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# **Discussion Forums in a Blended Learning Approach for Social Studies: The Influence of Cognitive Learning Styles on Attitudes towards Asynchronous Collaboration in a South East Asian University**

J. A. G. Doiron

## **Abstract**

To keep pace with ubiquitous computing in all aspects of society, universities have invested heavily in off-the-shelf or in-house learning management systems, and teachers are being encouraged to seek ways in which to optimize the role of information and communication technology to support their teaching and learning activities; both on the campus and beyond campus borders. However, many students in residential universities are resistant to embracing CMC-mediated activities as an integral part of their coursework, and this attitude underscores the importance of understanding how these students are affected by the implementation of the new teaching and learning strategies associated with a 'blended learning' approach. This study explores a particular context in which discussion forums were deployed as a replacement to traditional face-to-face tutorial discussions. Research subjects (n=147), health psychology students at a South East Asian university, completed a Felder Soloman Index of Learning Styles (ILS) questionnaire before being assigned to online discussion forum groups of 8 or 9 students per group. During the 9 weeks of the tutorial assignment activity, student interactions in the discussion forums were monitored and transcripts of their postings and replies were analysed and coded. Quantitative data from attitude survey MCQs, grades, peer ratings and usage statistics, as well as qualitative data from attitude survey open-answer questions and one-to-one interviews, were also gathered and analysed. The findings identified a number of weaknesses and drawbacks of using discussion forums: notably that students who felt uncomfortable about expressing their opinions in discussion forums also had difficulty understanding what was being communicated in the postings and didn't trust their group members; students who were identified as having a moderate to strong 'Sequential' cognitive learning style preference were more likely to indicate that they had a difficult time working in the discussion forums; and students who were identified as having a moderate to strong 'Active' cognitive learning style preference tended to make fewer forum postings. Nevertheless, since the scope of the information quoted, and opinions generated, in the discussion forum postings was noticeably greater than what was generally brought up in face-to-face discussions, and because the majority of students worked independently and responsibly, this particular blended learning approach was deemed a success by the course instructor. However, the author puts forward a number of recommendations to instructional designers, practitioners and students for designing, setting up and running a similar but more flexible approach as an alternative to traditional large-class face-to-face tutorial discussions.

Discussion Forums in a Blended Learning Approach for  
Social Studies: The Influence of Cognitive Learning  
Styles on Attitudes towards Asynchronous Collaboration  
in a South East Asian University

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1 8 DEC 2008



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To Marc, love Dad

## **DECLARATION**

I declare that this thesis is my own work and is not the same as any which has been previously submitted for a degree at this or any other university.

## **STATEMENT OF COPYRIGHT**

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## Chapter 1

### INTRODUCTION

#### 1.1 Rationale for the Study

The use of computer-mediated communication (CMC) technology, such as discussion forums, to support teaching and learning in higher education has generated much debate and research. Advocates of the use of CMC point out that students interacting in discussion forums collaborate by sharing their opinions, ideas, experiences, readings and web resources (Finegold & Cooke, 2006; McConnell, 2000; Stacey, 1999), and emphasize that working in discussion forums encourages reflection, debate and negotiation (Ellis, 2001; Salmon, 2002, 2004; Vonderwell, 2002; Wozniak, & Silveira, 2004). However, requesting students to work collaboratively in discussion forums has also generated student complaints that this activity leads to “information overload”, engenders confusion for some and causes anxiety for others who are insecure about posting messages (Edirisingha, 2004; Lopez-Ortiz & Lin, 2005). As well, many students complain about the heavy time commitment typically required from discussion forum users (Gabriel, 2004; Song, Singleton, Hill & Koh, 2004).

As the debate on the benefits and drawbacks of using discussion forums in higher education continues, many universities, having already invested heavily in off-the-shelf or in-house learning management systems, are seeking ways to optimize the role of information and communication technology (ICT) in supporting teaching and learning activities both across the campus and beyond campus borders (Brunner, 2006; Ellis, Goodyear, Prosser & O'Hara, 2006). In 2002, the author was first contacted to design, develop and evaluate a strategy to replace the traditional post-lecture, face-to-face, large-group tutorial discussions with a tutorial assignment activity that focused on small-group peer collaboration using online discussion forums as the medium of interaction.

The blending of traditional on-campus classroom activities together with online activities is commonly known as a ‘blended learning’ approach. Because this approach is touted as providing the best mix of teaching and learning strategies in the context of higher education (Finegold & Cooke, 2006; Motteram, 2006), ‘blended learning’



designs are receiving serious consideration from the many university lecturers and administrators who see ICT as providing the necessary tools for managing the increasingly common large undergraduate class sizes, and for addressing the problematic scheduling of campus classrooms and lecture halls (Concannon, Flynn & Campbell, 2005; Marsh, McFadden & Price, 2003).

However, there are many reasons why some students might not be receptive to the changes brought about by the implementation of a 'blended learning' approach in their campus courses, and this underscores the need to understand how students are affected by these changes (Brunner, 2006; Finegold & Cooke, 2006; McConnell, 2000; Molz, Eckhardt, & Schnotz, 2002). One of the factors affecting a student's resistance to change may be the consequence of a mismatch between the requirements of an ICT-mediated learning strategy and the student's personal cognitive learning style preference (Ford, & Chen, 2001; Smith & Whiteley, 2002).

Prior to this present research, the author had run a trial of a new 'blended learning' strategy in which post-lecture face-to-face tutorials were replaced with small-group peer-mediated tutorial discussions in dedicated discussion forums. The findings from that pilot study recommended that further research be undertaken in order to identify the characteristics of students who had shown a clear preference for the traditional face-to-face tutorial discussion format over the small-group online tutorial discussion format throughout the trial (Bishop & Doiron, 2003). Hence, the present research was conducted to look specifically at the relationship between cognitive learning style and attitudes towards working in discussion forums as a replacement to the in-class tutorial discussion format.

In this chapter, the details and implications of the initial pilot study are discussed and an overview of the structure of the thesis is presented.

## **1.2 Background for the Study**

Health psychology is an applied area of psychology and thus lends itself well to discussions on how psychological principles and findings can be applied to real world problems. Bishop and Doiron (2003) believed that because of the availability and convenience of ubiquitous CMC, undergraduate students in the health psychology course of a South East Asian university could benefit greatly from the use of online

discussion forums to communicate ideas and comment on readings that related theories in health psychology to specific health issues. Furthermore, since the 1998 launch of its own online learning management system, known as the integrated virtual learning environment (IVLE), the university had made the use of IVLE mandatory in all courses. Hence, students in the health psychology course, being third year undergraduates, were already familiar with the use of the university's CMC tools.

During the last semester of the 2002/2003 academic year, Bishop and Doiron designed and developed a small group collaborative online discussion activity aimed at replacing the traditional large group face-to-face tutorial discussions which had been a feature of the health psychology course in previous semesters. As figure 1.1 shows, in contrast to the previous years, the new format did away with face-to-face post-lecture tutorial discussion sessions. Also, the tutorial assignment was changed from a weekly short paper from every student, to one longer paper (as well as a summary of what was brought forward in the related discussion forum) from the one student in the group, the assigned group leader for that week, who would be the only one graded for the assignment.

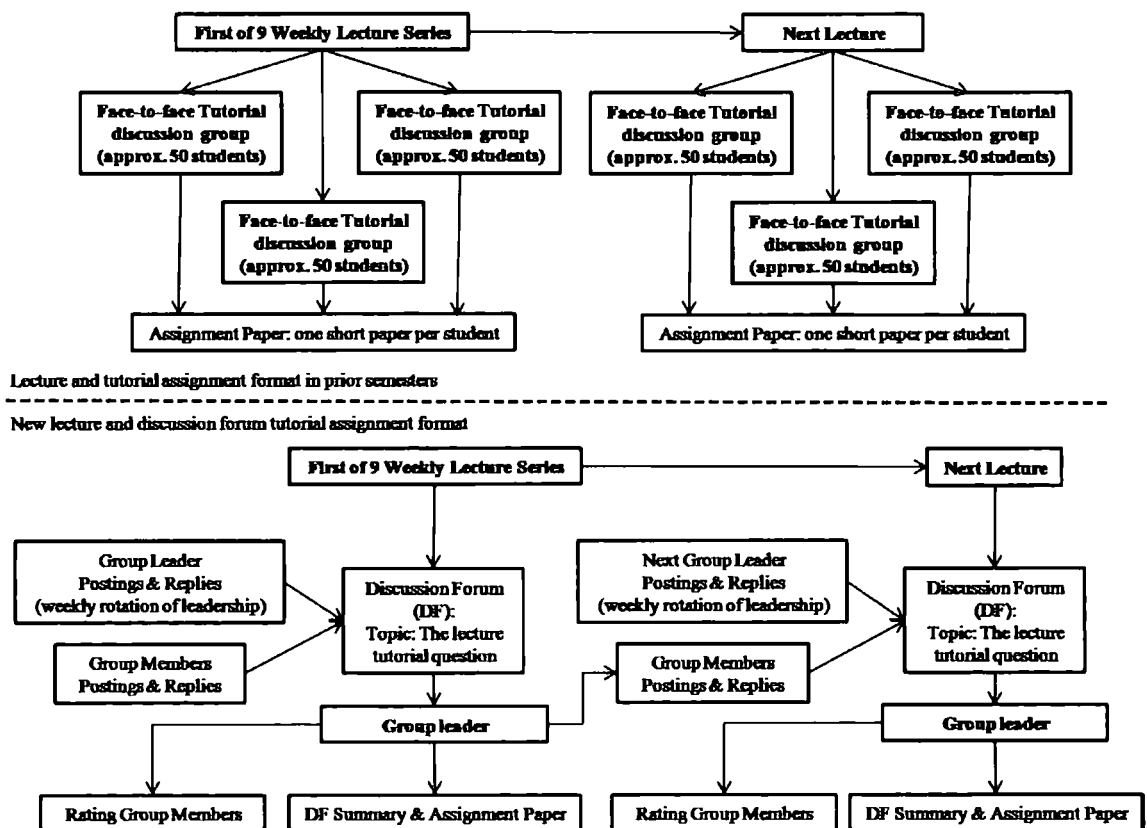


Figure 1.1: The lecture and tutorial assignment: prior and new discussion forum format

Because many researchers have emphasized that discussion forums provide a convenient setting from which students are able to learn from one another through the sharing of perspectives (Brook, & Oliver, 2003; Garrison & Anderson, 2003; Jameson, Ferrell, Kelly, Walker & Ryan, 2006; Marra, Moore & Klimczak, 2004; Northover, 2002; Salmon, 2002, 2004; Stacey, 1999; Taradi & Taradi, 2004; van Aalst, 2006; Wang & Woo, 2007; Yazdani & Bligh, 1997), this new discussion forum activity was designed to encourage collaboration and mutual support among students. By collaborating (between each other and with the leader) to provide information (references from articles and web sites, etc.), opinions and perspectives from which the group leader could consult when writing her/his paper, the group members would be rewarded by the leader with a mark that counted in the final course assessment. Since each student would write one tutorial paper during the semester, this interdependence was expected to foster mutual support and bring about a collaborative peer-learning experience. Although Salmon (2002) has made some distinction between the terms “co-operative working” and “collaborative working” in groups, due to the rotation of the leadership in this particular design, the author has chosen to use the term collaborative.

The class of 142 students was randomly assigned to fourteen groups of nine and two groups of eight, and instructed on how to use the course discussion forums to collaborate on the weekly tutorial assignments. After the weekly lecture, each group accessed their discussion forum and throughout the following seven days, shared information and ideas about the tutorial assignment question. Students posted messages and replied to postings at their convenience from wherever they had access to the Internet. Group leaders were tasked to get the discussions started and to keep the group on track, and while the course instructor did not take part in any discussion forum, the students were made aware that he was monitoring their discussions.

At the end of seven days, the forums were closed and the group leaders had one more week in which to write the assignment paper. Leaders were told that while their paper should reflect the group’s discussions, they were not solely limited to the points raised or the materials provided by their group members. To familiarise everyone with what was expected on an assignment paper, an exemplar paper was made available on the health psychology course web site for students to consult, and as the group leadership was rotated weekly, each group member became leader for one of the assignments. Throughout the semester, statistics on the number of postings each student submitted,

transcripts of weekly discussion forum postings and responses from two surveys administered during the semester, were collated, coded and analysed.

While the tutorial papers accounted for 25% of the overall course grade, each group member’s contribution to the online discussions also counted for marks. The group leaders were tasked to anonymously rate each group member’s contributions towards addressing the tutorial question, and at the end of the semester these ratings were tallied and converted to 10% of the course grade. To complete the continuous assessment portion of the course grading, 15% was allocated to the critique of a tutorial paper by a student from another discussion forum group. The remaining 50% of the grade was allotted to mid-term and final written exams.

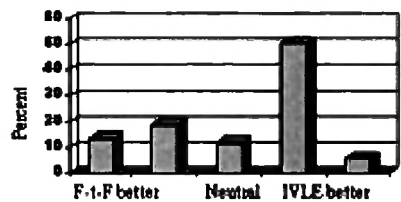


Figure 1.2: How would you compare the quality of Face-to-Face to IVLE discussions? (N=91)

The implications of this pilot study were discussed by Bishop and Doiron (2003), and they suggested that although participation in the online discussions had consistently been very high throughout the semester, further study was needed in order to explain some of the findings. For instance, as figure 1.2 shows, student feedback (n=91) had indicated that, while a total of 56% of respondents believed the quality of discussion in the forums had been better than in the traditional face-to-face format, 32% still preferred the face-to-face format.

