facilitate the development and implementation of online discussions for tutors who work with culturally diverse groups of non-native English speaking students. Additional studies might be needed to foster the applicability of the principles and guidelines to different fields, and to further improve the effectiveness of the principles and guidelines in facilitating deep learning. Some areas of further research are explored in the next section.

## *7.3 Implications of language and cultural factors*

In an online environment, culture and language have been recognised as challenges, especially for individuals coming from non-western countries (Gerbic, 2005). Findings from the study provide additional evidence that language and cultural factors need to be given due consideration in the design and implementation of effective online discussions among non-western learners and those for whom English is a second language. This section highlights how language and cultural issues that emerged during the course of the study were addressed through the formulation of contextually sensitive design principles and guidelines such that deep learning was facilitated among non-western trainee teachers in a non-native English speaking context.

This study and others (Lai et al., 2008) have found that the use of English language by non-native speaking students can increase students' workload as they need to devote more time to the formulation of their postings and to understand the postings of their peers and the tutor. The restraining influence of language was minimised in this study by developing a design principle that required the tutor and the trainee teachers to place more emphasis on the quality of ideas than on the quality of the language used. This principle was applied through the use of the following strategies:

- Provision of assessment criteria that lay more emphasis on the quality of ideas than the quality of the language.
- No penalty for grammatical, spelling and punctuation errors.
- Provision of feedback that lay emphasis on the quality of the ideas and arguments rather than on the quality of the language used.

Trainees reported that they felt more at ease to interact online when they knew that were not going to be penalised for grammatical, spelling and punctuation errors. They could better concentrate on the quality of their ideas. The fact of not having to pay too much attention to the grammar, spelling and punctuation also helped the novice online learners.

Although the trainees generally accepted that it was a good thing not to be penalised for grammatical, spelling and punctuation errors, they felt that the quality of the language should not be completely overlooked. Trainees mentioned that the use of appropriate, clear and simple language was an important point to consider for effective online discussions. Trainees also reported that as students at tertiary education level and as prospective teachers in an educational system where English is the official medium of instruction, the quality of the language cannot be totally ignored. Thus, tutors can consider allocating marks to the quality of the language once all students feel at ease with the technological aspects of the online learning environment. The weighting should be less than the weighting allocated for the quality of ideas. Furthermore, the focus should be more on clear formulation of ideas, using the appropriate wordings and tone rather than on the grammar, spelling and punctuation. If tutors wish to assess the quality of language among non-native English speakers, they need to consider students' familiarity with online discussion and clear formulation of ideas. In this study, tense situations arose due to misunderstandings and misinterpretation of ideas that were not clearly formulated. The time factor should also be given due consideration, especially if students have a heavy workload. Students may need up to 5 weeks to discuss a topic online to allow them to thoroughly read and understand the postings and respond to them. Besides providing some additional time to students, opportunities should also be provided to foster the time management skills of the students.

Extant literature shows that technology-facilitated distance learning environments, including online learning environments, can be implemented more effectively in countries with an individualistic culture as opposed to countries with a collectivist culture (Anakwe et al., 2002; Lai et al., 2008). Moreover, Wilson (2001) stated that students used to teacher-centred learning environments may face cultural

discontinuity when asked to participate in an online discussion because of a mismatch between the conditions of online learning and the students' socio-cultural experiences. In this study, trainee teachers participated actively and meaningfully in the online discussions despite their collectivist cultural orientation, greater prior exposure to teacher-centred approaches, and mixed conceptions about teaching and learning. They felt that the online discussions provided a more relaxed atmosphere, unlike written assignments or face to face oral presentations where they tend to feel the pressure more. They also reported that they were more at ease to pose questions to their peers online than face to face. They perceived their peers' postings and tutor's postings as being equally important. The positive study findings can be largely attributed to the development of design principles and guidelines that took into consideration the cultural background of the trainee teachers, including their prior learning experiences, and their conceptions about teaching and learning.

In order to facilitate deep learning through online discussions among non-western students and to determine the degree and nature online participation, tutors can use tools such as Chan's TLCQ (Chan, 2001) to assess their students' conceptions about teaching and learning. If students hold predominantly traditional conceptions about teaching and learning, they need to participate more in online discussions and post some content-related information. On the other hand, if students hold predominantly constructivist conceptions about teaching and learning, tutors need to participate to a lesser extent and assume mainly the roles of monitoring, coaching and facilitating. In this study, given that trainees held mixed conceptions about teaching and learning, the tutor's online presence was important. The tutor's participation in both discussions mainly involved monitoring of the online discussions, providing feedback to encourage participation, and asking questions to extend and deepen the discussion. The tutor refrained from adding postings at the start of the online discussions, except to address technical problems faced by the trainees or in case of flaming messages. Trainees were informed prior to the start of the discussions that the tutor would be monitoring their postings daily, but she would not intervene much at the beginning. Thereafter, when she intervened, she used a guiding tone rather than a leading approach.

Allocating marks for online participation motivated trainee teachers to devote more time and to participate more actively and meaningfully in the online discussion. Thus, tutors working with students of Asian origin or students used to a teacher-centred learning environment, should consider allocating marks for students' online participation. The assessment goals and criteria should be clear and formulated such that students are guided towards deep learning. Moreover, if students hold collectivist cultural orientations, as is the case in many non-western societies, the assessment criteria should encourage adherence to netiquette so that students pay due attention to the tone and wordings used to express their disagreements and objections. In this study, although trainees acknowledged the importance of having diverging views and opinions in an online discussion and being receptive to them, some of them did not appreciate the tone and wordings used to challenge ideas and to express disagreements. It has been observed that students from collectivist cultures tend to feel uncomfortable when they are challenged in group situations (Lai et al., 2008). Thus, students should be encouraged and guided to express their disagreements and objections clearly and politely. The tutor can encourage and guide trainees by placing emphasis on that aspect when highlighting the ground rules for effective online discussions during the orientation session. Tutors can also provide exemplars, encourage the proper use of emoticons, and inform trainees that they can privately communicate sensitive issues to them through emails or SMS. The next section discusses additional language and cultural issues that were not adequately addressed in this study and that need to be further explored.

## *7.4 Limitations of the study and implications for future research*

This study has implications for educational practice. Even though the findings make a significant contribution to extant literature, some areas of further research emerged from the integrated analysis of data and from limitations in the scope of the study. The small number of female participants in this study, predominantly of Asian origin, limits the generalisability of its findings. Further research could be conducted with a larger group of culturally diverse students to study the influence

of gender, age, community and cognitive ability. Researchers can try to find out whether students have more opportunities to explore multiple perspectives about an issue online when they belong to heterogeneous groups in terms of gender, community, age and ability as observed by Kanuka (2002). In this study, the cognitive ability of the trainee teachers was not determined. If studies with larger groups of students are conducted, the effectiveness of scaffolding in facilitating deep learning among students of lower cognitive ability could be researched. The applicability and effectiveness of the contextually sensitive design principles and guidelines among large groups of students with predominantly transmissive conceptions about teaching and learning or with different levels of English language proficiency can also be further researched.

In this study, the students did not work in small groups for the graded online discussions since few of them reported that they preferred to work in pairs and small groups. This did not pose a major problem to monitor and facilitate the online discussions since there were only 11 students. However, when managing online discussions with larger groups of students, it is important to get students to work in small groups. In a learning context where individual work is favoured, research on effective strategies to foster group work in online discussions in order to promote collaborative learning is warranted. Studies can be conducted to find out whether collaborative learning is promoted online among students used to a teacher-centred learning environment when existing models of group development, such as Tuckman's model, are used for the group formation process right from the commencement of the course. According to Tuckman's model small groups need to experience five sequential stages - forming, storming, norming, performing and adjourning- to achieve optimal effectiveness (Atherton, 2010).

In this chapter, it was suggested that trainee teachers should be guided towards expressing their disagreements and objections clearly and politely. This was suggested since trainees had a collectivist cultural orientation where the tendency is to agree and support the views of others (Gunawardena et al., 2001), and they were not accustomed to challenging their peers and tutors in group situations. The effectiveness of the strategies proposed in this study to address this issue such as providing exemplars to students, encouraging the proper use of emoticons,

privately communicating sensitive issues to the tutor through emails or SMS can be further explored among students with collectivist cultural orientations and those who are used to a teacher-centred learning environment. Moreover, in a blended learning environment, it would be worth comparing patterns of participation in face to face and online discussions among students with collectivist cultural orientations and those who are used to a teacher-centred learning environment. Studies can be conducted to determine whether students feel more comfortable to questions their peers and their tutor(s) and to challenge their ideas in face to face discussions after having participated in online discussions that have been developed using the contextually sensitive design principles and guidelines.