As well, when asked which format better stimulated learning, although 51% of respondents felt that online discussions were better, as figure 1.3 shows, a substantial 37% of respondents still felt that face-to-face tutorial discussions were better. Students were also specifically asked which format they preferred

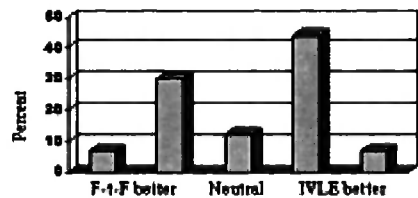


Figure 1.3: Which format better stimulates learning? (N=91)

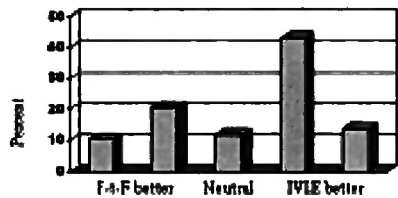


Figure 1.4: Which format do you prefer? (N=91)

Here again, as figure 1.4 shows, 54% of students said they preferred online discussions, while 34% indicated that they preferred the traditional face-to-face tutorial discussions.

Yet after reviewing transcripts of the online discussions, the course instructor noted that the range of materials included in the postings was far greater, and of higher quality, than that which had generally been seen in the face-to-face sessions of previous years. Bishop and Doiron (2003) suggested that this was due in part to the fact that online discussions were convenient and flexible, and thereby provided students with the opportunity to seek out additional materials relevant to the issues that arose in the discussions.

Because the majority of students had found the small group online tutorial discussion activity to be a positive learning experience, the course instructor felt that the continued use of this approach was warranted. However, the pilot study did expose some important drawbacks. In their feedback, many students indicated that they missed the social interaction of face-to-face discussions, while others complained that they had difficulty adjusting to the features of asynchronous communication and the non-linear sequencing of messages. Hence, Bishop and Doiron (2003) recommended that further research be undertaken to identify the characteristics and patterns that might influence student attitudes towards the use of the discussion forum as a replacement for the traditional face-to-face tutorial discussions.

### **1.3 The Structure of the Thesis**

The main themes of the research relate to a) the implementation of a 'blended learning' approach in higher education; b) learning styles research and the match between cognitive learning styles and teaching strategies; and c) the influence of cognitive learning styles on collaborative work in discussion forums. Chapter 2 introduces the 'blended learning' approach and the use of discussion forums in residential university on-campus courses, the background and debate over learning styles research, a number of contemporary learning styles models and the Felder and Soloman (1991) Index of Learning Styles (ILS) questionnaire. The research design and the context of the experiment are then described in Chapter 3. This chapter focuses on the research methodology used as well as the development and deployment of the survey instruments, the data collection methods and the statistical procedures used in the study. The subsequent four chapters present the findings.

In Chapter 4, the data from the discussion forum usage, the discussion forum postings and the continuous assessment marks are presented. Pearson correlations and discriminant function analysis calculations are used to examine relationships between the data and to identify predictors of cognitive learning style preference groups and student demographic groups. This is followed by the analysis of the Survey I and Survey II multiple choice questions (MCQs) in Chapter 5. Pearson correlations, factor analysis, paired samples correlations, paired samples t-test and effect size calculations are used to describe the relationships within the data.

The qualitative data from the Survey I and Survey II open-ended questions is examined in Chapter 6. In order to succinctly describe the comments that the students entered, these responses were coded for analysis. As well as the findings from the analysis, the development of the coding descriptors and the results of the inter-rater reliability tests are also covered. Lastly, a post hoc analysis is presented in Chapter 7. The discriminant function analysis approach was used to determine whether any survey MCQs, student characteristics or discussion forum posting content characteristics could be identified as predictors of membership to cognitive learning style preference groups, demographic groups, performance groups or discussion format preference groups.

Finally, while Chapter 8 discusses the relationships between the findings presented in Chapters 4, 5, 6 and 7, the extent to which these findings confirm or contradict the literature and the acceptance or rejection of the research hypotheses, Chapter 9 addresses the study's contribution to knowledge, the implications and generalisability of the findings, the advice for practitioners, students and instructional designers, and the recommendations for further research.

## **Chapter 2**

### **LITERATURE REVIEW**

#### **2.1 Overview**

The three main areas of interest in this study include ‘blended learning’ in higher education, learning style models and the Felder and Soloman (1991) Index of Learning Styles (ILS) questionnaire. Specifically, this literature review looks at recent reports on the use of discussion forums as an integral component of on-campus coursework activities and presents the findings and recommendations from these studies. The development of some of the most popular cognitive learning style models and their associated dimensions of learning, as well as the construct validity and internal consistency reliability of the ILS questionnaire, are also examined.

While research into ‘blended learning’ in the context of higher education is a relatively new phenomenon, over the past thirty years much has been written about individual preferences for acquiring and processing information and how these preferences, or learning styles, are identified. Learning styles have also been examined from various perspectives and a number of constructs relating to how individuals approach and process information have gathered wide acceptance.

In this chapter, some contemporary models of learning, such as Kolb’s experiential learning theory, Honey and Mumford’s learning cycle and Felder and Silverman’s learning model are presented, and since the Felder and Soloman ILS questionnaire was used in the present study, research into its dependability is also discussed.

#### **2.2 Blended Learning**

Since the advent of ubiquitous on-campus and off-campus computing, some university administrators, researchers and teachers have tried to combine distance education learning strategies with face-to-face learning strategies in an attempt to create a better, more effective and more efficient learning experience for their students (Guri-Rosenblit, 2002). However, since much of the research associated with the integration of learning strategies has focused on a number of different information and communication



technology tools, the resulting discourse has generated some confusion due to inconsistencies in the terminology used (Guri-Rosenblit, 2005).

In the literature, terms such as: web-based learning, computer-mediated instruction, virtual classrooms, on-line education, e-learning, e-education I-Campus, borderless education, distributed learning, flexible learning, mobile learning and blended learning, have all been used to express a relatively similar construct (Brunner, 2006). Hence, for the sake of consistency, when referring to a learning context in which students who participate in on-campus learning activities such as lectures, labs and face-to-face group activities are also required to access and participate in online activities such as peer collaboration, peer co-operation, peer assessment and peer reviews, the author has chosen to use the term 'blended learning'.

While the roll-out of learning management systems (LMS) in residential university settings was expected to revolutionize the traditional modes of teacher-student and student-student interactions, few universities have used the new technology features of the LMS to replace face-to-face interaction with online alternatives because most lack the appropriate infrastructure and human capital to use such technologies effectively (Bates, 2001; Bernath & Hulsman, 2004; Collis & van der Wende, 2002). This is evident when one considers that although the new technologies, such as web conferencing, enable continuous interaction between teachers and students, without extensive preparation and technical support, it is difficult for any teacher to interact with the large numbers of students that virtual settings are able to accommodate (Guri-Rosenblit, 2005; Ryan, 2002; Twigg, 2001).

Another barrier to the wide-spread implementation of the 'blended learning' approach has been the resistance from both students (Felder & Brent, 1996; Guri-Rosenblit, 2002; Hunt, Thomas & Eagle, 2002; Woods, 1994) and faculty (Finley & Hartman, 2004; Knight, Knight & Teghe, 2006). For example, when given the opportunity to not attend class and be provided with online materials and required assignments instead, it seems that students still preferred and valued their traditional classroom encounters (Wang & Woo, 2007). In a two year study at the University of California at Berkeley, the end-of-semester surveys conducted in a technologically-enhanced first-semester introductory chemistry course indicated that more than 80% of the 904 respondents preferred attending class over accessing the lecture webcast (Harley, Denke, Lawrence, Maher,

Gawlik, & Muller, 2002). This study also revealed that close to 30% of the students were unwilling to do more activities online in order to spend fewer hours in the lab, and 35% would not recommend similar courses in which online quizzes and assignments were used.

However, Harley et al (2002) found that ‘blended learning’, as evidenced by their study, was nonetheless a cost effective approach to higher education. They pointed out that:

- instructors spent less time doing repetitive tasks
- instructors spent less time answering routine questions
- student performance was not significantly affected
- on-demand lectures had the potential to allow for a greater number of students to be enrolled in the course
- the number of repeated lectures given each day could be reduced
- with reuse of the materials, the cost of creating technology-enhanced courses would decrease over time

Many researchers agree with Harley et al, and also believe that ‘blended learning’ will greatly contribute to a growing flexibility of academic study patterns, and that the combination of face-to-face learning activities with online components will emerge as a pragmatic approach to new realities in many academic settings (Brunner, 2006; Collis & Moonen, 2001; Dziuban & Moskal, 2001; Guri-Rosenblit, 2002, 2005). More importantly, the adoption of a ‘blended learning’ approach will also lead to a fundamental reconsideration of course design in light of the new learning strategies that are enabled through the use of LMS features and ICT tools (Brunner, 2006; Concannon, Flynn & Campbell 2005; Ellis, Goodyear, Prosser & O’Hara, 2006; Garrison, 2007; Laurillard, 1995; Motteram, 2006; Voos, 2003; Saddler-Smith & Smith, 2004).

However, Condie and Livingston (2007) caution that:

*“The blending of traditional and online learning approaches needs to be more fully understood, particularly the issues that have to do with: (1) the appropriate balance between these two, (2) the methods of optimising the links between teacher-directed and independent student study and (3) the implications for the role of the teacher and the student when sharing the learning process.”* (Condie & Livingston, 2007:344)

They suggest the need for fundamental changes to the conventional teaching and learning process in higher education: a redefinition of both teacher and student responsibilities and expectations, and a move away from the teacher being the proverbial “Sage on the Stage” who presides over the transfer of knowledge to students, to a context in which the teacher is the “facilitator” who empowers students to take on greater responsibility in the creation of a meaningful learning experience (Condie & Livingston, 2007; Danchak & Huguet, 2004; Jaffee, 1998; Laurillard, 1993).

However, although an emphasis on the importance of the experiential and social aspect of education has long been advocated by distinguished educationists such as John Dewey (1916) and Paulo Freire (1970), and is reflected in Lev Vygotsky’s (1976) constructivist learning model, the large scale endorsement of such a radical change to the deeply embedded traditional roles may prove to be the most difficult obstacle to overcome in the development and implementation of a successful ‘blended learning’ approach within the context of higher education (Condie & Livingston, 2007; Gulati, 2004; Jaffee, 1998). As Condie and Livingston (2007) point out, “the culture of schools often works against challenging well-established roles and practices.”

### 2.2.1 Online discussion forums in on-campus courses

With the increasing use of ICT and CMC tools, such as discussion forums in tertiary education, it is imperative to ensure that these tools provide an appropriate means to enhance learning (Cox, Carr & Hall, 2004; Ellis, & Calvo, 2006; Ellis, Goodyear, Prosser & O’Hara, 2006; Northover, 2002; Wang & Woo, 2007). As pointed out in section 1.2, many researchers have emphasized that discussion forums provide a convenient setting from which students are able to learn from one another through the sharing of perspectives (Brook, & Oliver, 2003; Garrison & Anderson, 2003; Jameson, Ferrell, Kelly, Walker & Ryan, 2006; Marra, Moore & Klimczak, 2004; Northover, 2002; Salmon, 2002, 2004; Stacey, 1999; Taradi & Taradi, 2004; van Aalst, 2006; Wang & Woo, 2007; Yazdani & Bligh, 1997), and others note that the inclusion of discussion forums in group-work activities is supportive of a social constructivist approach to learning (Garrison, 2007; Jonassen, Peck & Wilson, 1999; Kovacic, 2004; Krüger, 2006; Veerman & Veldhuis-Diermanse, 2001).

Constructivism, a theory of human learning conceived by Lev Vygotsky (1976) in the 1920’s, advocates a greater understanding of the social nature of learning and the

positive effects of group-work (Slavin, 1996). Vygotsky proposed that learning was a product of social interactions and that it was not simply the assimilation and accommodation of new knowledge, but the process by which all the higher cognitive functions “originate as actual relationships between individuals”. Yet as Gulati (2004) noted, because many discussion forums were being monitored and regulated by the course instructor, this surveillance and disciplinary power of the instructor was “not only disempowering but also not constructivist”. Consequently, in order to foster open and collegial relationships between participants in discussion forums, it was seen as essential that instructors take a “hands-off” approach towards directing and managing the forums (Condie & Livingston, 2007; Finegold, & Cooke, 2006).

Much research has also focused on the characteristics that differentiate collaboration in face-to-face discussions from collaboration in an online discussion forum setting (Chen & Zimitat, 2004; Jaques & Salmon, 2007; Koory, 2003; Larson & Keiper, 2002; Meyer, 2003; Maurino, 2006; Tiene, 2000; Wang & Woo, 2007). Tiene (2000) outlined four specific areas of interest within this research:

- Access
  - Discussion forums require access on a continual basis. Hence, the reliability of the technology is an important factor for success. Students have complained of losing their work due to breakdown or unfamiliarity with the technology (Bishop & Doiron, 2003; Ng, 2007; Song, Singleton, Hill & Koh, 2004).
  - Access to on-campus facilities for face-to-face meetings is not usually a problem for residential universities.
- Timing
  - Discussion forum participants need more time to read, reflect, compose and type a response to a posting (Downing & Chim, 2004). Participants also access the discussion at different times, and while this is a notable convenience (Brunner, 2006; Concannon, Flynn & Campbell, 2005; Motteram, 2006) the discussion of a topic must then also be extended over a number of days.
  - Timing for face-to-face meetings is usually scheduled and fixed. However, due to lack of preparation, or physical or emotional discomfort, some participants may not be ready to interact effectively (Graham, 2006).

- Mode of expression
  - Discussion forums are text based. Communicating through written messages may be easy for participants who are comfortable with expressing themselves in writing, but for those who prefer talking instead of writing, contributing to a discussion forum may be quite stressful. Lack of auditory cues may also be confusing for some (Edirisingha, 2004; Krüger, 2006; Tiene, 2000).
  - Introverts may find discussions in face-to-face meetings stressful, while extroverts may be happy to speak up and dominate the discussion (Lind, 1996).
- Visual cues
  - Discussion forums do not usually include the playback of a video segment as part of the posting. The absence of visual cues such as hand gestures and facial expression adds to what some participants interpret as the impersonal nature of the discussion forums (Lopez-Ortiz & Lin, 2005).
  - In face-to-face meetings the visual cues from participants are evident, even for those individuals who are not openly participating in the discussions.

Other research has suggested that while discussion forum interactions are task-oriented and focus more 'on-topic' compared with face-to-face discussions, reaching a group consensus is nevertheless easier in a face-to-face setting (Finegold, & Cooke, 2006; Jaques & Salmon, 2007; Wang & Woo, 2007). Also, while discussion forum participants tend to cite more literature and provide bibliographic references and web hyperlinks (Bishop & Doiron, 2003), participants in face-to-face discussions are more likely to bring up personal experiences and opinions (Ainslie, 2001). These findings highlight the strong contrast between the more personal nature of face-to-face discussions and the perception that, for relatively large groups, collaboration in discussion forums is impersonal (Salmon, 2002; Jaques & Salmon, 2007), contributes to feelings of detachment and isolation (McInnerney & Roberts, 2004; Krüger, 2006), and provides some participants with a platform from which to display hostile or irresponsible behaviour (Beuchot & Bullen, 2005; Meyers, Bennett, & Lysaght, 2004).

Finally, the different characteristics associated with communicating face-to-face as opposed to those involved in writing have also generated some interest. The language used in communicating face-to-face is very different from that found in discussion forum postings (Kern, 1995; Warschauer, 1995). Participants in face-to-face discussions can be interrupted mid-sentence and use gestures, body language, voice intonations and facial expressions to convey meaning (Ng, 2007). Discussion forum participants, on the other hand, are limited to the use of icons to symbolize their feelings, and font features such as capital letters, bold and colours, to highlight or emphasize their comments.

### **2.3 Cognitive Learning Styles**

While early studies on individual differences in ability and intelligence had failed to identify the processes from which different approaches to learning could be determined (Grigorenko & Sternberg, 1995), once research into the origins of learning and the cognitive and perceptual functioning of individuals had begun, various model of learning styles were proposed. However, as researchers came from various traditions and worked in different contexts, diverse characterizations of learning emerged and a variety of learning style inventories were consequently developed (McLoughlin, 1999). Unfortunately, this lack of consistency in learning styles research created some confusion and uncertainty with regards to the implications of the research findings (Murray-Harvey, 1994).

Nonetheless, since the late 1970s, research from a wide range of educational settings has produced a substantial corpus of knowledge (Allinson & Hayes, 1988; Busato, Prins, Elshout, & Hamaker, 1998; Cleminson, Putnam, & Bradford, 1994; Ellis, 1996; Evans & Honour 1997; Ford, Wilson, Foster, & Ellis, 2002; McLoughlin, 1999; Pask, 1976; Watkins, 1998; Witkin, Moore, Goodenough, & Cox, 1977), with a number of researchers proposing general categorizations on how people acquire, process, perceive and understand information (Felder & Silverman 1988; Riding & Cheema, 1991; Witkin, Moore, Goodenough & Cox , 1977). Some researchers emphasized the importance of fixed genetic traits, while others stressed the importance of learning from experience and from the learning environment (Cassidy, 2004), and as a consequence, a great variety of perspectives and definitions of learning styles can be found in the literature with terms such as thinking styles, cognitive styles and learning modalities all being used interchangeably when referring to learning styles.

A comprehensive and systematic review of learning style models was offered by Coffield, Moseley, Hall and Ecclestone (2004). Although they have serious reservations about learning styles and believe that “clear, simple, but unfounded messages for practitioners and managers have too often been distilled from a highly contested field of research.” (p.119), they recognize the potential benefits of initiating a dialogue on learning styles in higher education.

*"Both McCarthy (1990) and Entwistle and Walker (2000) have spotted the potential of learning styles to act as an agent for broader change. Open-ended dialogue between tutor and students may begin by identifying forms of support such as courses on study skills and, with a tutor alive to the possibilities of growth, it should lead on to a discussion of the curriculum and assessment. If this in turn encourages tutors to discuss among themselves how they can improve students' approaches to learning, then the door is open for course teams, initial teacher trainers and continuing professional developers to use the topic of learning as a springboard for broader cultural change within the organisation. What may begin as a concern to respond more appropriately to variation in patterns of students' learning may provoke a re-assessment of the goals of education or training, the purposes of assessment and the relevance of certain aspects of the curriculum. If learning styles are to be used to improve practice, we recommend that they are employed in the hope that an exploration of pedagogy may well usher in far-reaching change."* (Coffield et al, 2004:133)

In their research, Coffield et al came across 71 different models of learning and categorized 51 of them according to their innate resistance to change over time. This “families of learning styles” inventory, with its associated models is presented in figure 2.1. The “flexibly stable learning preferences” family of models is of special interest because it includes the Felder and Silverman model (1988) which is used in the present study.

Learning styles and preferences are largely <b>constitutionally based</b> including the four modalities: VAKT.	Learning styles reflect deep-seated features of the <b>cognitive structure</b> , including 'patterns of ability'.	Learning styles are one component of a <b>relatively stable personality type</b> .	Learning styles are <b>flexibly stable learning preferences</b> .	Move on from learning styles to <b>learning approaches, strategies, orientations and conceptions of learning</b> .
Dunn and Dunn* Gregorc Bartlett Betts Gordon Marks Paivio Richardson Sheehan Torrance	Ridling Broverman Cooper Gardner et al. Guilford Holzman and Klein Hudson Hunt Kagan Kogan Messick Pettigrew Witkin	Apter Jackson Myers-Briggs Epstein and Meier Harrison-Branson Müller	Allinson and Hayes Herrmann Honey and Mumford Kolb Felder and Silverman Hermanussen Wierstra, de Jong and Thijssen Kaufmann Kirtton McCarthy	Entwistle Sternberg Vermunt Biggs Conti and Kolody Grasha-Riechmann Hill Marton and Säljö McKenney and Keen Pask Pintrich, Smith, Garcia and McEachie Schmeck Weinstein Zimmerman and Palmer Whetton and Cameron

Figure 2.1: Families of learning styles (Coffield, Moseley, Hall & Ecclestone, 2004)

In the following sections, this model and other popular learning models, including Kolb's experiential learning theory (Kolb, 1984) and the Honey and Mumford learning model (Honey & Mumford, 1992) are presented, and the origins of their learning dimensions are discussed.

## **2.4 Popular Models of Learning and Learning Styles**

Many researchers maintain that an individual's learning style relates to their general predisposition towards a particular learning approach (Robotham, 1999), while others believe that the characteristics related to human learning are part of a 'gestalt' in which an individual's neurobiology, personality, physical state and past experiences each have an overall influence on the internal and external operations that constitute learning (Keefe & Ferrell, 1990). Yet, as David Robotham (1999) noted, if an individual's learning style changed significantly over time, any assessment of that learning style would be valid only at the time of assessment, and thus the reliability of the measuring instrument would be questionable. However, proponents of learning styles research believe that while an individual may go through "qualitative changes" in their learning style, the "essence" of that style remains constant over time (Curry, 1990; Cornett, 1983; Claxton & Ralston, 1978).

Since the introduction of Kolb's experiential learning theory (ELT) in 1984, a number of models of learning proposing "flexibly stable learning preferences" have found increasing popularity, especially among corporate trainers, teachers and university lecturers (Coffield et al, 2004). The following section looks at the origins of these models and their particular perspectives on learner profiles and learning style constructs.

### **2.4.1 Kolb's experiential learning theory (ELT)**

According to Coffield et al (2004), one of the most influential models of learning styles is Kolb's ELT. Conceived by David Kolb and his associate Roger Fry, ELT has its foundation in John Dewey's notion of experiential education, Kurt Lewin's concept of action research, Jean Piaget's ideas on the "process of equilibration" between assimilation and accommodation in cognitive development and Carl Jung's personality types (Kolb, 1976; 1981; 1984, Kolb & Fry, 1975). In his elaboration on ELT, Kolb (1984) highlighted six defining aspects of his experiential learning theory:

1. The process of learning is the imperative, not the learning outcomes.



2. The process of learning is continuous and grounded in experience.
3. The process of learning elicits personal adaptive strategies in order to resolve conflicts between the two opposing modes of adaptation to the world; concrete experience versus abstract conceptualization and active experience versus reflective observation.
4. The process of learning is a holistic process of adaptation to the world.
5. The process of learning involves transactions between the individual and his/her environment.
6. The process of learning involves transactions with social knowledge from which personal knowledge is created.

Kolb and Fry (1976) described experiential learning as having a four-stage cycle from which concrete experience (CE) is followed by reflective observation (RO), which leads to abstract conceptualization (AC) and finally active experimentation (AE). From this process, four definitions of learning styles were derived:

- The Converger
  - perspective ranges from AC to AE
  - likes to experiment with new ideas and to work with practical applications
  - is good at problem solving, making decisions and creating practical applications
  - prefers technical tasks and is less concerned with people and interpersonal aspects
- The Diverger
  - perspective ranges from CE to RO
  - is good at seeing from different perspectives
  - prefers observation to action
  - is imaginative, emotional and interested in people
  - likes to work in groups and is receptive to personal feedback
- The Assimilator
  - perspective ranges from AC to RO
  - is concise and logical
  - is good at understanding and synthesizing information
  - prefers ideas and concepts over interactions with people
- The Accommodator

- perspective ranges from CE to AE
- is a 'hands-on' person
- relies on instinct and intuition rather than logical analysis
- prefers a practical, experiential approach
- likes new challenges and experiences
- likes working in teams

In 1976, Kolb developed a learning style diagnostic questionnaire, the learning style inventory (LSI), which has since been revised several times. Kolb believed that in the context of higher education, a person's learning style was important in shaping their learning experience and that students not only chose to study in a field of education that was "consistent with their learning styles", but that once they became actively involved in these studies, the associated learning style was then further reinforced (Kolb, 1984). For example, he argued that more convergers would be found among engineering and economics majors, more accommodators would be found among business and management majors, more assimilators would be found among mathematics, sociology and chemistry majors, and more divergers would be found among English, history and psychology majors.

While many have lauded Kolb's work, researchers critical of his model have noted that the ELT does not describe the process of reflection and how it occurs for the learner (Boud, Keogh & Walker, 1985) nor does it account for the differences in cognitive and communication styles that are culturally-based (Anderson, 1988). Jarvis (1987), who studied adult learners and showed that the ELT does not apply to all experiential learning situations, points out that the empirical support for Kolb's learning cycle is weak and, along with Coffield et al (2004), believe the model to be seriously flawed.

#### 2.4.2 Honey and Mumford's learning model

An offshoot of the ELT was later developed by Honey and Mumford (1992). Alan Mumford and Peter Honey, who had been using the Kolb's LSI with in their organization, found that industry managers had difficulty identifying with the LSI questions, so they decided to create their own learning style diagnostic instrument. In the process, and strongly influenced by Kolb's ELT, they developed their own experiential learning model with its associated learning styles (Coffield et al, 2004).

As with Kolb, Honey and Mumford identified four stages of learning from which they derived four learning styles:

- The Activist
  - flexible and open-minded, but may take unnecessary risks
  - ready to take action but may act without sufficient preparation and not consider the consequences
  - likes to be exposed to new situations and is unlikely to resist change, but may get bored with implementation, consolidation and follow through
  - tends to be a loner and enjoys being the center of attention
- The Reflector
  - careful, thorough and methodical, but may be slow at decision making and may not take enough risks
  - thoughtful, but may not be assertive or forthcoming
  - good listener and assimilates information well, but tends to hold back from direct participation
- The Theorist
  - logical, but not necessarily a creative thinker
  - rational and objective, but may find uncertainty, disorder and ambiguity upsetting
  - good at asking probing questions
  - disciplined approach, but may be intolerant of anything subjective or intuitive
  - has a grasp of the 'big picture'
- The Pragmatist
  - eager to test things out in practice, but may be impatient with indecision and go for the first expedient solution to a problem
  - practical and realistic, but tends to reject anything that doesn't have an obvious application
  - technique-oriented, but may not have much interest in theory or basic principles
  - more task-oriented than people-oriented

Honey and Mumford (2000) later emphasized that while each learning style has its own strengths and weaknesses, these attributes are but one element in a range of factors that

affect learning, such as past learning experiences, the range of learning opportunities available, cultural and motivational influences and the impact of the trainer/teacher. On a more pragmatic note, Mumford stressed that a learning model should be easy enough to understand so that people would be aware of the necessary stages they would need to go through in order to become balanced learners, and thus be able to “improve their learning processes, not just diagnose them” (Mumford, 1987).