This study considered the students' characteristics that are known to influence their learning approach. Tutors' characteristics such as their conceptions about teaching and learning and their determination and enthusiasm for teaching are other factors that can influence students' learning approach (Entwistle, 2000; Eren, 2009; Gordon & Debus, 2002; Lew, 2005; Pisutova-Gerber & Malovicova, 2009). Further studies are needed to explore the influence of these factors on the teaching approach of non-western tutors' in an online learning environment and how they influence students' learning approach. Studies can also be conducted to determine the applicability and effectiveness of the contextually sensitive design principles and guidelines developed in this study among tutors with transmissive or mixed conceptions about teaching and learning.

## *7.5 Conclusion*

This study examined how to develop and implement asynchronous online discussions using design principles and guidelines drawn from constructivist principles such that deep learning is facilitated among non-western trainee teachers who are non-native English speakers. The findings have theoretical and practical implications for tutors designing and facilitating online discussions. Reeves' model of DBR was chosen to guide the research design of the study. This approach allowed the researcher to design and implement online discussions based on design principles and guidelines that were progressively and iteratively tested and refined.

The findings suggest that DBR is an appropriate research approach to explore and develop and a set of design principles for effective online discussions. It allowed the researcher to solve a practical problem in a real-world setting while extending theories and refining design principles and simultaneously taking into consideration different variables of relevance to the study context. The use of iterative cycles of design, enactment, analysis and redesign along with the use of mixed methods and data from multiple sources (questionnaires, online transcripts, interviews, reflective log) ensured greater objectivity, validity, credibility and applicability of the research findings (Bell, Hoadley, & Lim, 2004; Design-Based Research Collective, 2003; Wang & Hannafin, 2005). At times, it may be difficult for a researcher to determine when to stop the iterative design process (Dede, 2004). In this study, two iterative cycles were deemed appropriate to meet the study objectives and the time frame to complete the study.

The researcher was involved in the design, development and implementation of the online discussions. This required that the researcher had the necessary know-how in online learning and could carry out independent research. The involvement of the researcher as a participant observer is to be perceived as a key aspect of studies involving DBR rather than a contaminating intervention (Barab & Kirshner, 2001). By assuming multiple roles, the researcher could address practical and contextual constraints in the design and implementation of the online discussions that appeared during the course of the study (Van Den Akker, 1999). Nonetheless, the researcher paid careful attention to adapt to the perspectives and beliefs of the study participants rather than imposing her own values and beliefs. The researcher also reassured the study participants that their responses to the questionnaires and interviews would in no way affect their course grade.

The research findings of studies using a DBR approach cannot be readily generalised across study participants and contexts (Wang & Hannafin, 2005). In this study, the study context and all the changes brought about during the iterative design and planning processes were thoroughly documented such that researchers and designers working in other learning contexts can get a clear picture of the relevant contextual factors. Consequently, they can modify and adapt the refined design principles to suit their context.

The study findings also indicate that online discussions designed using constructivist principles can foster deep learning among non-native English speaking students with a non-western cultural orientation. When due consideration is given to language, culture and students' conceptions about teaching and learning in the design and implementation of online discussions, potential barriers and challenges noted in previous studies such as difficulties to communicate online in English, collectivist cultural orientations, and a mismatch between the conditions of the learning environment and the learners' socio-cultural values and experiences (cultural discontinuity) can be overcome or minimised (Anakwe et al., 2002; Gerbic, 2005; Gunawardena, 1998; Lai et al., 2008; Lim, 2004; Lin, 2008; Moghadam & Assar, 2008; Schallert et al., 2003; Wilson, 2001).

In this study, several elements have been found to influence the effective implementation of the online discussions. The orientation sessions were successful in familiarising trainee teachers with the technological aspects of the online learning environment, especially the novice online learners. The sessions also provided opportunities for the trainees to learn how to interact and respond online, and helped the trainees to formulate meaningful questions and to structure their postings. Time management skills could also be fostered during orientation sessions to enable students to manage their time effectively when they have a heavy workload since a heavy workload can deter students from engaging actively and meaningfully in online discussions.

Even if students have good time management skills, they need an adequate amount of time to extract meaning from the learning materials, make connections, plan their postings and reflect. Study findings suggest that non-native English speaking students require more time to read, understand and interpret the postings of their peers and tutor before they can respond to the postings in a meaningful way to extend and deepen the discussion. Allowance should also be made for an adjustment period for the novice online learners to get used to the technical aspects and processes required for online interaction.

It is important for tutors to consider the technical aspects of the online learning environment besides focusing on the pedagogical design when developing online discussions. This promotes and maintains a sense of safety and trust. When students feel comfortable with the online technologies, they tend to participate more actively in online discussions. In this study, trainees felt that online discussions provided a more relaxed atmosphere than written assignments and oral presentations. However, slow Internet connectivity and inability to access the site at home hindered online interaction and collaboration.

In order to maintain a sense of safety and trust online, especially among learners with a collectivist cultural orientation and those used to a teacher-centred learning environment , emphasis should be placed on the tone and wordings used to express disagreements, objections and divergence of views. Tutors need to encourage and guide their students to express their disagreements and objections clearly and politely. This would minimize misunderstandings and tense situations which can be deterrent to students' online interaction and collaboration despite the fact that the topic of discussion is highly meaningful.

The topic of discussion is a critical element to promoting deep learning. When the discussion topic is selected in consultation with students, it is not addressed in face to face classes, and it involves ill-defined problems that relate to students' career and recent experiences, students are more likely to engage actively and meaningfully in online discussions. Online interaction and critical thinking are also fostered when students are encouraged to comment on peers' postings and to make suggestions besides simply asking questions and responding to them. Among non-native English-speaking students and novice online learners, online interaction is promoted when they are not penalised for grammatical, spelling and punctuation errors. If tutors wish to allocate marks for the quality of the language, the weighting should be less than the weighting for the quality of ideas. Marks can be allocated for clear formulation of ideas and using the appropriate wordings and tone once all the students feel at ease with the technological aspects of the online learning environment. Grading online discussions and clearly communicating the assessment goals increase students' motivation to participate actively and meaningfully. The assessment criteria and guidelines should also be clearly

communicated. They should guide students towards deep learning by placing more emphasis on the qualitative aspects of the postings, such as the clarity of ideas and the pertinence of questions, comments and suggestions, than the quantity of ideas, questions and postings.

The tutor has a key role in the effective implementation of online discussions to facilitate deep learning. Study findings suggest that students' conceptions about teaching and learning significantly influence the tutor's degree and nature of online participation. High online presence of the tutor through monitoring of the online discussion and through the provision of regular feedback is essential when students hold mixed conceptions about teaching and learning. Students who hold strong transmissive conceptions about teaching and learning tend to give more importance to the tutor's postings. Moreover, they expect the tutor to contribute to online discussions by providing content-related information that supplements students' postings. Hence, when implementing online discussions designed using constructivist principles among students with transmissive conceptions, the tutor can provide some content-focused feedback, adopting a stance of co-learning rather than acting as a content expert.

The study findings, on the whole, provide further evidence that online discussions should not be integrated in teacher education courses solely to increase student-student interaction and tutor-student interaction (Garrison & Cleveland-Innes, 2005; Havard et al., 2005). They should also be used effectively as a tool to promote deep learning. The tutor has an important role in fostering the conditions for effective design and implementation of online discussions such that deep learning is facilitated. Online discussions, in and of themselves, do not facilitate deep learning nor do they automatically become interactive, collaborative and reflective by virtue of their text-based, reflective and collaborative properties (Kanuka, 2002; Pawan et al., 2003; Wang, 2009). The development of contextually sensitive design principles and guidelines, in this study, should facilitate the task of tutors and other practitioners working with culturally diverse groups of non-native English-speaking students to develop and implement effective online discussions. Moreover, it is anticipated that the principles may be

applied to various fields as they are generic principles rather than content specific principles.

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# APPENDICES

## *Appendix 1: Phase 2 questionnaire*

Dear trainees,
We are currently trying to gather some data to see how we can improve the learning environment of our teacher education programmes. All data will be treated in strict confidentiality. We rely on your cooperation and honest opinions to provide us with useful information. Kindly follow the instructions for each of the sections in the questionnaire.

SECTION A
**Please provide the following information about you by placing a check (√) in the appropriate box(es) and/or writing the required details.**

A1. *Gender*: Male □ Female □

A2. *Your age*: _____ years

A3. *Your first language*:

□ Creole
□ French
□ English
□ Other (please specify _____)

A4. *Your community:*

□ Indo-Mauritian
□ Creole
□ Sino-Mauritian

A5. *Your highest qualification*:

□ Higher School Certificate (HSC) with 2 A-level subjects
□ Higher School Certificate (HSC) with 3 A-level subjects
□ Diploma (please specify _____)
□ First Degree please specify _____)
□ Postgraduate Degree (please specify _____)
□ Other (please specify _____)

SECTION B

**Please provide the following information about you by placing a check (√) in the appropriate box(es).**

B1. *How often do you use desktop or laptop computers*?

□ Never used a computer
□ A few times a month or less
□ Once a week
□ Every day or two
□ Several times a day

B2. *Do you have regular access to a computer?* ***(If you answer NO to this question, go to question B4)***.