#### 2.4.3 The Felder and Silverman model

In 1988 Richard Felder and Linda Silverman proposed their own learning-style model that classified students “according to where they fit on a number of scales pertaining to the ways in which they received and processed information”. These scales included:

- Perception: sensory/intuitive
- Input: visual/auditory
- Organization: inductive/deductive
- Processing: active/reflective
- Understanding: sequential/global

In developing their model, Felder and Silverman were strongly influenced by Carl Jung’s theory of psychological types (Jung, 1921), Paivio’s dual coding theory (Paivio, 1971), Witkin’s work on field dependence and field independence (Witkin & Goodenough, 1981), Kolb’s experiential learning model (Kolb, 1984) and Pask’s styles and strategies of learning (Pask, 1976). As a starting point they asked five fundamental questions about student learning preferences and then proposed some corresponding teaching strategies. These were:

- “1) What type of information does the student preferentially perceive: *sensory* (external) – sights, sounds, physical sensations, or *intuitive* (internal) - possibilities, insights, hunches?
- 2) Through which sensory channel is external information most effectively perceived: visual—pictures, diagrams, graphs, demonstrations, or *auditory* - words, sounds?
- 3) With which organization of information is the student most comfortable: *Inductive* - facts and observations are given, underlying principles are inferred, or *deductive* - principles are given, consequences and applications are deduced?
- 4) How does the student prefer to process information: *actively* - through engagement in physical activity or discussion, or *reflectively* – through introspection?

5) How does the student progress towards understanding: *sequentially* – in continual steps, or *globally* - in large jumps, holistically?” (Felder & Silverman, 1988:675)

From this initial model, Richard Felder then collaborated with Barbara Soloman to develop the index of learning styles (ILS), a questionnaire that incorporated four of the original five learning style dimensions from the Felder and Silverman model. These dimensions were the:

- sensing/intuitive dimension
  - sensing – concrete thinker, oriented towards facts and procedures
  - intuitive – abstract thinker, innovative, oriented towards theories and underlying meanings
- visual/verbal dimension
  - visual – prefers pictures, diagrams, flowcharts
  - verbal – prefers written or spoken explanations
- active/reflective dimension
  - active – learns by trying things out, enjoys working in groups
  - reflective – learns by thinking things through, prefers working alone
- sequential/global dimension
  - sequential – linear thinking process, learns in small incremental steps
  - global – holistic thinking process, learns in large leaps

In his 2002 preface to the original 1998 article, Felder explained why he had omitted the original inductive/deductive dimension of learning from the ILS questionnaire. He explained that in a university setting, the best teaching strategy required an inductive approach to learning, and as such, he did not want to provide instructors with a justification for continuing to use the traditional deductive approach that he claimed was a “less effective lecture paradigm”. As well, he relabeled the “visual/auditory” dimension to “visual/verbal” because he believed that it was a mistake to classify written prose as either a ‘visual’ or ‘auditory’ element since expository prose was “much more likely to be speech-mediated” when silently read (Felder & Henriques, 1995).

#### 2.4.4 Characteristics of flexibly stable learning preferences

As previously mentioned, Carl Jung’s (1921) theory of psychological types and his concept of introversion/extroversion, in which adaptation and orientation are achieved

through physical sensations, thinking, feeling and intuition, inspired many researchers such as Myers and McCauley (1985), Kolb and Fry (1976), Felder and Silverman (1988) and Allinson and Hayes (1996), in their conceptualization of how people learn. The elaboration of an introvert/extrovert dimension of human psychology lead these researchers to formulate an “active experimentation/reflective observation” dimension of learning in which introverts tend to focus on their own feelings and thoughts, and extroverts tend to interact with other people and the outside world. Katharine Cook Briggs and Isabel Briggs Myers made use of this aspect of learning in the Myers-Briggs Type Indicator (MBTI) (Myers & McCauley, 1985), and it is the foundation from which the “diverger learning style” (Kolb, 2000), the “Activist” and “Reflector” learning styles (Honey & Mumford, 1992) and the Active/Reflective dimension of learning (Felder and Silverman, 1988) were based.

Allinson and Hayes (1996) were particularly interested in Jung’s thinking and intuition functions, and developed an Intuition/Analysis dimension of learning. They believed that this dimension reflected cognitive traits, or learning styles, which could be measured by the tendency to make immediate judgments based on either feelings or mental reasoning and attention to detail. Variants of this learning style dimension are found in the MBTI’s Sensing/Intuition scale (Myers & Myers, 1980), Kolb’s (2000) “converger learning style” and Felder and Silverman’s (1988) Sensory/Intuitive dimension of learning.

Other researchers suggested that people have innate preferences regarding the manner in which they acquire and process information. Gordon Pask (1976) proposed that a learner’s approach to assimilating information was influenced by their Holist/Serialist perspective, in which Serialist learners preferred a sequential step-by-step approach, while Holists liked to see the overall relationships. Witkin, Moore, Goodenough and Cox (1977) referred to Holists as “field-independent”, individuals who are adept at structuring and analytic activity, and Serialists as “field-dependent”, individuals who prefer to have learning organized and structured for them. Felder and Silverman’s (1988) Global/Sequential dimension of learning is a variant of Pask’s Holist/Serialist perspective.

Alan Richardson (1977) also proposed a Verbalizer/Visualizer aspect of processing information in which people tended to either express their knowledge through words

(Verbalizer), or through pictorial forms (Visualizer). This Verbal/Visual dimension has in turn spawned many variants such as Riding’s Verbaliser/Imager dimension (Riding & Cheema, 1991), Felder and Silverman’s (1988) Visual/Auditory dimension and elements of Fleming and Mills’ (1992) VARK (Visual, Aural, Read/write, and Kinesthetic sensory modalities).

### 2.5 Felder and Soloman’s Index of Learning Styles Questionnaire

The Felder and Soloman (1991) ILS questionnaire incorporates four of the learning style dimensions from the Felder and Silverman (1988) model, and as figure 2.2 shows, the scale on which the learning style dimensions are evaluated is based on 11 questions per dimension.

Learning Style		ILS Scale	Learning Style	
ACTIVE	←	11 questions	→	REFLECTIVE
SENSING	←	11 questions	→	INTUITIVE
VISUAL	←	11 questions	→	VERBAL
SEQUENTIAL	←	11 questions	→	GLOBAL
+11 ↔ +9 ↔ +7 ↔ +5 ↔ +3 ↔ +1 0 -1 ↔ -3 ↔ -5 ↔ -7 ↔ -9 ↔ -11				
strong preference	moderate preference	well balanced	moderate preference	strong preference

Figure 2.2: Felder and Soloman ILS scale

For each ILS question there is an A or B response, answer A represents a characteristic of one learning style of the dimension, while answer B supports the other learning style of the dimension. The accumulated score (+1 point for one learning style and -1 point for the other) indicates if the respondent is unaffected by either perspective, or has moderate or strong leanings towards one of the two associated learning styles.

Since 1996 the ILS questionnaire has been available for use online at <http://www.engr.ncsu.edu/learningstyles/ilsweb.html> (Felder & Soloman, 1991). It is free of charge, and anyone who completes the questionnaire and activates the submit button is presented with the ‘Learning Style Results’ web page. This page shows a score on all four of the ILS dimensions, and explains that:

- “• If your score on a scale is 1-3, you are fairly well balanced on the two dimensions of that scale.
- If your score on a scale is 5-7, you have a moderate preference for one dimension of the scale and will learn more easily in a teaching environment which favors that dimension.

- *If your score on a scale is 9-11, you have a very strong preference for one dimension of the scale. You may have real difficulty learning in an environment which does not support that preference."*

(Felder & Soloman, 1991)

This 'Learning Style Results' web page also provides a hyperlink to more specific information on learning styles and includes suggestions to help those whose score indicates a moderate or strong learning style preference. For example, Felder and Soloman suggest that:

- Active learners might try to compensate for limited class time allotted for discussion or problem-solving activities by setting up a study-group in which to explore various perspectives and run trials to work out solutions to problems.
- Reflective learners might try to compensate for limited class time allotted for assimilating new information, by taking the time to review the readings and thinking of possible questions or applications. Writing short summaries might help a reflective learner retain materials more effectively.
- Sensing learners struggling with abstract and theoretical material might try to compensate by asking the instructor for specific examples of concepts and procedures and how these concepts would apply in practice.
- Intuitive learners find memorization and rote learning tedious and boring and might compensate by asking the instructor to discuss some of the interpretations or theories that link the facts. Since Intuitive learners tend to show impatience with details, they may be prone to careless mistakes on tests and should be mindful to take time to read every question carefully before answering.
- Visual learners might try to gain from their learning style by finding diagrams, sketches, schematics, photographs, flow charts, or any other visual representation of course materials. Using concept maps to help visualize relationships between concepts, and colour-coding to help in organize and manage notes, may also be helpful.
- Verbal learners might try to gain from their learning style by writing summaries or outlines of course material. Verbal learners also tend to find that working in groups is particularly effective.
- Sequential learners might try to compensate for some difficulty in following and remembering material that is presented with gaps or in no apparent order



by asking the instructor to fill in the gaps or to explain the links between elements.

- Global learners might try to benefit from their learning style by skimming through the reading materials first in order to get an overview of the subject, and might find it more productive to immerse themselves in one topic rather than spend their time switching from one topic to the next.

Since its launch, the ILS online questionnaire has now been translated into several languages, including Spanish, Portuguese, Italian and German, and has generated over 500,000 hits per year. Felder cautions however that the ILS results should not be over-interpreted, and says that “if someone does not agree with the ILS assessment of his or her preferences, trust that individual's judgment over the instrument results”. He also emphasizes that the ILS questionnaire provides an indication of possible strengths, tendencies or habits that might lead to difficulty in academic settings, but that it does not “reflect a student's suitability or unsuitability for a particular subject, discipline, or profession”.

The reliability and construct validity of the Felder and Soloman ILS questionnaire has been examined in a number of studies (Cook, 2005; Cook & Smith, 2006; Felder & Spurlin, 2005; Litzinger, Lee & Wise, 2005; Livesay, Dee, Felder, Hites, Nauman, & O'Neal, 2002; Seery, Gaughran & Waldmann, 2003; Spurlin, 2002; Van Zwanenberg, Wilkinson & Anderson, 2000; Viola, Graf, Kinshuk & Leo, 2006; Zywno, 2003) and in the following section a review of the findings from these investigations is presented.

### 2.5.1 Reliability and construct validity of the ILS

Although Robotham (1999) doubted that many of the learning styles diagnostic questionnaires could meet the stringent instrument validity and measurement reliability requirements critical to good research, a three-year longitudinal study on the relationship between student learning styles and academic achievement in a hypermedia-assisted learning environment found that the Felder and Soloman (1991) ILS questionnaire scores indicated strong and moderate reliability coefficients on all of the learning style scales (Zywno, 2003). However, while research by Livesay, Dee, Felder, Hites, Nauman, and O'Neal (2002), and Seery, Gaughran and Waldmann (2003) showed similar findings, Van Zwanenberg, Wilkinson and Anderson (2000) and Viola,

Graf, Kinshuk and Leo (2006) have reservations with regards to the robustness of the ILS, its validity and reliability.

In an effort to address this criticism, Felder and Spurlin (2005) looked at test-retest reliability measurements of the ILS from three studies (Livesay et al, 2002; Serry et al, 2003; Zywno, 2003). Pointing out that a four week interval between the test and retest provided a reasonable compromise between respondents remembering their responses and losing too many of them for the retest, they draw attention to the large correlations from the Serry et al (2003) study. As Table 2.1 shows, Serry et al found large significant ( $p<.01$ ) correlations on all ILS scales (A-R: Active/Reflective; S-N: Sensing/Intuitive; Vs-Vb: Visual/Verbal; Sq-G: Sequential/Global), and while the longer intervals between test-retest showed lower correlation coefficients, correlations on all of the ILS scales still remained high.

**Table 2.1:** Test-Retest Correlation Coefficients (Felder & Spurlin, 2005)

$\Delta t$	A-R	S-N	Vs-Vb	Sq-G	N	Reference
4 wk.	0.804**	0.787**	0.870**	0.725**	46	Serry et al (2003)
7 wk.	0.73*	0.78*	0.68*	0.60*	24	Livesay et al (2002)
8 mo.	0.683**	0.678**	0.511**	0.505**	124	Zywno (2003)

\* $p<.05$  \*\* $p<.01$

Felder and Spurlin (2005) also looked at the Cronbach Alpha coefficients for these studies, including the lower coefficients reported in the Van Zwanenberg et al (2000) study. The Cronbach's  $\alpha$  is a coefficient used to assess how well a set of items on a scale, such as Felder and Soloman's ILS learning style dimensions, can measure a single underlying construct (Messick, 1995; Trochim, 2004; Viola, Graf, Kinshuk & Leo, 2006; Zywno, 2003). The higher the Cronbach's  $\alpha$  value, the more reliable the scale, and when evaluating scales related to attitude tests, a Cronbach's  $\alpha$  value of .50 ( $\alpha=0.50$ ) is the recommended cut-off for internal consistency reliability (Tuckman, 1999; George & Mallery, 2001).

In table 2.2, the Cronbach Alpha coefficients from the Viola et al (2006) study and the Litzinger, Lee and Wise (2005) study are added to those presented by Felder and Spurlin (2005). In all of the studies, only two coefficients, both from the Sequential-Global dimension ( $\alpha=0.43$ ;  $\alpha=0.41$ ), were below the acceptable cut-off level. Litzinger et al (2005) also ran a classical item analysis on the ILS questions and concluded that the reliability of the scales could be improved by eliminating the weakest item in each

scale. They noted that the Sequential-Global scale would benefit most from this; with a raise from  $\alpha=0.56$  to  $\alpha=0.60$ .

**Table 2.2:** Cronbach Alpha Coefficients (Litzinger et al (2005))

A-R	S-I	Vs-Vb	Sq-G	N	Reference
0.53	0.63	0.63	0.43	282	Van Zwanenberg et al (2000)
0.60	0.77	0.74	0.56	572	Litzinger et al (2005)
0.56	0.72	0.60	0.54	242	Livesay et al (2002)
0.62	0.76	0.69	0.55	584	Spurlin (2002)
0.51	0.65	0.56	0.41	282	Van Zwanenberg et al (2000)
0.60	0.70	0.63	0.53	557	Zywno (2003)
0.60	0.69	0.61	0.50	557	Zywno (2003)

Lastly, Felder and Spurlin (2005) addressed concerns regarding the findings of inter-scale correlations. Acknowledging that the Sensing-Intuitive and the Sequential-Global scales had shown a ‘moderate’ degree of association (Cook, 2005; Cook & Smith, 2006; Livesay et al, 2002; Spurlin, 2002; Van Zwanenberg et al, 2000; Viola et al, 2006; Zywno, 2003), they explained that a correlation between these scales was not unexpected, and even supported the construct validity of the ILS.

This view was supported by Litzinger et al (2005) who noted that the findings from their factor analysis of ILS scores had revealed factors “appropriately matched to the intent of the scale, providing evidence of construct validity for the instrument”. While these inter-scale correlations may be problematic for the internal consistency of the ILS scales, Felder and Spurlin (2005) argued that since the objective of the ILS results was to recommend teaching and learning approaches congruent with an indicated learning style preference, if a learning approach designed for the benefit of intuitive learners was also helpful to global learners, then so much the better.

### 2.6 Summary

The review of the literature addressed three main areas of interest. First, the advent and the development of ‘blended learning’ in higher education were explored. Then, cognitive learning styles and models of learning were presented, and lastly, the validity and reliability of the ILS questionnaire was examined.

Research into ‘blended learning’ in the context of higher education is a relatively new phenomenon and many different terms have been used to express the inclusion of ICT-

mediated activities into the residential university coursework. Hence, for the sake of consistency, the author has chosen to use the term 'blended learning' when referring to any learning context in which students are required to participate in both on-campus and on-line learning activities.

Even though a number of studies have shown that both students and faculty do not necessarily support the adoption of a 'blended learning' approach, university administrators are nonetheless keen on its implementation because of its perceived cost effectiveness. Additionally, many researchers believe that 'blended learning' will not only contribute to a greater flexibility of academic study patterns, but more importantly, that it will trigger a fundamental reconsideration of course design in which the best mix from both face-to-face and online learning strategies will be applied to optimize the learning experience.

However, since many ICT-mediated learning activities call for fundamental changes to conventional teaching and learning methods in higher education, a redefinition of both teacher and student responsibilities and expectations must therefore be considered, and a constructivist model of learning is advocated. As a result, teachers would need to learn how to facilitate peer-to-peer learning and students would need to accept greater responsibility for their learning.

Unlike research into the new 'blended learning' designs and their implications for higher education, research into the origins of learning and the cognitive and perceptual functioning of individuals has been extensive. However, because researchers have come from different traditions and worked in diverse contexts, various definitions of learning emerged and as a consequence, a variety of learning style inventories have been developed.

Kolb's and Honey and Mumford's learning models and their associated learning styles were examined. Each proposed four similar learning styles and classified individuals as learners who preferred doing and experiencing (Converger or Activist), observing and reflecting (Diverger or Reflector), reasoning and understanding concepts (Assimilator or Theorist), or trying things out (Accommodator or Pragmatist). Richard Felder and Linda Silverman also proposed a learning-style model from which the index of learning styles

(ILS) questionnaire was later developed. The ILS questionnaire addressed four learning style dimensions. These included the:

- Sensing/Intuitive scale, drawn from Carl Jung's work on thinking and intuition
  - Sensing learners are concrete thinkers, oriented towards facts and procedures
  - Intuitive learners are abstract thinkers, innovative and oriented towards theories and underlying meanings
- Visual/Verbal scale, drawn from Alan Richardson's work on information processing
  - Visual learners prefer to process information from pictures, diagrams, flowcharts
  - Verbal learners prefer to process information from written or spoken explanations
- Active/Reflective scale, drawn from Carl Jung's notion of introversion/extroversion in his theory of psychological types
  - Active learners prefer to learn by trying things out and enjoy working in groups
  - Reflective learners prefer to learn by thinking things through and would rather work alone
- Sequential/Global scale, drawn from Gordon Pask's (1976) work on Serialist and Holist learners and research from Witkin, Moore, Goodenough and Cox (1977) on "field-independent" and "field-dependent" individuals
  - Sequential learners are linear thinkers who learn in small incremental steps
  - Global learners are holistic thinkers who learn in large leaps

Lastly, the robustness of the ILS questionnaire was discussed. Since some researchers have challenged the validity and internal consistency reliability of the ILS, Felder and Spurlin sought to address those concerns by reviewing the findings from several studies. They pointed to research that found strong and moderate reliability coefficients on all, and significant Cronbach Alpha coefficients on most of the learning style scales. While they acknowledged that the Sensing-Intuitive and the Sequential-Global scales seemed to show a moderate degree of association, they claimed that the correlation between these scales was not unexpected and even supported the construct validity of the ILS. Felder and Spurlin concluded by arguing that since the objective of the ILS results was

to recommend teaching and learning approaches congruent with an indicated learning style preference, should a learning approach designed for the benefit of intuitive learners also be helpful to global learners, then so much the better.

In the following chapter the research methods are presented. First the research questions and hypotheses are discussed, then the design of the experiment is described. In particular, the chapter covers the design of the survey questionnaires and interviews, the characteristics of the research subjects, the data gathering methods and the data analysis procedures.

## **Chapter 3**

### **RESEARCH METHODOLOGY**

#### **3.1 Overview**

In this chapter, the research questions, experimental design, instrumentation and analysis methods are presented. Firstly, in reference to the link between the previous research outlined in the literature review and the rationale for undertaking this study, four related hypotheses are proposed. Then, the research method is presented, and as the study involved a single group design in which a treatment was administered over a period of several months, threats to the internal validity of the study and to the reliability of the testing methods and instruments used are also addressed.

This is followed by sections in which the design of the survey questionnaires and the end-of-semester interview sessions are described. While the objective of the first survey questionnaire was to examine initial attitudes towards the small-group online tutorial discussion format, the objective of the second survey was to identify the changes in these attitudes over time. Some questions addressed technical issues and personal perceptions relating to confidence, relationships and learning, while others focused on comparing and contrasting the online and the traditional face-to-face discussion formats. Since the online peer collaboration, peer review and peer assessment aspects of the treatment were new experiences for the students, further questions were designed to examine attitudes towards these activities. In order to complement the information gathered in the survey questionnaires, one-to-one interviews were conducted in the last weeks of the semester with a small number of best peer-rated and worst peer-rated students.

Before describing the experimental design, a comprehensive description of the research sample is presented. The chapter concludes with a description of how data from the discussion forum postings, peer ratings, surveys and interviews was gathered, and the procedures that were used for the statistical analysis of the data.

### 3.2 Research Questions and Hypotheses

As explained in section 1.1, this study was undertaken to examine why some students were not amenable to adopting a 'blended learning' approach. The author believed that one significant factor which could account for this attitude was associated with the influence that cognitive learning style preferences have on a student's ability to access, process and respond to information delivered through discussion forum postings, as well as their approach towards collaborating with peers.

According to Felder and Silverman (1988), since Active learners prefer to work in groups and tend to retain and understand information best by discussing it, applying it or explaining it to others, it was expected that these students would perform well in the online discussion activity and receive high peer ratings for their contributions to the tutorial discussion. Hence, one hypothesis proposes that there will be a significant positive correlation between Active learners and high peer ratings.

Because Intuitive learners prefer innovation, dislike repetition and are comfortable working with new concepts (Felder & Silverman, 1988), it was expected that they would show a preference for the online discussion activity over traditional large group face-to-face discussions. Hence, a second hypothesis proposes that the results of the survey questionnaires will show a significant positive correlation between Intuitive learners and a preference for the small group online tutorial discussion format.

Sequential learners tend to learn better when information is presented in linear sequential steps (Felder & Silverman, 1988). Consequently, they would be likely to experience difficulty working in an asynchronous discussion forum environment. As such, a third hypothesis proposes a significant positive correlation between Sequential learners and difficulty in working effectively in the online tutorial discussions.

The literature also suggests that insecurities triggered by novel and unfamiliar assessment activities, such as important changes to long established course assignment and assessment modes, persist if steps to reduce the resistance are not taken (Felder & Brent, 1996; Hunt, Thomas & Eagle, 2002; Lynch & Collins, 2001; Wang & Woo, 2007; Woods, 1994). Therefore, because no attempt to address the issue of resistance to change was planned, when comparing the results of the first attitude survey conducted



early in the semester, to the second survey conducted at the end of the semester, it was expected that the initial resistance to replacing the traditional face-to-face tutorial discussion format with a peer rated small-group CMC-mediated collaborative activity would not diminish after implementation. Hence, this hypothesis proposes that maturation will not produce a decrease in the resistance to change.

A final hypothesis focuses on the relationship between attitude and performance. Would student’s attitudes towards participating in small group online tutorial discussion format affect their performance? Students who were unsympathetic towards participating in collaborative group work, or who resented using CMC to express themselves, might not be inclined to make good contributions to the online discussions. Hence, another hypothesis proposes a significant positive correlation between attitudes associated with participation in the online discussion forum format and the peer rating of performance in discussion forums.

### 3.3 Research Method

In the final semester of the 2003/2004 academic year, a repeat of the pilot study ‘blended learning’ design described in section 1.2, was run with another cohort of health psychology students. One hundred sixty-six students were registered for the course, and in response to some of the feedback gathered from the pilot study, this time the students were given an opportunity to meet their fellow group members face-to-face before working on their first assignment.

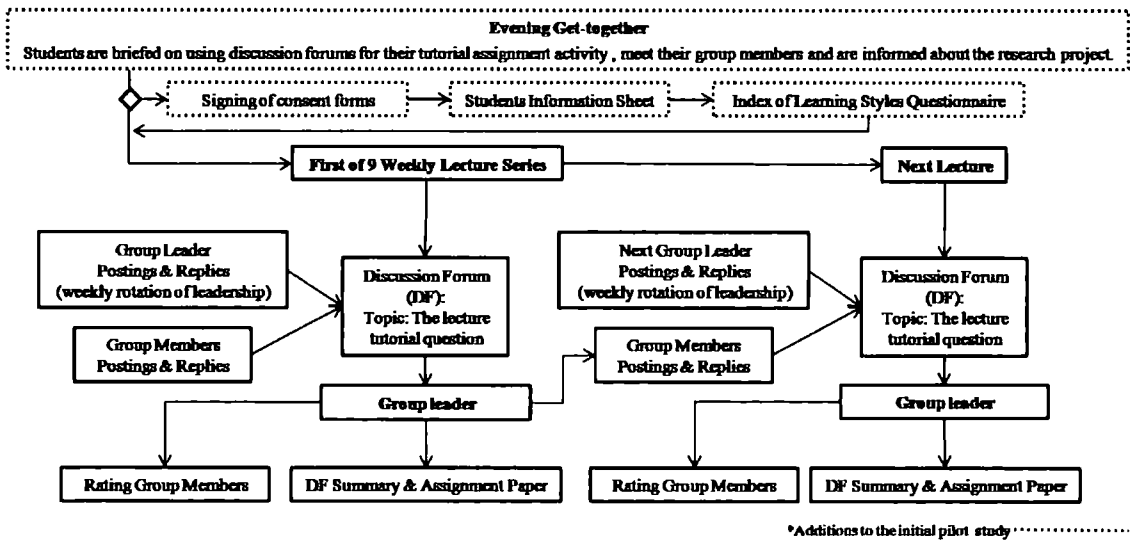


Figure 3.1: Model for using discussion forums as a resource for tutorial assignments

As figure 3.1 shows, the students were requested to attend a start-of-semester get-together where they would be more fully briefed on the details of the tutorial assignment, and get to meet their fellow discussion forum group members. At this meeting, the author presented the objectives of the research, and invited the 147 students present to participate in the study. All of the students agreed to take part in the research and each signed a consent form (see Appendix A). They subsequently filled in an information sheet providing demographic information (see Appendix A) and completed an Index of Learning Styles (ILS) questionnaire (Felder & Soloman, 1991).

As in the earlier pilot study, during the following 9 weeks of the semester, students accessed their group's discussion forums to discuss readings, present opinions, debate issues and summarise papers or information they had researched. After each lecture, the discussion forums were opened and students had 7 days in which to post and reply to messages. The group leaders then had 7 more days to write their 8 page paper on the tutorial question, as well as a summary of the forum postings, and to anonymously rate each group member for their contribution to the online discussion. During that week, the group leaders were also group members of discussion forum on the next lecture's tutorial question. As group leadership was rotated weekly, each group member took a turn at being the leader, and by the end of the semester everyone would have submitted a paper on one of the tutorial questions along with a summary of postings from that particular forum week, and have received 8 peer ratings.

The course instructor did not directly participate in the discussion forums, but he did monitor them and sent reminder emails out to the group leaders if no postings had been submitted in the days following the lecture. Transcripts of the discussion forums were archived for later analysis, and the postings were assigned to one of two categories, depending on the nature of their contribution to the topic under discussion. Postings in which a group member provided only facts were categorized as "Factoid", and postings in which the member presented a substantiated argument or analysis were categorized as "Proposition". The frequency of bibliographic references, web site hyperlinks, statements for directing or managing the group, and friendly or unfriendly comments were also noted.

During the semester, students were asked to complete two online survey questionnaires. The first survey was conducted early in the term, and the second at the end of term.

Questions in both surveys focused on the ease of use of the technology, its reliability and usability, the quality of the online discussions, the preferred format for learning: online vs. face-to-face discussions, personal perceptions about online relationships and personal perceptions about collaborative learning.