.
□ Yes
□ No

B3. *Where do you have regular access to a computer?* ***(Please check all that apply).***

□ Work
□ Home
□ Friend's or relative's house
Library
□ Social Welfare/Youth/Community centre
□ "Cybercafe"
□ Post Office

B4. *How would you rate your current computer skills?*

□ Very poor □ Poor □ Fair □ Good □ Very Good

B5. *How often do you use the Internet / World Wide Web? ?*

□ Never used the internet/web
□ A few times a month or less
□ Once a week
□ Every day or two
□ Several times a day

B6. *Do you have regular access to the Internet?* ***(If you answer NO to this question, go to question B8)***.

.
□ Yes
□ No

B7. *Where do you have regular access to the Internet?* ***(Please check all that apply).***

□ Work
□ Home
Library
□ Social Welfare/Youth/Community centre
□ "Cybercafe"
□ Post Office

B8. *How would you rate your current Internet or Web skills?*

□ Very poor □ Poor □ Fair □Good □ Very Good

SECTION C

**Please provide the following information about your opinion and participation in online discussions, i.e., group discussions that involve the exchange of messages among participants via the Internet in a way that does not require them all to be available at the same time.**

C1. *Have you ever participated in an online discussion?* ***(If no, go to question C3).***

| Yes | No |
|---|---|
| □ | □ |

C2. *How comfortable were you when you participated in the online discussion(s)?*

| Very uncomfortable | Uncomfortable | Unsure | Comfortable | Very comfortable |
|---|---|---|---|---|
| □ | □ | □ | □ | □ |

C3. *How keen are you to participate in online discussions in courses offered in your teacher education programmes?*

| Very keen | Keen | Unsure | Not so keen | Not keen at all |
|---|---|---|---|---|
| □ | □ | □ | □ | □ |

**For <u>each</u> of the statements below, please place a check (√) in the box that best describes your opinion.**

| | **Strongly disagree** | **Disagree** | **Unsure** | **Agree** | **Strongly agree** |
|---|---|---|---|---|---|
| C4. *As a student, I can use online discussions to explain my ideas to others.* | | | | | |
| C5. *I can ask other students to explain their ideas in the online discussions.* | | | | | |

| | | | | | |
|---|---|---|---|---|---|
| C6. *I expect other students to respond to my online postings.* | | | | | |
| C7. *I expect my tutor(s) to respond to most of my online postings.* | | | | | |
| C8. *I feel more comfortable expressing myself in English orally than in writing.* | | | | | |
| C9. *As a student, I feel that face to face discussions are more useful than online discussions.* | | | | | |
| C10. *I feel comfortable communicating online in English.* | | | | | |
| C11. *I am more likely to participate in online discussions if my tutor allocates marks or grades for my online postings.* | | | | | |

SECTION D

**For <u>each</u> of the statements below, please place a check (√) in the box that best describes your opinion about teaching and learning.**

| | **Strongly disagree** | **Disagree** | **Unsure** | **Agree** | **Strongly agree** |
|---|---|---|---|---|---|
| *D1. The ideas of students are important and should be carefully considered.* | | | | | |
| *D2. The major role of a teacher is to transmit knowledge to students.* | | | | | |
| *D3. Learning occurs primarily from drilling and practice.* | | | | | |
| *D4. During the lesson, it is important to keep the students confined to the textbooks and the desks.* | | | | | |
| *D5. Teachers should have control over what students do all the time.* | | | | | |
| *D6. Effective teaching encourages more discussion and hands on activities for students.* | | | | | |

| | | | | | |
|---|---|---|---|---|---|
| *D7. Teaching is simply telling, presenting or explaining the subject matter.* | | | | | |
| *D8. I have really learned something when I can remember it later, i.e., whatever I have learned is not forgotten after a short while.* | | | | | |
| *D9. Good teaching occurs when there is mostly teacher talk in the classroom.* | | | | | |
| *D10. Students have to be called on all the time to keep them under control.* | | | | | |
| *D11. Students should be given many opportunities to express their ideas.* | | | | | |
| *D12. Learning means remembering what the teacher has taught.* | | | | | |
| *D13. A teacher's major task is to give students knowledge/information, assign them drill and practice, and test their recall.* | | | | | |
| *D14. Learning mainly involves absorbing as much information as possible.* | | | | | |
| *D15. Good students keep quiet and follow teacher's instructions in class.* | | | | | |
| *D16. In good classrooms there is a democratic and free atmosphere which stimulates students to think and interact.* | | | | | |
| *D17. The traditional/lecture method for teaching is best because it covers more information/knowledge.* | | | | | |
| *D18. Every child is unique or special and deserves an education tailored to his or her particular needs.* | | | | | |
| *D19. Good teachers always encourage students to think for answers themselves.* | | | | | |

| | | | | | |
|---|---|---|---|---|---|
| *D20. The focus of teaching is to help students to construct knowledge from the learning experience instead of knowledge communication.* | | | | | |
| *D21. It is best if teachers exercise as much authority as possible in the classroom.* | | | | | |
| *D22. Different objectives and expectations in learning should be applied to different students.* | | | | | |
| *D23. Teaching is to provide students with accurate and complete knowledge rather than to discover it.* | | | | | |
| *D24. A teacher's task is to correct learning misconceptions of students right away instead of verify them for themselves.* | | | | | |
| *D25. Learning to teach simply means practising the ideas from lecturers without questioning them.* | | | | | |
| *D26. No learning can take place unless students are controlled.* | | | | | |
| *D27. Good teachers always make their students feel important.* | | | | | |
| *D28. Instruction should be flexible enough to accommodate individual differences among students.* | | | | | |
| *D29. It is important that a teacher understands the feelings of the students.* | | | | | |
| *D30. Learning means students have ample opportunities to explore, discuss and express their ideas.* | | | | | |

**Thank you for your time and cooperation.**

## *Appendix 2: Phase 3 (1st cycle) questionnaire*

Dear trainee,

The purpose of this questionnaire is to help us understand how well the online discussion of the *Independent Study* module enabled you to learn. Your responses will help to improve the design and implementation of subsequent online discussions for this module as well as for other modules in our teacher education programmes.

There are no 'right' or 'wrong' answers. We are interested only in your opinion. Please be assured that your responses will be treated with a high degree of confidentiality, and will not affect your assessment grade in any way. We rely on your cooperation and honest opinions to provide us with useful information.

Thank you very much for your time and cooperation.

SECTION A

**Please provide the following information about your opinion and participation in the "Eating habits of adolescents" online discussion. For <u>each</u> of the statements below, please place a tick (√) in the box that best describes your opinion.**

| | **Strongly disagree** | **Disagree** | **Unsure** | **Agree** | **Strongly agree** |
|---|---|---|---|---|---|
| 1. The goals and purpose of the online discussion were clearly communicated. | | | | | |
| 2. The online discussion environment was easy to use. | | | | | |
| 3. I tried my best to observe the ground rules and guidelines for effective online discussion discussed in class. | | | | | |
| 4. The tutor's comments and suggestions were helpful. | | | | | |
| 5. I felt comfortable to add my postings online. | | | | | |
| 6. My postings and responses were treated respectfully by my peers. | | | | | |
| 7. The guidelines provided for the online discussion task facilitated my participation. | | | | | |
| 8. The online discussion task focused on an issue that is of relevance to me as a prospective Home Economics teacher. | | | | | |
| 9. What I learned from the online discussion is important for my career as a Home Economics teacher. | | | | | |
| 10. I laid more emphasis on the quality of my ideas and arguments than on the quality of the language used. | | | | | |
| 11. I felt comfortable explaining my ideas to others. | | | | | |
| 12. I felt at ease to ask my peers to explain their ideas, assumptions, viewpoints or implications of ideas. | | | | | |
| 13. My peers' questions encouraged me to participate more actively in the online discussion. | | | | | |

| | | | | | |
|---|---|---|---|---|---|
| 14. When asking questions to my peers, I preferred to ask questions to those peers I get along with better. | | | | | |
| 15. I used the dictionary several times when composing my postings. | | | | | |
| 16. I used the dictionary several times when reading my peers' postings. | | | | | |
| 17. I would have preferred to discuss the issue selected for this task face to face. | | | | | |
| 18. I would prefer to work in pairs or in small groups for future online discussions. | | | | | |
| 19. The tutor asked questions that stimulated my thinking. | | | | | |
| 20. I felt more comfortable to question my peers than my tutor. | | | | | |
| 21. I would have preferred that my tutor asked questions rather than my peers. | | | | | |
| 22. I felt it was more important to respond to the tutor's questions than my peers' questions. | | | | | |
| 23. Participation in the online discussion improved my questioning skills. | | | | | |
| 24. Participation in the online discussion improved my ability to critically analyse information and reflect upon assumptions. | | | | | |
| 25. I was given adequate time to complete the online task. | | | | | |
| 26. At the time I had to participate in the online discussion, my workload for the other modules was heavy. | | | | | |
| 27. Participation in the online discussion required me to engage in higher order thinking (analysis, synthesis, evaluation) rather than just state facts. | | | | | |