Lastly, after the final assignment had been completed, 9 students who had received the highest aggregate peer ratings for their contributions to the online discussions, and 8 students who had received some of the lowest aggregate peer ratings, were interviewed. While these sessions were audio taped, the author also took notes as the students offered their opinions and personal experiences about their online collaboration.

### **3.4 Design of the Experiment**

This experiment is a field study in which subjects from a sample of convenience were observed in their actual setting as they proceeded through a graded out-of-classroom activity over the course of one semester. Due to constraints in setting up the study, a control group could not be created, so a single group quasi-experimental design was used.

In an effort to address the validity and reliability issues related to the constructs and psychometric instruments used, the study extended over 9 weeks. During that period, the availability of data from various sources, such as discussion forum usage statistics and transcripts, peer ratings of weekly postings and attitude survey questionnaires, contributed to building a clearer picture of the issues and helped provide a better understanding of the relationships involved in the implementation of this small group online tutorial assignment activity.

Pearson's correlation, factor analysis and repeated measures t-test calculations were used to examine whether relationships and attitudes had changed over time. Discriminant function analysis (DFA) calculations were used post hoc to establish whether particular conditions of independent variables (IVs) could predict membership to groups of dichotomous dependent variables (DVs).

#### **3.4.1 Single Group Design Threats to Validity**

The experimental treatment in this study was observed over a period of 9 weeks; hence it was important to address issues relating to history, maturation, testing,

instrumentation, and mortality. For example, is it possible that experimental history and maturation might have a significant affect upon student attitudes? Undoubtedly, an increase in the use of discussion forums for other courses could affect their expectations and attitudes.

As well, since most entertainment, sports and news web sites include a discussion forum feature, this increasing popularity of discussion forums as a supplement to radio and television programs could create a disparity between students who regularly accessed online media and those who did not. Hence, it was important to examine the relationship between the student's ICT experience, their satisfaction with using discussion forums, and their performance on the course assignments.

The testing instruments in this research were survey questionnaires. These were designed to explore initial attitudes about the discussion forum activity, and over time looked at changes in these attitudes. Finally, issues of experimental mortality had to be considered. If many students dropped out of the discussion forum activity, then the findings would be subject to the biasing effect of mortality, and the causes for this would need to be examined.

### **3.5 Design of the Survey Questionnaire**

At the beginning and end of the semester, students were asked to voluntarily complete an online survey. Although these surveys were not anonymous, it was emphasised that this research process was completely independent of the course administration, and the students were assured that their course instructor would not have access to the raw data.

The survey question types included five point and three point Likert scale responses, true/false responses, nominal selections from a list, and open answer input. The questions were designed to examine how students felt about using online discussion forums, how they perceived the quality and value of interactions, their views on relationships in online discussion forums and the effectiveness of online peer collaboration.

There were 22 questions in Survey I, and most of these were repeated in Survey II. However, because the technical reliability issues from Survey I had been addressed by the time Survey II was administered, questions relating to the learning management

system were omitted. One hundred fifty-seven students completed Survey I, and 132 students completed Survey II. Copies of the Survey I and Survey II questionnaires are attached as appendix B and appendix C.

### 3.5.1 The First Survey Questionnaire

Survey I had five sections: 1) Ease of use of the technology, 2) Quality of the online discussions, 3) Comparing online versus face-to-face discussions, 4) Perceptions about online relationships and 5) Perceptions about learning.

Questions from the first section were designed to find out if the technology itself had responded appropriately, if access to the discussion forums was easy and if students had difficulty posting messages. The students were asked to describe problems they had encountered when accessing the discussion forums, and if the process of posting messages was user friendly.

In the section titled “Quality of online discussions”, two questions explored the student’s experiences in using online discussion forums. The first question asked whether they had experienced difficulties in understanding what other discussion group members had written, and the second question focused on their ability to express themselves in the online discussion format. These two questions were designed to establish whether difficulties in reading and writing English, and/or difficulties in synthesizing seemingly disjointed information from many postings, were related to the student’s principal language of communication, preferred cognitive learning style, or attitudes towards participating in an online collaborative learning activity.

In the section titled “Comparing online versus face-to-face discussions”, students were asked to refer to their experiences of the traditional face-to-face discussion format and to consider in retrospect whether they felt they had contributed more opinions and spent more time gathering information through participating in the online discussion format. Each question was followed by an open answer text input box, allowing each student to elaborate on the reasons why they felt they had contributed fewer or more opinions, and why they felt they had spent more or less time gathering information.

The next section was designed to explore online relationships. Because research in collaborative learning has pointed to issues of trust, self-consciousness and social

etiquette in a group as being important factors related to attitude and performance (Culnan & Markus, 1987; Gay, Boehner & Panella, 1997; Gay & Grosz-Ngate, 1994; Gay & Lentini, 1995; Gay, Sturgill & Martin, 1999) students were asked how they felt about working collaboratively online. Did they trust most group members to make good contributions? Did they feel insecure about expressing their opinions? Did they feel that their relationship with the other group members was "business like" and impersonal? These questions were followed by an open answer text box in which students could elaborate on the reasons why they did or did not trust their group members, or why they felt insecure or confident about expressing their opinion. Students were also asked to explain how they felt about their relationship with the other group members.

The last section of the survey questionnaire, titled "Perceptions about learning", asked if students had learned and remembered more about tutorial topics through their participation in the discussion forums as compared to attending the traditional face-to-face tutorials. Lastly, peer collaboration was examined as a learning strategy, and students were asked to consider whether being a member of a team of "consultants", assigned to provide advice on community health issues, was a good approach to learning.

### 3.5.2 The Second Survey Questionnaire

Survey II was designed to expose any changes in attitude towards the issues explored in the first survey, and except for the first section relating to the use of technology, all the other questionnaire section titles remained the same. As with the first survey, the students were asked to voluntarily complete this online questionnaire.

Since issues relating to the ease of use of the technology had been explored in the first section of the first survey, new questions were created to examine issues of technical reliability and usability of the LMS and the peer rating input website. Students were asked to indicate if they had encountered problems in accessing the online discussion forums, and whether the peer rating website, specifically designed and created for the class, was user friendly.

In the section titled "Quality of the online discussions", questions from the first survey were repeated. To further explore how students had perceived the contributions of others, an additional question asking whether postings had been relevant to the topics

under discussion was inserted. The students were also asked whether they preferred online or face-to-face tutorial discussions, and to elaborate on the reasons for their preference.

In the section titled “Perceptions about online relationships”, students were asked to indicate whether their trust in the group members had changed over the course of the semester and to list the reasons for such changes. In a similar fashion, they were also asked whether their confidence in expressing their opinions had increased or decreased, and why; and whether their relationships with their online discussion group members had changed to become more or less impersonal, and why.

Questions in the last section, “Perceptions about learning”, were designed to cover the same objectives as those from the first survey questionnaire, but were reformulated to pose the question in a reverse order. For example, the question: “I believe I learn more about a tutorial topic from participating in the IVLE discussion forum rather than in the face-to-face discussion format” was rewritten as: “I believe I learn more about a tutorial topic from attending a face-to-face tutorial discussion than from participating in the IVLE discussion forum format”. This was done to avoid any bias in the presentation of the questions from one survey to the other.

### **3.6 Design of the Interview Sessions**

Interviews with some of the students who had agreed to participate in the study were scheduled for the last week of the semester. A private office, easily accessible to the students, was secured for this purpose, and since the interviews were to be conducted over an eight day period just prior to the end of semester, only approximately 10% of the research sample would be interviewed.

The objective of the interview was to gather information pertaining to why certain individuals had done well, while others had done poorly, in the peer assessment component of the discussion forum. Each week the assigned group leader would anonymously assign a mark to each group member based on their individual contribution to that weeks’ discussion. The cumulative scores would thus indicate which students had been recognised by their peers for having made significant contributions throughout the semester, and which students were deemed to have contributed very little.

Students from the top 20 and bottom 20 peer rating rankings would receive an email message inviting them to a private one-to-one interview session with the investigator. The interview sessions were to be audio taped, and if relevant information was not freely offered during open conversation, the interviewer planned to ask about: a) the student's level of motivation and the importance of the course marks towards their good academic standing; b) the student's writing ability and how they adapted to the discussion forum as a mode of communication; and c) the student's feelings about being the team leader.

### 3.7 Research Subjects

The subjects were third year university undergraduates from the Department of Social Work and Psychology in the Faculty of Arts and Social Sciences at a major university in Southeast Asia. They were enrolled in a course that was designed to challenge their understanding of both theoretical principles and research in health psychology by requiring them to relate this knowledge to real world situations. Hence, the coursework activities were designed to: a) engage the students in the critical analysis of theory; b) encourage them to collaborate in formulating creative approaches to addressing a research question; and c) enable them to experience and evaluate varying perspectives on issues.

While unobtrusive data was to be gathered from the entire class during the 9 weeks of tutorial assignments, those students who had agreed to take part in the research also filled out an information sheet about their background, completed an Index of Learning Styles questionnaire (Felder & Soloman, 1991), and consented to have the contents of all their discussion forum postings and their continuous assessment marks made available for analysis. This group of students (N=147), referred to as the research sample, was composed of 123 female and 24 male students. Almost all were between 20 to 23 years of age, and 102 students (69%) indicating that English was their principal language of communication.

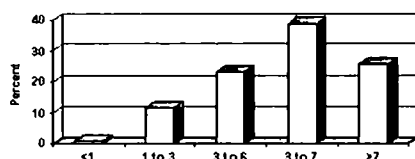


Figure 3.2: Years of ICT experience



As figure 3.2 shows, the students were quite familiar with ICT; more than 87% of them had been using ICT for at least 3 years, with the most popular ICT application being email. As figure 3.3 shows, more than 27% of the students sent emails on a daily basis and 79% used email at least once per week. However, the students were not very familiar with discussion forums and as figure 3.4 shows, only 19% made weekly postings in discussion forums, while just 2% made daily postings.

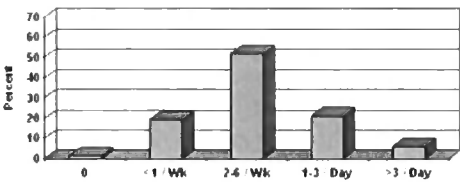


Figure 3.3: Email use

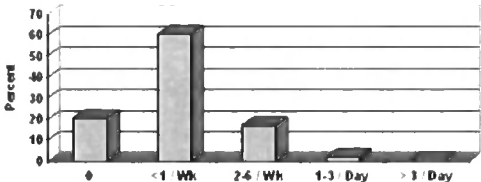


Figure 3.4: Forum use

The students were also asked to rate their experience of the traditional face-to-face tutorial discussions and online discussion forums for collaborating on tutorial assignments. As figures 3.5 shows, 50% of the students said they enjoyed face-to-face tutorial discussions, while 8% said they disliked them. Interestingly, nearly half of the group (45%) could not comment about using discussion forums since they claimed to have had no prior experience. However, as figure 3.6 shows, of the 55% who said they had already experienced online discussion forums, only 14% of these said they had enjoyed working in that format.

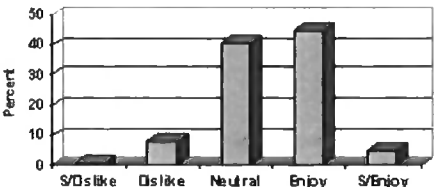


Figure 3.5: Experience: F-to-F discussion

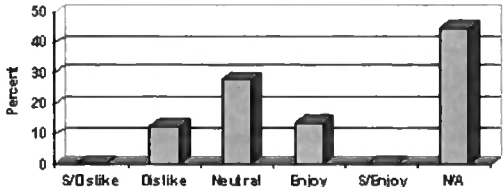


Figure 3.6: Experience: Discussion forum

Finally, the students were asked to rank order a list of 5 motivators for taking the course. Since the motivation “I’m interested in the topics covered” was selected as the top choice by 97% of the students, rankings for the second most important motivator were examined. To represent the data, the 4 remaining motivators were labeled A to D. The results showed that 14% of the students selected motivation A, “there are no face-to-face tutorial sessions”; 23% of the students selected motivation B, “I believe I can achieve a high grade”; 9% of the students selected motivation C, “I believe the work load is light”; and 17% of the students selected motivation D, “I can contribute to tutorial sessions and submit assignments from home using IVLE”, as their second most important reason for taking the course.

### 3.7.1 Subjects and learning styles

As outlined in section 2.3, in their discussion on the interpretation of the ILS results, Felder and Soloman (1991) specify that students who score +5 or more, or -5 or less, on any ILS dimension are deemed to have a tendency (moderate to strong) towards individual traits specific to the associated profile. Of the 147 students who completed the questionnaire, 6 students showed a preference for the Active dimension (A), 55 showed a preference for the Reflective dimension (R), 52 showed a preference for the Sensing dimension (S), 25 showed a preference for the Intuitive dimension (I), 84 showed a preference for the Visual dimension (Vs), 8 showed a preference for the Verbal dimension (Vb), 34 showed a preference for the Sequential dimension (Sq), and 20 showed a preference for the Global dimension (G).

As table 3.1 shows, except for the Active and Reflective learning styles, the distribution of preferences are comparable to those of a previous long term study by Zywno (2003) and others reported by Felder and Spurlin (2005). It is also important to note the very different composition of the research subjects in these studies. Although all of the subjects were undergraduates, the subjects in Zywno's study were mostly male Canadian engineering students; the subjects in studies reported by Felder and Spurlin were American engineering students and Brazilian science and humanities students; while the subjects in this study were mostly female Southeast Asian faculty of Arts and Social Sciences students.