| | | | | | |
|---|---|---|---|---|---|
| 28. Composing messages for the online discussion was too time-consuming. | | | | | |
| 29. Reading peers' postings was too time-consuming. | | | | | |
| 30. The online discussion allowed comparison of ideas. | | | | | |
| 31. Reading my peers' postings allowed me to see things from various perspectives. | | | | | |
| 32. Reading my peers' postings helped me to change my own perspectives. | | | | | |
| 33. The online discussion forum created a "space" to allow for diversity of views and perspectives to be heard and appreciated. | | | | | |
| 34. I enjoyed the freedom of choosing relevant materials for the online discussion task. | | | | | |
| 35. I relied on the tutor's readings as the main source of information. | | | | | |
| 36. Participation in the online discussion encouraged me to take responsibility for my own learning. | | | | | |
| 37. I prefer assessment tasks in which I am expected to look for new learning materials and ideas on my own. | | | | | |
| 38. The weighting of 20% given for the online task was adequate. | | | | | |
| 39. Participation in the online discussion allowed me to critically reflect on my own ideas and those of my peers. | | | | | |
| 40. I laid more emphasis on the quality of my postings than on the number of postings or the length of my postings. | | | | | |
| 41. The assessment criteria were clear. | | | | | |

| | | | | | |
|---|---|---|---|---|---|
| 42. The goals and purposes of the online discussion were in line with the objectives of the Independent Study II module. | | | | | |

43. Write 3 things you like **best** about the online discussion task.

_____

_____

_____

_____

_____

43. Write 3 things you like **least** about the online discussion task.

_____

_____

_____

_____

_____

**End of Section A – THANK YOU!!!**

## SECTION B

This section has a number of items about your attitudes on how you tackled the online discussion task and your preferred ways of studying. ***There is no right way of studying.*** It depends on what suits your own style and the nature of the online discussion task you were required to attempt and complete. ***It is accordingly important that you answer ALL questions/items as honestly as you can.*** Do not worry about projecting a good image. Your answers are CONFIDENTIAL.

***Please fill in the box with the ONE most appropriate letter (see below) alongside each of the questions/items.***

A – this item is *never* or *only rarely* true of me

B – this item is *sometimes* true of me

C – this item is true of me about *half the time*

D – this item is *frequently* true of me

E – this item is *always* or *almost always* true of me

**Do not spend a long time on each item: your first reaction is probably the best one.**

1. When attempting the online discussion task, I found that at times studying for the task gave me a feeling of deep personal satisfaction. ☐
2. When attempting the online discussion task, I found that I had to do enough work on the selected topic so that I could form my own conclusions before I was satisfied. ☐
3. My aim was to pass the online discussion task while doing as little work as possible. ☐
4. When attempting the online discussion task, I studied seriously only the readings that were given out by the tutor. ☐
5. I feel that virtually any topic can be highly interesting once I get into it. ☐
6. When attempting the online discussion task, I found the topic interesting and often spent extra time trying to obtain more information about it. ☐

7. I did not find the online discussion task very interesting so I kept my work to the minimum. ☐
8. When attempting the online discussion task, I learnt some things by rote, going over and over them until I knew them by heart even if I did not understand them. ☐
9. When attempting the online discussion task, I found that studying the selected topic could at times be as exciting as a good novel or movie. ☐
10. When attempting the online discussion task, I tested myself on important concepts and ideas until I understood them completely. ☐
11. I found I could pass the online discussion task by memorising key sections rather than trying to understand them. ☐
12. When attempting the online discussion task, I generally restricted my study to what was specifically set in the readings given out by the tutor as I thought it was unnecessary to read anything extra. ☐
13. When attempting the online discussion task, I worked hard because I found the material interesting. ☐
14. I spent a lot of my free time finding out more about interesting topics that have been discussed in different classes. ☐
15. When attempting the online discussion task, I found it was not helpful to study the selected topic in depth. It confused and wasted time, when all I needed was a passing acquaintance with the topic. ☐
16. I believe that lecturers shouldn't expect students to spend significant amounts of time studying material everyone knows won't be assessed. ☐
17. I come to most classes with questions in mind that I want answering. ☐

18. When attempting the online discussion task, I made a point of looking at most of the suggested readings. ☐

19. I see no point in learning material which is not likely to be assessed. ☐

20. I find the best way to pass examinations is to try to remember answers to likely questions. ☐

**End of Section B – THANK YOU!!!**

## *Appendix 3: Semi-structured interview questions for phase 3 (2nd cycle)*

**Online Discussion Interview Guide**

Q1. Which of the two online discussions did you prefer? Why?

Q2. Is there anything you did not like about the first online discussion ?

Q3. Is there anything you did not like about the second online discussion?

Q4. You *(except trainees G, K and A)* participated more in the second online discussion? Why is that so?

Q5. To what extent were the orientation sessions during the first few weeks useful?

Q6. Did you read all your peers and tutor's postings for the two discussions? Why?

Q7. Do you feel that it was more important to read your tutor's postings than your peers' postings? Why?

Q8. Do you think that the tutor should comment on or respond to all students' postings? Why?

Q9. Can you tell me what are some of the factors that influenced you to ask questions to your peers or comment on their postings?

Q10. Did you have any fear or feel tense when asking questions to your peers or commenting on their postings? If so how did you overcome your fear or tension?

Q11. How did you feel when someone disagreed with the ideas and points raised in your postings?

Q12. Did it matter to you that some of your peers had fewer questions to respond to?

Q13.Do you think it is fair to place more emphasis on the quality of the ideas than the quality of the language used in your postings? Why?

Q14.Was assessing the online discussion a good or bad thing? Why?

Q15. How does this type of assessment task compare to other assessment tasks (e.g., written reports, oral presentation) in terms of work load and meaningfulness/relevance to you as a prospective Home Economics teacher?

Q16. Overall, what do you perceive as the educational value of the online discussions?

Q17. In order to improve the use of online discussions in future teacher education modules, what are some recommendations you would make for your peers?

Q18. In order to improve the use of online discussions in future teacher education modules, what are some recommendations you would make for your tutor?

Q19. Would you like to add/share anything else about the online discussions?

## *Appendix 4: Permission from the Mauritius Institute of Education*

**Mauritius Institute of Education**
**Réduit, Mauritius**
***Tel:*** **(230) 454-1031** ***Fax:*** **(230) 454-1037**

05 January 2009

Mrs S. Thancanamootoo
Ag. Director
MIE

Thro' Mr A. Appadoo
Ag. Head
School of Applied Sciences

Dear Mrs Thancanamootoo

**Approval for Major Research Study in connection with Doctoral Education Programme**

I have already embarked on my doctoral studies with the University of Southern Queensland (USQ) and this semester I will start a major research study for my doctoral dissertation. The focus of the study is on designing, developing and implementing asynchronous online discussions that can enhance deep learning among our trainee teachers.

All PGCE (part-time) Home Economics students (n = 12) enrolled in the programme for the period 2009-2010 will be selected for the study. Informed consent will be obtained from all of them prior to the start of the study. Moreover, all data collected will be treated and analysed by myself in strict confidentiality.

Given that the Mauritius Institute of Education is putting much emphasis on exploring innovative and effective strategies to deliver its teacher education programmes, I am willing to share findings of the study and their implications with you and members of the institute once the study is completed in the year 2010. I shall be grateful if you would grant me permission to conduct the study. If you have any concern regarding the study, please do not hesitate to contact me on ext. 308 or brinda.pratap@mieonline.org.

Thank you for your usual support and understanding.

Yours sincerely

B.Oogarah-Pratap (Mrs)
Senior Lecturer
Home Economics Department

Brinda, Agreed. Looking forward to the results of your study. 8/1/09

05 JAN 2009

## *Appendix 5: USQ ethics clearance*

USQ
AUSTRALIA

University of Southern Queensland

TOOWOOMBA QUEENSLAND 4350
AUSTRALIA
TELEPHONE +61 7 4631 2300

CRICOS: QLD 00244B NSW 02225M

www.usq.edu.au

OFFICE OF RESEARCH AND HIGHER DEGREES
Ashley Steele
Research Ethics Officer
PHONE (07) 4631 2690 | FAX (07) 4631 2955
EMAIL steele@usq.edu.au

Thursday, 26 February 2009

Brinda Pratap
School of Applied Sciences,
Mauritius Insitute of Education
Reduit, Mauritius

**Re: Ethical Clearance – Developing and implementing asynchronous online discussions to facilitiate deep learning among trainee teachers in a multicultural and non-native English speaking setting**

Dear Brinda,

The USQ Human Research Ethics Committee recently reviewed your application for ethical clearance. Your project has been endorsed and full ethics approval was granted 24/02/2009. Your approval reference number is: **H09REA010** and is valid until **24/02/2010.**

The Committee is required to monitor research projects that have received ethics clearance to ensure their conduct is not jeopardising the rights and interests of those who agreed to participate. Accordingly, you are asked to forward a **written report** to this office after twelve months from the date of this approval or upon completion of the project.