**Table 3.1:** Comparison - distribution of ILS learning style preferences

A	R	S	I	Vs	Vb	Sq	G	N	Reference
4%	37%	35%	17%	57%	5%	23%	14%	147	present study
27%	15%	38%	11%	69%	3%	34%	15%	87	Zywno (2003)
32%	18%	38%	12%	64%	5%	21%	16%	119	Zywno (2003)
30%	15%	36%	15%	62%	3%	24%	14%	132	Zywno (2003)
24%	15%	43%	11%	61%	5%	31%	11%	183	Felder & Spurlin (2005)
25%	6%	49%	5%	46%	6%	29%	7%	214	Felder & Spurlin (2005)
19%	16%	33%	16%	10%	29%	27%	15%	235	Felder & Spurlin (2005)

Does the composition of the research sample in this study reflect a culture or gender bias? Studies by Downing and Chim (2004) and Barron (2002) have shown that the Reflector learning style is much more prevalent among Asian students. Interestingly, in Downing and Chim's research involving Asian students who had completed the Honey

and Mumford's (2000) Learning Styles Questionnaire, 40% of their 160 subjects were identified as strong Reflectors.

### 3.8 Experiment Procedure

The experiment was conducted during the university spring semester, and the procedure consisted of a) a pre-treatment stage for setting up the experiment, b) running the experiment and monitoring the online discussion forum groups throughout the 9 week duration, and c) gathering the data from the discussion forum usage, the discussion forum posting contents, surveys, interviews and performance indicators.

#### 3.8.1 Setting up the experiment

As soon as the class roster was uploaded to the university learning management system (LMS), the course instructor used the LMS random assignment feature to create groups of 8 or 9 students per group. Figure 3.7 shows the activities for setting up the tutorial assignment discussion forums.

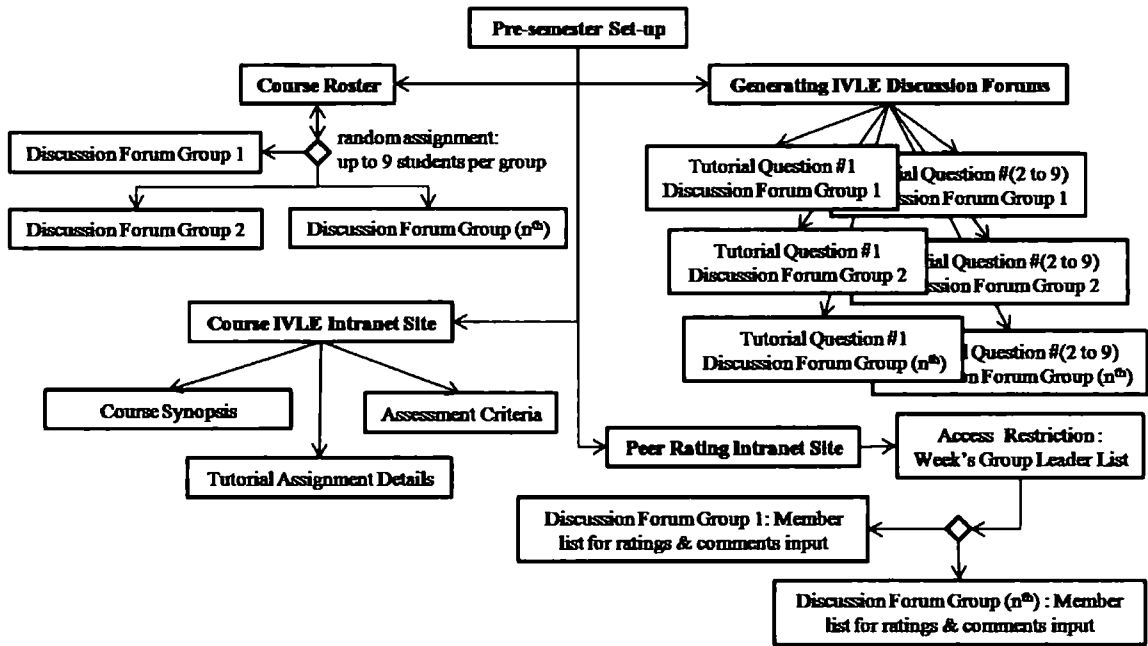


Figure 3.7: Setting-up the tutorial assignment discussion forums

During the first lecture of the semester, students were advised of their group assignment and directed to the course IVLE Intranet site to read an online article explaining how the tutorials were going to be conducted throughout the semester. Since using online discussion forums for tutorial assignments was not a common or widespread coursework activity at this university, the students were invited to attend an evening

session in which the group work procedures and the grading criteria were explained in detail.

One hundred forty-seven students attended the evening session. They sat with their assigned discussion forum group members and were given some time to introduce themselves and get acquainted. During the session, the research project was introduced and the experiment procedure was outlined. All 147 students agreed to participate in the study. They signed a consent form, filled-in an information sheet and completed a Felder and Soloman (1991) ILS questionnaire.

### 3.8.2 Running the experiment

Between the third and the eleventh week of the semester, the students used online discussion forums to work collaboratively within their groups. Each group used their weekly-assigned online discussion forum to discuss readings, present opinions, debate issues and summarize papers or information they had researched. As described in figure 3.1 (page 31), the discussion forums were opened for access after the weekly lecture and students had one week in which to post and/or reply to messages. The group leaders were allowed to access these forums for another week before they were automatically closed and archived.

Attitude questionnaires, designed to examine attitudes towards working collaboratively online, were administered during the fifth and tenth week of the semester. Because the university often used online questionnaires to poll the students on various issues, the survey questionnaires for this research were made available online, and the students were given one week in which to access and complete these questionnaires.

The researcher used the questionnaire creation and hosting features of the university learning management systems (LMS), the Integrated Virtual Learning Environment (IVLE), to produce and administer the surveys, and to subsequently collate the results. From the researcher's perspective, creating the questions from online templates was relatively easy and there were no distribution costs in running the survey. Once the students had completed the surveys, collating and transferring the data directly to electronic databases was straightforward and efficient.

### 3.8.3 Gathering the data

While the research sample demographic information and Index of Learning Styles questionnaires data were collected during the initial meeting with the class, throughout the semester, the university learning management system (IVLE) unobtrusively collected discussion forum usage data and collated discussion forums posting transcripts. Other data gathered during the semester included online surveys, end-of-semester one-to-one interviews and performance indicators ( peer ratings, total number of postings and replies, tutorial paper grade and paper critique grade).

#### 3.8.3.1 Discussion forum usage data

As well as the weekly and total group postings, the LMS automatically tallied each student's discussion forum postings. This data gave a clear picture of the level of involvement within each discussion group and could be transferred directly to electronic databases and prepared for statistical analysis. Figure 3.8 shows where the forum usage data was obtained.

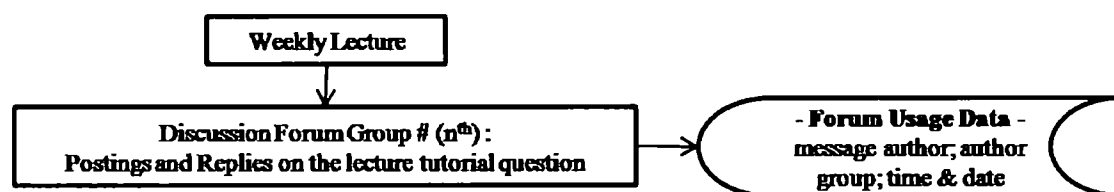


Figure 3.8: Origin of the forum usage data

#### 3.8.3.2 Discussion forum postings content data

Once the discussion forums for a given tutorial assignment were closed and archived, they were reviewed and the postings were analyzed for evidence of the student's contribution towards the topic of discussion. The number of bibliographic references, web site hyperlinks, statements directing or managing the group, and friendly or unfriendly comments were also noted. As Booth and Hulten (2003) and Schrire (2006) point out, a qualitative analysis of discussion forum postings is necessary for the in-depth understanding of the essence of the learning experience; hence, the process for analyzing evidence of the student's contribution towards the topic of discussion was examined.

While some researchers have attempted to make the procedure for this analysis more scientific and "resistant to subjective manipulations by evaluators and/or teachers" (Newman, Webb & Cochrane, 1995), existing models are still very complex. For example, as a guideline to reducing subjectivity when scoring discussion forum

transcripts for evidence of critical thinking, Newman, Webb and Cochrane (1995) used a set of indicators developed by Henri (1991). However, even after they had greatly simplified the large set of indicators proposed by Henri, Newman et al were still left with a substantial array of descriptors including ten categories, each having between four and ten subcategories. They cautioned that before their method of scoring discussion forum transcripts could be used on a large scale, such as the conditions in this study, a less complex process of content analysis was needed.

Therefore, in order to simplify the analysis of the content of the large number of postings in this study, a simpler criterion was adopted and the postings were grouped under two categories:

- 1. Factoids: postings that contained only factual information.
- 2. Propositions: postings in which the student showed evidence of critical thinking with a studied perspective on the issue(s) for the group leader to consider.

These two categories could also be represented in terms of the qualitative and quantitative learning outcomes as described by Biggs (1995) in his classification of observable learning outcomes or SOLO taxonomy. As figure 3.9 shows, Biggs (1999) used an approach similar to Bloom’s description of the cognitive domain (Bloom, Engelhart, Furst, Hill & Krathwohl, 1956).

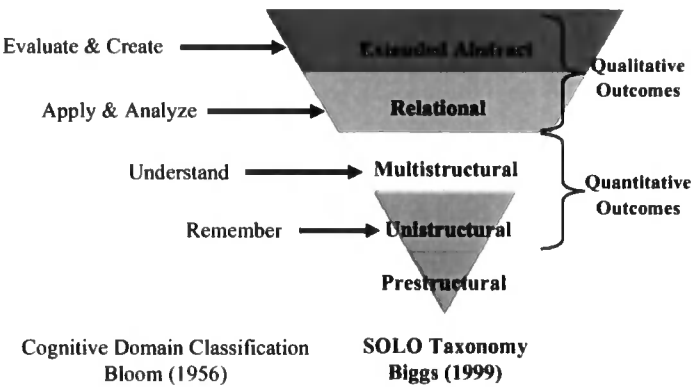


Figure 3.9: Bloom’s cognitive domain and the SOLO taxonomy

While Bloom’s taxonomy of learning has been used extensively as a guide for writing curriculum learning objectives (Gronlund, 2000), one of the primary aims of the SOLO taxonomy was to give teachers an assessment tool for identifying a student’s cognitive level of operation in written work (Biggs, 1999). Therefore, using the SOLO taxonomy, the discussion forum postings could be classified as:

- Factoid - evidence of SOLO quantitative learning outcomes
  - Prestructural

- little or no evidence of knowledge on the subject
- Unistructural - Factual knowledge
  - the student can identify, memorize and do a simple procedure
- Multistructural - More complete factual knowledge
  - the student can enumerate, describe, list, and combine
- Proposition - evidence of SOLO qualitative learning outcomes
  - Relational
    - based on extensive factual knowledge of the subject matter, the student can engage in critical thinking by comparing and contrasting, explaining causes, analysing, relating or applying this knowledge to different contexts
  - Extended Abstract
    - based on extensive factual knowledge of the subject, the student can engage in critical thinking by reflecting on abstract concepts and theorising, generalising or hypothesizing

Hence, if in a posting the student offered only information about the tutorial topic, regardless of the amount of factual knowledge provided, the posting was categorised as a "Factoid", providing the group with facts about the topic. However, if a student presented a coherent analysis of the problem, integrated or applied concepts central to the topic of discussion to another context, or hypothesized from a clear understanding of the issues, the posting was categorized as a "Proposition", providing the group with a critical perspective on issues related to the topic. Figure 3.10 shows where the forum content data was obtained.

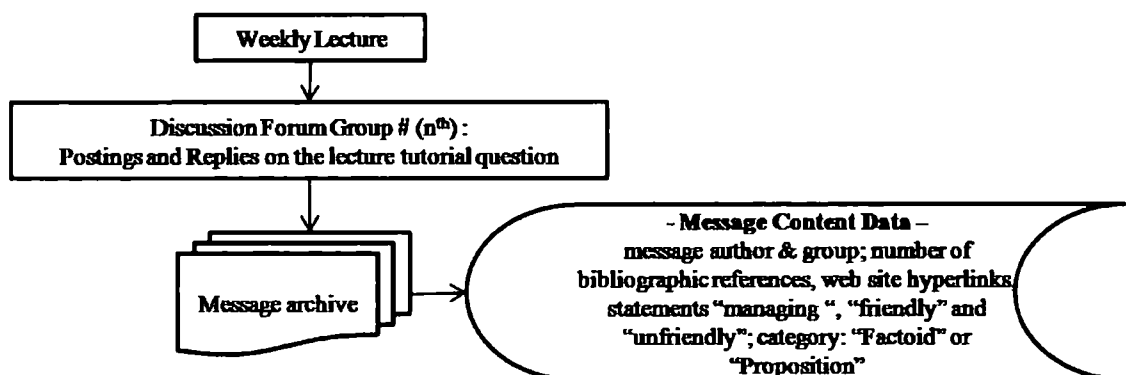


Figure 3.10: Origin of the forum usage data

### 3.8.3.3 Survey data

Data from Survey I and Survey II was collected online. When the survey questionnaires were opened for access, the students were contacted via email and asked to use the hyperlink within the message to bring up the questionnaire log-in. Both surveys were accessible for a period of one week. Survey I, held during the week of the third tutorial assignment, was completed by 157 students and Survey II, held during the week of the last tutorial assignment, was completed by 132 students: 126 students completed both surveys.