A questionnaire will be sent to you requesting details that will include: the status of the project; a statement from you as principal investigator, that the project is in compliance with any special conditions stated as a condition of ethical approval; and confirming the security of the data collected and the conditions governing access to the data. The questionnaire, available on the web, can be forwarded with your written report.

Please note that you are responsible for notifying the Committee immediately of any matter that might affect the continued ethical acceptability of the proposed procedure.

Yours sincerely

**Ashley Steele**
Research Ethics Officer
Office of Research and Higher Degrees

## *Appendix 6: Letter of informed consent*

*12 June 2009*

Dear trainee teacher,

I am inviting you to participate in a research study which I am currently conducting. The aim of the study is to determine how to design, develop and implement asynchronous online discussions in teacher education programmes such that deep learning is enhanced. There are several benefits to exposing trainee teachers to learning experiences that facilitate deep learning, namely helping trainees to develop a constructivist perception of teaching and learning rather than a transmissive one, and facilitating the development of problem-solving capabilities to assist you in coping with novel and challenging classroom situations.

Your participation in the study will involve completion of two questionnaires. The first questionnaire will seek to gather information about your access to a computer and the Internet, computer skills, prior online learning experiences, perceptions about teaching and learning, socio-demographic background and course expectations. The second questionnaire will gather information on your learning experiences and learning approach for selected online tasks (asynchronous online discussions) that you need to complete as part of the course assessment requirements. You may also be invited to participate in a semi-structured interview to provide additional information about your online learning experiences.

Data from the postings to selected asynchronous online discussions will be analysed. I can assure you that anonymity of all participants will be maintained at all times. All information collected will be given coded identities, and your name will not be revealed during data collection and analysis. Upon completion of the study, you will have access to any published research papers.

Currently, there is insufficient information about why, to what extent and under what conditions asynchronous online discussions facilitate deep learning, especially among non-native English speakers. This study will shed some light on these issues, and hence your participation in the study will be really appreciated. Kindly note that your participation is voluntary and you are free to withdraw at any time, with no negative impact on your involvement and progress in your course of study. In case of withdrawal or if you require further clarification on this study, please send me an e-mail at brinda.pratap@intnet.mu. If you have any concern regarding the implementation of the project, you should contact The Secretary, Human Research Ethics Committee, University of Southern Queensland, at ethics@usq.edu.au, telephone +61 7 4631 2690.

If you are willing to accept the invitation to participate in the study, please sign the form below and return it to me.

***B.Oogarah-Pratap (Principal investigator***)

(Tel: 911-2670)

**Name**: _____

**Date**:_____

**Signature**: _____

## *Appendix 7: Assessment rubric used for first online discussion*

PART A: FIRST POSTING (10%)

| Criteria | Marks |
|---|---|
| Clearly defined position statement. | /3 |
| Thoughtful and informed responses with clear reasons given for positions taken and views expressed. | /5 |
| Accurate and appropriate reflection of course readings, online resources and personal experiences. | /5 |
| Concisely expressed responses with consistent referencing system in-text and bibliography. | /3 |
| Logical flow and organisation of ideas. | /3 |
| Adherence to submission deadline. | /1 |
| TOTAL | /20 |

RATIOED MARKS: /10

PART B (10%)

| Criteria | Marks |
|---|---|
| Ability to ask questions that extend the discussion deeper and further. | /6 |
| Thoughtful and informed responses to your peers' and tutor's questions. | /10 |
| Adherence to submission deadline. | /1 |
| Concisely expressed responses with consistent referencing system in-text and bibliography. | /3 |
| TOTAL | /20 |

RATIOED MARKS: /10

## *Appendix 8: Coding of indicators for level of information processing*

| Surface Processing | Code | Deep Processing | Code |
|---|---|---|---|
| Repetition of information contained in the statement of the problem without making inferences or offering an interpretation | S1 | Linking facts, ideas and notions in order to interpret, infer, propose and judge | D1 |
| Repetition of what has already been said without adding any new elements | S2 | Offering new elements of information | D2 |
| Stating that one shares the ideas or opinions stated, without taking these further or adding any personal comments | S3 | Generating new data from information collected by the use of hypotheses and inferences | D3 |
| Proposing solutions without offering justification | S4 | Proposing one or more solutions with short-, medium-, or long-term justification | D4 |
| Asking questions which invite information not relevant to the problem or not adding to the understanding of it | S5 | Providing proof or supporting examples | D5 |
| Making judgements without offering justification | S6 | Setting out the advantages and disadvantages of a situation or solution | D6 |
| Offering several solutions without suggesting which is most appropriate | S7 | Perceiving the problem within a larger perspective | D7 |
| Perceiving the situation in a fragmentary or short-term manner | S8 | Developing intervention strategies within a wider framework | D8 |

## *Appendix 9: Position statements of first online discussion that reflect surface level of information processing*

***Position statement of Trainee B***

*All human being eat to survive. The type and the amount of food consumed should be taken into consideration in order to stay in good health.*

*The term eating habits refers to why and how people eat, which food they eat, with whom they eat, as well as the ways people obtain, store, use and discard food.*

*There are good eating habits as well as bad ones. Good eating habits means consuming healthy foods in the right proportion which will in turn keep us healthy whereas bad eating habits means consuming unhealthy foods which can lead to the non-communicable diseases such as tooth decay, obesity, diabetes and cardiovascular diseases.*

*Adolescents are much more prone to unhealthy eating habits as many among them do not have time or do not to prepare meals and they are from working parents and hence they mostly rely on fast foods and convenience foods that are easily prepared.*

*Adolescence is a critical period of the lifespan, characterized by major physical, chemical and emotional changes. This age group ranges from 12-19 years. The need of a nutritionally adequate diet is of paramount importance to ensure optimum growth and development and to delay or prevent the onset of non-communicable diseases. ( B.Oogarah Pratap (2007), "Dietary habits of Mauritian school adolescent")*

*During adolescence, the child becomes more autonomous, has greater control over his/her food choices, tends to eat at unconventional times and may disregard healthy eating messages.*

*(Santrock, 1993; Johnson and Hackett, 1997; Seymour et al., 1997)*

*There are many factors which influence the eating habits of adolescents. These include:*

- *Individual preferences*
- *Economic circumstances*
- *Peer pressure*
- *Marketing and advertisement*
- *Mood and emotions*
- *Cultural norms and religious restrictions*

***Individual preferences***

*Every adolescent is unique and has his/her own individual preferences regarding food consumption. For instance, when I was an adolescent, I preferred to consume home made foods instead of fast foods as I was very fond of consuming meals that were prepared by my mother at home. When I was at school for my School Based Experience, I noticed that nowadays adolescents do not consume healthy foods. They mostly depend on fast foods from the school canteen.*

*This is mostly because there is a lack of up-to-date information on the dietary habits of adolescents in Mauritius; the last national dietary survey among adolescents was conducted in 1988.( B.Oogarah Pratap (2007), "Dietary habits of Mauritian school adolescent")*

***Economic circumstances***

*Economic and cultural studies have shown how income and food costs determine food selections, and often override considerations of "healthfulness," social desirability, and even taste. Adolescents are mostly dependent upon their parents. Nowadays with the financial crisis affecting the world, it is more apparent that parents are facing great problems regarding expenses in the home. Some parents may even choose cheap foods that are not fresh also for their families.*

***Peer Pressure***

*Almost all adolescents are influenced by their peers in almost all ways. All adolescents in a specific peer group tend to behave, dress and even eat the same type of food. This in turn greatly affects their eating habits. I think that every adolescent should be aware of the dietary guidelines.*

***Marketing and advertisement***

*Marketing creates a desire and temptation to consume fast foods. When I was an adolescent, I was very tempted to consume burgers at KFC and Mac Donalds and pizzas at Pizza Hut because of the advertisment and the attractive packaging also. Personally, I think that there are many adolescents who are tempted to consume these fast foods as I was time back. For instance, there are many stars and actors of cinema who advertise for fast foods and adolescents tend to adopt their eating habits.*

***Mood and emotions***

*All adolescents are greatly affected by their mood and emotion. From my own experience, I can say that when I was an adolescent girl, my eating pattern was greatly affected depending on my mood. Whenever I was happy, I ate healthy foods in the right proportion and whenever I was sad I consumed convenience and junk foods and I ate a lot and hence depression, anxiety, boredom and stress often lead to unhealthy eating habits.*

***Cultural norms and religious restrictions***

*In Mauritius, there are different religions. These include the Hindus, Muslims, Christians, etc. in each culture there are both acceptable and unacceptable foods that influence the food choice of adolescents. For instance, the hindus do not consume beef and pork whereas the muslims do not consume pork.*

*To round up, I would say that the eating habits of adolescents are affected by several internal and external factors such as peer pressure, mood and emotions, cultural norms and religious restrictions and marketing and food advertisement. These habits are formed and change over a person's lifetime. However adolescents should consume healthy foods in order to stay healthy.*

***Position statement of Trainee F***

*Adolescence is the transitional period between childhood and adulthood, and occurring roughly between the age of 10 and 20. It is a period of rapid growth and body development, and the nutrient requirements increase at this stage. Therefore a healthy eating habit among adolescent play a key role in their mental and physical development, and it promote growth and reduce many risks associated with both immediate and long-term health problem.*

*The eating patterns and behaviors of adolescents are influenced by many factors, including peer influences, parental modeling, food availability, food preferences, cost of foods, personal and cultural beliefs, mass media and body image.*

***Peer influences**, when I was an adolescent, during the lunch time I have a tendency not eat my bread that I prepare at home but instead I will buy the same type of food like my friend.*

***Parental Modeling:*** *At home, my parent was encouraging me to have a proper eating habit as my grandparent s were diabetic, for dinner I was forced to eat vegetables and legumes, and avoid fatty food and decrease the amount of oil in food preparation. Although my mother were encouraging me to eat fruits every day I bring a fruit and then return it back home and I did not find the time to eat the fruit.*

***Food availability:*** *This also play an important role in the food choice, in Mauritius when there is bad weather, the price of vegetables at the market will increase, or even some vegetables are not available at all. At home in those types of situation we eat mainly pulses and convenience foods and there is restriction of fruits and vegetables.*

***Food Preferences:*** *when I was an adolescent, I preferred to consume Fast food like Pizza, and hamburgers, it was mainly because of their taste. And also at home some vegetable I refused to eat such as bitter gourd and eggplant and this was because of their appearance and taste.*

***Cost:*** *when I was an adolescents the cost I food did not really affect me, I got sufficient amount of pocket money to buy whatever I want to eat.*

***Personal and Cultural belief:*** *In my religious there is no restriction of certain food so I can consume all types of foods, but during the 40 days of lent, especially on Friday where I had to eat only vegetarians foods, it was very difficult for me, and on that day I preferred not to eat at all.*

***Mass media:*** *The media play an important role, they easily influence people on some products, sometimes when KFC or Pizza Hut makes advertisement, and I was easily tempted. I wanted to try its new products. And media encourage people to consume a lot of fast foods.*

***Body Image:*** *When I was an adolescent, I'm consider myself as underweight , and to have some weight I have a tendency to eat more fast food, carbohydrate food and less fruits and vegetable. But when I was in form 6 then I realize that I was fault.*

*To conclude, I can say that adolescent s are easily influenced by what they see and heard, they should have a proper education about the proper eating habits, as the adolescents will become an adult and they should be able to inculcate the good eating habits to their children and also this will decrease many risk factors related to foods.*

## *Appendix 10: Examples of position statements of first online discussion that reflect deep level of information processing*

***Position statement of Trainee D***

*"Adolescence is a critical period of the life span during which many physical, chemical and emotional changes occur in the individual." During this phase of life, the child becomes more autonomous and has more control over his food choices. (B.Oogarah Pratap; Dietary habits of Mauritian school adolescent, Nutrition & Food Science, Vol. 37 No.6, pp.442-443). There are numerous factors influencing eating habits of adolescents. In my opinion, the main factors are: awareness about nutrition, family background, peer influence and environment. Other factors include; family composition, cooking skills, socio-economic status and food advertising. (Worsley et al, 1993; Caraher et al 1999; Hamilton et al 2000; Truswell & Darnton-Hill, 1991; Shepherd, 1992).*

***Awareness about Nutrition***

*As stated above, awareness about nutrition is one of the main factors influencing food choices during adolescence. Basing on my own experience, when I was adolescent, I used to eat many junk foods such as Hotdogs, burgers and chips which were popular at that time. Frequent snacking between meals was also part of my eating pattern. It must be noted that the snacks consumed were unhealthy ones such as sweets, chocolates and crisps. In the survey carried out by the Ministry of health in 2001, I can also say that I didn't form part of the 49% of the youths which had fruits daily. Moreover, as the research (www.eufic.org) about nutrition labeling pointed out, I also didn't bother to read the nutrition label before buying foods to be consumed. All this was due to a lack of awareness about nutrition and the healthy way of eating.*

***Family Background***

*Family background also has an effect on the eating habits of adolescents. During my teenage days, I used to have healthy foods when I was at home especially at dinner time. This was due to my parents who used to cook balanced meals for dinner and all the family had to eat the meal together under the observation of my elders. This greatly contributed to make me adopt good eating habits during adolescence. This was also due to my parents' knowledge about nutrition, they were aware about the proper way of eating and thus they composed nutritious and balanced meals to be consumed. In contrast to my own example, I will take the example of one of my classmates, she used to have junk foods all the day as her parents did not have cooking skills and they were also not aware of the dangers of fast foods and this affected the eating habits of my friend. So, we can see that family background plays an important role in the food choices of adolescents.*

***Peer influence and Environment***

*Peer influence and the environment in which we live are other factors affecting food choices of the individual during adolescence. As it has been mentioned that: "an adolescent is easily influenced by his environment", so it is most likely that his food choices also will be affected by his peers at school where he spends most of his time. To support these two factors, I will take myself as an example; when I was in college, I did not consume fish which is a highly nutritious foods as my friends didn't used to consume it as it was considered to be a strong-smelling food. The*

*foods that we usually ate at school were burgers, hotdogs, chips, fried noodles, fried rice and farathas as they were available at reasonable prices in the school canteen. As we can see, these foods were rich in fats and salt and most of my friends used to consume them. When I was not at home, I ate unhealthy foods but when I was at home it was the complete opposite. So, we deduce that peer influence and the environment are indeed factors influencing eating habits of adolescents.*

*To make adolescents adopt good eating habits, the government should sensitize the population about the proper way of eating, counseling about nutrition should be provided to parents and more healthy meals and snacks should be available in the school canteens. This would greatly help in making youngsters adopt good eating habits.*

***Position statement of Trainee E***

*Adolescence is the transitional stage between childhood and adulthood (13 to 19 years old), characterized by a rapid spurt of physical growth along with psychological and emotional changes occurring in the body (http://en.wikipedia.org/wiki/Adolescence ). All these changes, in one way or the other, affect adolescents eating habits which can be either good or bad. Good eating habits refer to eating the right amount and type of food which will keep the body healthy and in good shape. On the other hand, bad eating habits imply taking the incorrect amount and type of food. Regarding my eating habits, besides being influenced by the biological, emotional and psychological changes, it was greatly influenced by the parent's eating habits, my pocket money, my food preferences and also my figure consciousness.*

***Parent's Eating Habits and influence***

*Sound nutrition can play a role in the prevention of several chronic diseases (http://www.uptodate.com/patients/content/topic.do ). To help prevent diet-related chronic diseases, researchers have proposed that healthy eating behaviors should be established in childhood and maintained during adolescence (Gidding, 2006). Given that my father suffers from high blood pressure and high blood cholesterol, since my early childhood, my meals was always very low in fat and salt. This affected my eating habits during my adolescence also as I was never used to eat oily or salty foods and it prevented me from eating the oily chips available in the school canteen, which my peers used to eat during breaks. At that time, I can say that, it was not due to the fact that I was too health conscious that I didn't consume those foods but rather because I was not used to. Good eating habits can result when families eat together. In the March/April 2009 issue of the Journal of Nutrition Education and Behavior, researchers from the School of Public Health, University of Minnesota reported, for their study on long-term benefits of regular family meals that adolescents who participates in regular family meals have more healthful diets and meal patterns compared to adolescents without regular family meals (ScienceDaily, Mar. 10, 2009). Research has shown that we eat more with our friends and family than when we eat alone and the quantity of food increases as the number of fellow diners grows (De Castro JM, 1997). As at home we always had dinner all together and my mum had always seen to it that we all have nutritious and balanced meals, I was never allowed any excuses for not having my meals in adequate amount. Thus, I could never have fast foods, such as KFC, like my friends often used to do after schools or tuition, as this would have prevented me from having a complete meal.*

***Cost Factor***

*As an adolescent, the pocket money I was entitled to restricted my eating habits to a certain extent. At school for example, the foods available at the school canteen, though most of them were empty calories food, the few healthy foods available like yogurts, dried fruits, etc were sold at a higher price than usual. As a result I could afford to buy the healthy foods only occasionally and most of the time ate the low-nutrient dense foods. According to a survey carried out in Mauritius, it was found that the most commonly purchased items were oily snacks, soft drinks and confectioneries (Oogarah-Pratap, 2007) which are less expensive.*

***Food Preferences***

*A like for sweetness and dislike for bitterness are considered innate human traits, present from birth (Drewnowski A, Ahlstrom Henderson S, Barratt-Fornell A, 2001). As a teenager, I was very choosy in foods. I disliked sour vegetables like bitter-gourd and fruits such as papaya due to its appearance. The sensory properties of foods, such as taste, smell or appearance also affect our food choices (Food Today, 2004).*

***Body Image***

*In my late adolescent years, my eating habits changed drastically due to my growing concern for my body image. Body image is how someone feels about his or her own physical appearance. Lots of factors, like media images of skinny models, can affect a person's body image (http://kidshealth.org/teen/your_mind/body_image/body_image.html). As such, in order to have a nice body image and to be accepted by peers, I used to abstain from certain calorific foods which I used to like a lot like chocolates, ice creams, etc.*

*From what follows, we can note that all the factors mentioned above have deeply influenced my eating habits. These factors, including the quest for independence and acceptance by peers, time spent at school and, and preoccupation with self-image, contribute to the erratic and unhealthy eating behaviors that are common during adolescence (www.uptodate.com/patients/content/topic ).*

## *Appendix 11: Extracts from trainees' follow-up postings for second online discussion illustrating indicators of a deep level of information processing*

| ***Indicators of a deep level of information processing*** | ***Trainee's postings*** |
|---|---|
| **Linking facts and ideas in order to interpret** | ***Trainee B***: *As suggested by 'tutor', the recipes should first be tried and tested and presented using the right formats, etc.*<br>***Trainee E***: *… I would like to say that I completely agree with 'trainee D' on the fact that much consideration must be given to planning of the school time table. After completing our curriculum modules we have all noted how effective planning helps us to meet our aims and objectives.*<br>***Trainee J***: *Well 'trainee D' I have learned that in assessment and evaluation module. If the majority of students did not understand then re-teaching is done, if only one or two students did not understand then remedial and finally if everyone understood the topic scaffolding should be done. In the case I mentioned it would be remedial, which means that complete teaching and learning did not take place for these one or two students.*<br>T***rainee J***: *As 'trainee G' mention that "practice make Perfect" so it is a pity to these students who were missing these practical classes.* |
| **Offering new elements of information** | ***Trainee B****: Over and above that, my suggestion would be that, teachers should also verify that the recipes suggested are skillful enough to be used for the exams, otherwise the students may lose marks.*<br>***Trainee E***: *After reading 'trainee G's' posting, where she said … if I am not wrong, I think that the authority to split the classes does not rest in the hands of solely the HOD but that of the Rector also, am i right?! The HOD can only put the problem forward to the rector and also suggest what can be done to overcome the problems.*<br>***Trainee G:*** *… it is true that the state schools also can organise some activities or Food Day to collect some money. During my SBE at 'school …', the Home Economics Dept organised … In 1 week time, the Head of the Dept already arranged for a lot of equipment (chopping board, non-stick tins, food covers among others. They were to afford for spare equipment also. In fact, there was good management of resources in the Dept.*<br>***Trainee H:*** *I wish to add something, as there were five teachers who teach Home Economics at 'school …', they were able to split their lower secondary classes, because when half of the class were doing food & nutrition practical the other half were doing* |

| | |
|---|---|
| | *the theory part with another teacher, and for the next week it was vice versa.* |
| **Proposing solutions with justifications** | ***Trainee A:****…I would like to suggest to you about how according to me how we can solve the problem of lack of equipments. I think we can advice our students to buy a small equipment each. For e.g. we can advice a student in a group to buy a measuring jug, another student can buy a rolling pin etc... Thus we can gather all equipments in each group.*<br>***Trainee C:*** *After reading Jean Bell's September 2002 report, i have found that another interesting teaching strategy which i hope might motive the student to be motivated in the practical cookery class is by inviting a local chef in school or peer teaching to do a demonstration. By peer teaching i mean that, you may ask a student of form IV to demonstrate the form III students an Apple pie. At the end of the lesson the form III students will even have the opportunity to taste the dish. This teaching strategy will have a psychological impact on the form III students. They will be thinking, "the form IV girl is very skillful and managed to show us an interesting recipe within 70 minutes, so why not us!" Where as a Local Chef may share his skills and enthusiasm with the youngsters and even perform a demonstration.*<br>***Trainee E:*** *Another solution to cater for this problem is to sensitize the students about the importance practical classes and at the same time motivate them through the theory classes. It is our duty to make students understand how practical classes can be applied in our everyday life, by taking examples that if they go for further studies abroad and they are left on their own, the simple skills they have learnt will help them not only to cook but also cooking nutritiously and hygienically for a better health. Including more experiments like food tasting may also generate more interests.* |
| **Providing proof or supporting examples** | ***Trainee F:*** *…what I had observed in my SBE in school a long class of theory that is two consecutive periods of the theory class make it boring and difficult for the students to concentrate, sometime after one hour they are switch off. therefore this make students not motivated to do the subject, according to me in a theory classes their should be demonstration and some realise, for example, if a teacher is doing a class on the topic "egg", if the teacher use only the book to explain the students by only reading in the book what they often do, students are not interested, instead for this lesson the teacher can use poster of an eggs…*<br>T***rainee I:*** *Only two periods are allocated for practical classes which in insufficient for the students to complete their dishes so to remedy this problem three periods must be allocated for practical classes not only for food and nutrition classes but also for fashion and fabrics. At 'school X' where I had been for my SBE the time allocated for all practical classes were for three periods even for lower and upper classes.*<br>***Trainee J:*** *I do agree with you that practical classes cater for all mutiple intelligences because i am a visual learner and i learned* |

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| | *during the practical where i could merge the theory part(especially for fashion and fabrics)than memorizing literature.* |
| **Setting some advantages and disadvantages of a situation or solution** | ***Trainee H:*** *I thought that if the lower secondary students have got ONLY 2 practicals per year it's difficult for them to learn the skill of weighing of ingredients by themselves in only 2 class. However, i think the students could do some basic preparation depending on the recipe like washing, peeling of vegetable, grate cheese and of course removing and washing of equipments that must be used during the practical in order to save time.*<br>*As for the form 4, form 5 and HSC students who does Food & Nutrition, the case is not the same, these students have opted for this subject, they are mature enough and obviously they should be able to measure their ingredients correctly. I strongly agree with you that these students will be alone for exam and they should know the skill of weighing ingredients.*<br>***Trainee J:*** *One of the solutions that most of my friends mention was a fund-raising activity; indeed this is a very good solution to the problems. The HE department can organized the food day where they can bring food or even food is cooked by students of upper secondary and they collect the money to buy equipments for the lab. But one of my friend suggested that the activity should be done on a weekly basis. In fact it is not a bad idea but due to lack of time I don't think every week the activity will be possible. In that case students could sell their own dish which they practice every week and use the money to buy their own equipments.*<br>*Due to lack of equipment in the lab students should bring their own equipments from home.*<br>*Another way to solve the problem is that the teacher should either give the students recipe to practice certain dish or the teacher should encourage student to watch video clip on cookery to be able to enrich their knowledge of the practical.*<br>*Moreover the teacher can seek the help of the PTA to buy necessary equipment for the lab or finally the last solution mention was to make arrangement to get money from the government.*<br>*T**rainee K:** ... actually even i did think of that as a solution but then I thought that there are some recipes which you just can't show through a video clip or chart, especially concerning cake making, as they even got to know about the consistency of the cake mixture, and also we won't be able to show them the shortness, tenderness, how the grain should be, whether it is soft or not ,the texture of the cake, so its only during a real practical class that you can show all these to the students. You can support your teaching with video clip and chart but this won't be able to replace a real practical class where student get opportunity to manipulate, to touch and have this sensation how it is done in practicals classes.* |
| **Perceiving** | ***Trainee B:*** *Yes, thats true that by exchanging recipes all students* |

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| **the problem within a larger perspective** | *will not lack recipes in their recipe portfolio but I think that teachers could monitor the recipes before exchanging to see whether they are well written and the ingedients are in the right proportion also.*<br>*Moreover, I think that the idea of exchanging recipes would not work well in national colleges like the … college as it is said that the students do not really share anything(notes)with their friends.*<br>***Trainee C:** I think that it is difficult for both the supply teacher and his students to work together. First of all, it must be noted that supply teachers keep on changing each two to three months. As it is often the case, the students do not get familier with the teacher as this requires some time and when this is due to happen, the teacher goes to another school! Here we have a problem of adaptation on behalf of both the teacher and the students. This takes time for the students to familiarise with the teaching methods of their new teacher and the teacher also will take time to familiarise with the school enviroment.*<br>*Very often, their is a delay in the syllabus and when the supply teacher comes, he has to take over all that has been missing, in addition to that; sometimes students did not understand so he has to rexeplain which again takes time.*<br>*Moreover, supply teachers often complain that they do not feel a sense of belonging to a particular school and they do not get the opportunity to teach a whole syllabus as they have to take over what another teacher has already began which is not easy!*<br>***Trainee E:** The HOD can only put the problem forward to the rector and also suggest what can be done to overcome the problems. It is only when the staffs have good collaboration and cooperation of the Rector that the school will function smoothly and a solution can be found for every problem.* |
| **Developing intervention strategies within a wider framework** | ***Trainee E:** The idea of having local chefs also is very interesting and I think to implement this plan, the Ministry of Education, the IVTB, where we have the Hotel School and the Ministry of Tourism, should work in close collaboration so that resource persons like Mauritian chefs working in five star hotels can come to make demonstrations for the practical classes. This will also enhance the school-community relationship whereby the private sector, hotels, will be helping the state schools.* |

## *Appendix 12: Extracts from tutor's postings for second online discussion illustrating indicators of a deep level of information processing*

| *Indicators of a deep level of information processing* | *Trainee's postings* |
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| **Offering new elements of information** | *Some good suggestions and valid points have emerged from your discussion. I would like to bring to your attention that in most state schools prac HEco classes are not split for Forms I and II following a decision of the Ministry of Education. As such even if the school has enough teachers, they prefer not to split the classes in order to abide by Ministry's decision. The rationale for this decision is still not clear for me and at the level of the Department we have already taken up this issue with the Ministry. It would seem that in a few state secondary schools some Heads of Home Economics Department have been able to convince their rectors of the need to split practical classes right from Form I.*<br><br>*...you have rightly pointed out that we should encourage students to look for recipes and exchange them with their friends, but the Food and Nut teacher needs to verify whether the recipe is well written, using the standard format. You will learn more about different recipe formats and how to evaluate a recipe in the BEd Food programme.*<br>*One more thing worth pointing out is that any recipe should always be tried out before recommending it to others.* |
| **Providing proof or supporting examples** | *...I would like to add that it is very important to involve students at different intervals during a lesson. In the example that you've given, students can be involved through the use of an interactive poster and also in the test for egg freshness.* |
| **Perceiving the problem within a larger perspective** | *Other means of raising funds (as described in 'Trainee G's' and 'Trainee H's' postings) are very often more effective because you obtain the funds faster. But of course, there are certain procedures to follow and you need to obtain clearance from your superiors. The initiative does not necessarily always have to come from the head of the Department. As a new recruit and if you are dynamic and creative you can discuss the idea with your Head of Department, and as a team you can then implement the fund raising activity.* |

## *Appendix 13: Examples of surface level follow-up postings from trainee teachers for the second online discussion*

***Trainee A:*** *… I also agree with you that it is very difficult to manage a practical class of 40 students and they should be split so as to have better control on them.*

***Trainee D:*** *Your idea that the HE Educator could creat a cookery club to encourage students to participate in cookery and fashion activities is a brillant one. I will keep that in mind when I will be teaching in schools. If ever there is such problem during my career, I will definetly make use of this advise of yours.*

***Trainee E:*** *… Thanks for clarifying why the electric plates cannot be used in place of the gas stove, though i personally believe it is more a question of adaptation.*

***Trainee F:*** *...Very good suggestion from your side, i think that the government should take the good example of private school, and their should be more home-economics teacher, as a student should start the practical class in form I, and it is unfair that the student when she came in form 4 that she must start doing the basic recipe.*
*And the state school should take the example of the private college, and i am totally agree with the suggestion of 'Trainee D' and we should take example of it*

***Trainee G:*** *Overall, you presented a good piece of work.*
*You mentioned that "Only half of the students could watch the demonstration and even that, they could not watch properly certain part of the demonstration. I had to do the practical all over again and explain the scientific reasons taking place in a creaming method" so, can you briefly explain the scientific reasons for a creaming method?*

***Trainee I:*** *I totally agree with the piece of advice which 'tutor' has given to us, it is indeed that all the teachers including new recruits must always seek permission to their Head of Department,Rector or higher authorities before deciding what to do for the school. All their views and ideas must be taken into considerations before coming to a final decision.*

***Trainee J:*** *It is the duty and responsibility of every teacher to get the attention of his/her students and to motivate them enough to follow the class. Each of my students is my concern. The student may not be willing to follow but the teacher should get the attention of that student.*

## *Appendix 14: Selected postings from second online discussion reflecting some tension*

Re: problem encountered in Food & nutrition practical classes

by 'Trainee B' - Thursday, 29 October 2009, 09:56 PM

Hello, 'Trainee J'
In your report, you mentioned that"if one of my student has not understood something it means that my teaching is not appropriate...". Do you think that this statement implies only to the teacher or to the student also because it might be that the student himself/herself does not want to follow the class?

Hello 'Trainee B'

by 'Trainee J' - Saturday, 31 October 2009, 05:39 PM

It is the duty and responsibility of every teacher to get the attention of his/her students and to motivate them enough to follow the class. Each of my students is my concern. The student may not be willing to follow but the teacher should get the attention of that student. Do you think that ignoring that student will solve the problem? Is the teacher doing justice to his/her profession and to his/her student? I doubt it.

Re: Hello 'trainee B'

by 'Trainee D' - Tuesday, 3 November 2009, 09:19 PM

Hi 'Trainee J',
I also agree with 'Trainee B's' point of view. One cannot say that his way of teaching is unappropriate just if in a class of thirty or forty students one or two haven't understood! According to me, if all teachers have this attitude, then it will be very discouraging for oneself. One should always think positively. If a student doesn't want to follow, even though you explain several times, the student won't follow! May be in that particular case, the student has a psychological (personal) problem which must be dealt with a psychological perspective.
Thank you.

Re: 'Hello Trainee B'

by 'Trainee B' - Thursday, 5 November 2009, 09:41 PM

Hello ‘Trainee J’.

I strongly agree to what ‘Trainee D’ has said.
Infact, it is very easy to say that teachers should get the attention of students even though they are not willing to follow the class but in real situations it is not so much easy even by changing the teaching style.

I don't think that one should ignore that student too because it is against what we have learnt at the MIE and i don't think that a teacher would be able to do that also.

‘Trainee J’, you had been teaching for your SBE at school, do you think that it is easy to get the attention of the whole class at the same time?

Hope to hear from you soon, ‘Trainee B’

Re: problem encountered in Food & nutrition practical classes

by ‘Trainee E’ - Friday, 6 November 2009, 09:07 AM

Hello ‘Trainee J’,

Referring to what ‘Trainee B’ and ‘Trainee D’ have said, i must say that i also share their point of view.

I beleive that for effective teaching to take place, at no point in time, we should ignore a problem encountered during the teaching and learning process. So ‘Trainee J’, one major problem during practical classes is to get the attention of all the students. If you read my postings and ‘trainee C's’ suggestions you can get some ideas about how to motivate and gain the attention of all the students. I will really appreciate if you have any more ideas as to how to tackle this problem and share it with us because ignoring the problem is surely not a solution. Thank you.

Looking forward to hear from you
Kind regards
Trainee E

Re: problem encountered in Food & nutrition practical classes

by Trainee J - Wednesday, 11 November 2009, 08:44 AM

Hello trainees E, B and D
Is it positive thinking from a teacher to say that a student who does not follow wont follow! ‘Trainee D’ rightly pointed out that the student may have psychological problem. That was exactly my point. The teacher should solve the problem or do the class in such a way so that the student forgets the

problem. Someone who leaves his/her student on his/her own if they are not following and still feel satisfy with it can not be considered a responsible teacher.

Is it ignoring a student if a teacher questioned his/her methodology when students are not following! I don't think so.

Any way I would suggest that you read my posting again (31 0ctober 2009). I asked whether a teacher could ignore a student who is not following and not said that a teacher should ignore a student who is not following.

From 'Trainee J'

Re: problem encountered in Food & nutrition practical classes

by 'trainee D' - Saturday, 14 November 2009, 09:38 AM

Hello 'Trainee J',

I just wanted to clear a misunderstanding, may be you have not well read my question which was not about ignoring the student! In your report, you mentioned, I quote:

"I am the kind of person who believes that if one of my students has not understood something it means that my teaching is not appropriate."

So 'Trainee J', my question was:
How can one say that his teaching is unappropriate if in a class or thirty to fourty students, only one or two haven't understood? Then how come the majority of the students understood the explanation if your teaching was unppropriate?

Re: problem encountered in Food & nutrition practical classes

by 'Trainee J' - Sunday, 15 November 2009, 08:15 PM

hello 'Trainee B'

Well 'Trainee B' I have learned that in assessment and evaluation module. If the majority of students did not understand then re-teaching is done, if only one or two students did not understand then remedial and finally if everyone understood the topic scaffolding should be done. In the case I mentioned it would be remedial, which means that complete teaching and learning did not take place for these one or two students. That is why remedial should be done. For these students I would give individual attention in the next class, I will try to find a way to recap what we have done for them. That is why my teaching was inappropriate because if my teaching was perfect I would do

scaffolding not remedial.

Thank you
From Trainee J

Re: problem encountered in Food & nutrition practical classes

by ‘tutor’ - Monday, 16 November 2009, 11:22 AM
Hi Trainee J’,

you have provided some thoughtful response. I hope that the misunderstanding has now been cleared .

Take care

‘tutor’