The questionnaires included multiple choice questions (MCQs) with selections from a Likert scale or a nominal list, True/False questions and open answer questions. These online responses provided both quantitative and qualitative data that was easily exported to a database application. Survey I and Survey II questionnaires are attached as appendix B and appendix C, and the transcripts of the open-answer responses are attached as appendix D. Figure 3.11 shows where the survey data was obtained.

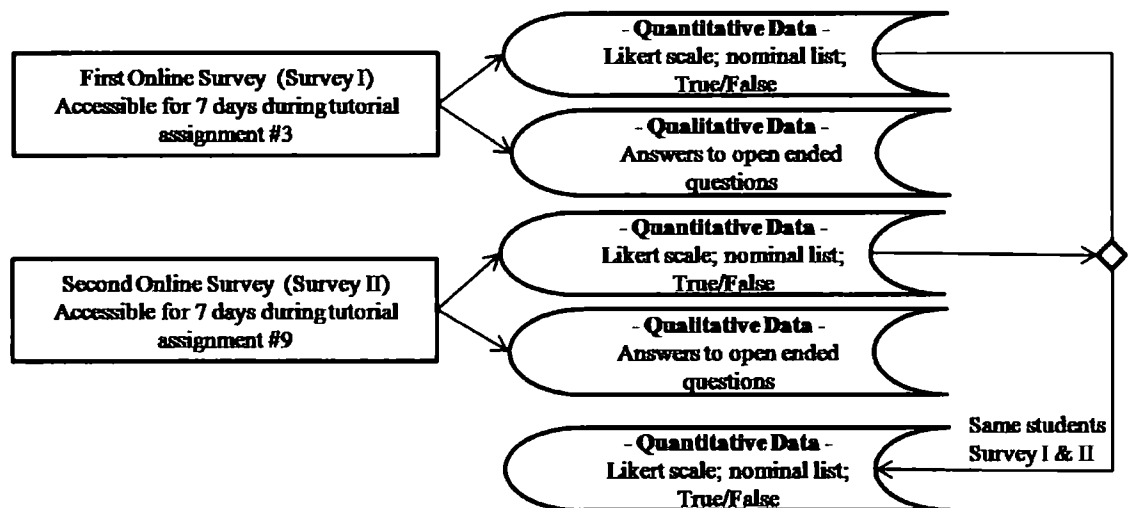


Figure 3.11: Origin of the survey data

### 3.8.3.4 Interview data

During the one-to-one interviews conducted at the end of the semester, selected students were asked to elaborate on their observations and feelings about using discussion forums to work collaboratively on tutorial assignments. To supplement the notes taken during the session, the interviews were audio taped and transcripts of the tapes were later used to substantiate or support the notes. The transcripts of the interviews are attached as appendix E. Figure 3.12 shows how the interview data was obtained.



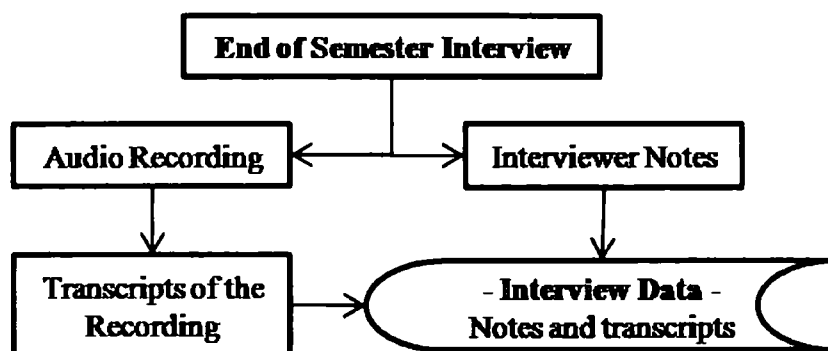


Figure 3.12: Origin of the survey data

### 3.8.3.5 Performance indicator data

The performance indicators included the peer ratings, the tutorial paper grade, the paper critique grade and the frequency of postings and replies in the discussion forums. While the course instructor's marks were made available to the researcher at the end of the semester, the frequency of forum usage was automatically collected and collated by the LMS and a custom online program was created to collect the weekly peer rating data.

Upon submitting their tutorial assignment, group leaders were instructed on how to access the peer rating website log-in. To help them complete the required task, information about the evaluation criteria and the rating input process was included on the web site. After log-in, group leaders were presented with a list of their group members and asked to assign a rating from 0 to 7 for each member. Alongside each rating input field was a text input field in which the leader could write a comment along with the rating. Since each group member had a turn at being the group leader, everyone in the group was to received 8 peer evaluations over the course of the semester.

## 3.9 Method of Analysis

The quantitative data from all sources collected during the study was collated and prepared for statistical analysis, and the data set for each student in the study included:

- ILS results
- Survey I results
- Survey II results
- Tutorial paper assignment mark
- Peer paper critique assignment mark
- Discussion forum peer rating
- Discussion forum usage statistics

- Discussion forum content categories
  - “Factoid” category postings
  - “Proposition” category postings
  - “Friendly” comments included in the postings
  - “Unfriendly” comments included in the postings
  - statements in postings for directing or managing the group activity
  - referenced articles included in the postings
  - web hyperlinks included in the postings
- Student demographic categories
  - gender
  - age
  - principal language of communication
  - ICT experience
  - face-to-face tutorial discussion familiarity and popularity
  - online tutorial discussion familiarity and popularity
  - selected motivation for taking the course

Qualitative data from the Survey I and II open answer questions was collated, coded and prepared for statistical analysis, and comments that clearly reflected particular perspectives on key issues were noted for later reference. As well, specific statements made during the end-of-semester interviews were noted, recorded and presented.

### 3.9.1 Pearson correlations and factor analysis

In order to examine whether answers to survey questions were related, an analysis of bivariate correlations using a 2-tailed Pearson correlation coefficient test was run on the MCQs. Along with Pearson correlations, the relationships between questions within the survey MCQs were examined through a factor analysis calculation. The purpose of the factor analysis was to find patterns in the relationships among variables, and to establish whether these patterns were due to a much smaller number of unobserved random variables called factors.

While Charles Spearman was the first to use factor analysis in the field of psychology (Williams, Zimmerman, Zumbo, & Ross, 2003), Raymond Cattell (1952) expanded on Spearman’s work and made use of factor analysis in the field of psychometrics. Factor analysis is now widely used in social sciences, marketing, product management,

operations research, and other fields of study that typically need large quantities of data to be examined.

Factor analysis is a large sample size procedure. As Darlington (2004) points out, even a simple factor structure would be difficult to find with fewer than 50 cases. There are two main methods for extracting factors from the set of variables: the principal components analysis and the principal factors analysis. Typically, the principal components analysis is used for data reduction, but when the goal of the factor analysis is to discover the underlying factor structure, the principal factors analysis is preferred (Costello & Osborne, 2005; Fabrigar, Wegener, MacCallum & Strahan, 1999).

Rotation is used to simplify and clarify the data structure, and the most common choice is the orthogonal method, Varimax (Costello & Osborne, 2005). The Varimax rotation with Kaiser normalization maximizes the variance of the squared loadings of the factors on all the variables, and the factors can then be interpreted from the opposition of a few variables with positive loadings to a few variables with negative loadings (Abdi, H., 2003).

### 3.9.2 Paired samples correlations and t-tests

To investigate the relationships between the two surveys, and for a test-retest trial of the ILS psychometric scales, paired samples correlations and t-tests were conducted. Since the t-test is a parametric measure, Trochim (2004) specifies that the groups being assessed must have a normal distribution and an equal variance, but others (Hays, 1963; Sisson & Stocker, 1989; Hopkins, Glass & Hopkins, 1987) point to empirical studies of the t-test that have shown how these assumptions can be violated to an amazing degree without causing a substantial effect on the results. However, Glass and Hopkins (1996) caution that although a violation of the assumption of normality has little effect on a 2-tailed t-test, a sample size of at least 20 in the smaller group is required for a one tailed t-test.

Therefore in this study, t-tests were used to determine if there were significant differences between the means, and as recommended by Hopkins (2002), a calculation of effect size was conducted in order to ensure that statistically significant effects were worthy of further exploration. In designs in which a control group is present, the effect size calculation uses the difference between the means of the two groups as the

numerator, with either the pooled or the control group standard deviation as the denominator (Kramer & Rosenthal, 1999). However, because the surveys in this study were repeated measures on two dependent groups, the original standard deviations of the measures were pooled and used as the denominator (Dunlap, Cortina, Vaslow, and Burke, 1996). The values obtained were rated according to Cohen's (1988) convention: *d* values of .2, .5 and .8 denoting small, medium and large effect size.

### 3.9.3 Post hoc discriminant function analysis

Using a number of independent variables (IVs) as predictors, the discriminant function analysis (DFA) is used to classify dependent variables (DV) that have two or more categories (Klecka, 1980). Similar to a one-way analysis of variance, the DFA tries to determine whether categories differ with respect to the means of an IV (Laforge, 1981). The DFA looks at differences among groups, identifies variables that are related to group membership, discards variables that have little relevance for distinguishing groups, classifies cases into groups with a better than chance degree of accuracy and predicts group membership from a set of predictors (Davis, 1986; Klecka, 1980).

According to Huberty (1994), data suitable for DFA must meet a number of criteria. He notes that the DV must represent a true dichotomy, the IV should be interval data, and the number of IVs must not be fewer than 2 less than the sample size ( $n-2$ ). It is important that there be at least two cases in each category of the DV, and that these categories should not be grossly different in size. Should there be a great disparity in group numbers, Press and Wilson (1978) suggest that a logistic regression would be a more appropriate procedure to run.

The DFA calculation is highly sensitive to outliers within the IVs (McGarigal, Cushman & Stafford, 2000; Tabachnick & Fidell, 1996), so the IVs should have a normal distribution with residuals being randomly distributed and outliers removed. The DFA needs to show a homogeneity of variances (homoscedasticity) and covariance of correlations, and the Box's *M* test, a test for the null hypothesis of equal population covariance matrices, must show a significance  $p(M) < 0.05$  in order for the null hypothesis to be accepted and the assumption of homoscedasticity (or homogeneity of variance) to be upheld.

The DFA attempts to build a model that will best predict the group to which a case of the IV belongs, and as Duntelman (1984) explains, this is done in a stepwise manner. All variables are reviewed and evaluated, and the variable that contributes most to the discrimination between groups is identified and removed, before the process is run once again. This model can also be built from a backwards step analysis in which the variable that contributes least to the prediction of group membership is eliminated before running the next iteration.

The importance of an IV is reflected in the “p” value, the Wilks' Lambda and the F-test. For IVs that show a significant “p” value ( $p < 0.05$ ,  $p < 0.01$ ), the smaller the Wilks' Lambda and the larger the F-test value, the more important the IV is to the discriminant function.

#### 3.9.4 The student demographic information data analysis

Before starting the ILS questionnaire, the students were asked to fill out a form providing basic demographic information such as age, gender, preferred working language, level of experience using CMC tools and motivation for taking the course. This information was gathered in order to examine possible confounding variables that might influence the outcome of the study.

After using descriptive statistics to present the information, a post hoc analysis was conducted. A discriminant function analysis calculation was used to examine differences among the groups and to identify variables that were related to group membership, or to discard variables which had little relevance for distinguishing groups. The resultant discriminant function was then used to classify cases into groups with a better than chance degree of accuracy and to predict group membership from a set of predictors.

The following dichotomous groups were investigated:

1. Gender (Female vs. Male)
2. Principal language of communication (English vs. Other)
3. Face-to-face tutorial discussion satisfaction rating (Negative vs. Positive)\*
4. Online tutorial discussion satisfaction rating (Negative vs. Positive)\*
5. Motivation A (no face-to-face tutorial vs. other reasons)\*\*
6. Motivation B (I can achieve a high grade vs. other reasons)\*\*

7. Motivation C (I believe the workload is light vs. other reasons)\*\*
8. Motivation D (I can work and submit assignments from home vs. other reasons)\*\*

\* These ratings used a 5 point Likert scale: Strongly disliked; Disliked; Indifferent; Enjoyed; Very much enjoyed. The scale was collapsed to 3 points: Negative (Strongly disliked & Disliked); Positive (Enjoyed & Very much enjoyed); Indifferent. \*\* These items were examined as second choices for taking the course because 97% of the students had ranked "Interested in the topics covered" as their prime motivation. Since this option could not produce viable dichotomous groups, the options selected as the second reason for taking the course were examined instead.

Other demographic information that identified particular student characteristics, such as years of ICT experience, frequency of email, chat room, and discussion forum usage, and satisfaction ratings from participating in face-to-face tutorial discussions and discussion forum tutorial groups, were also used as IVs in DFA calculations. These were examined as predictors of ILS learning style preferences and performance indicators.

### 3.9.5 The ILS results data analysis

As explained in 3.7.1, students who scored +5 or more, or -5 or less, on any of the Felder and Soloman (1991) ILS learning style dimensions were deemed to have a tendency towards the characteristics outlined in that associated cognitive learning style profile. After reviewing the ILS results, the students were assigned to their respective learning style preference group(s); Active, Reflective, Sensing, Intuitive, Visual, Verbal, Sequential or Global.

In order to identify the IVs that significantly affected membership to a learning style preference group, these groups were examined as DVs in DFA calculations. As described in section 3.9.3, the resultant discriminant function was used to classify cases of the IVs to one of two DV group categories, and to predict, with a better than chance accuracy, membership to these categories.

In each DV group, one category was composed of cases in which the ILS results indicated a preference for that particular ILS learning style dimension, while the other category was composed of the remaining cases (students whose ILS results did not show that preference). The following 8 learning style preference groups were formed:

1. Active group (Active vs. not Active)
2. Reflective group (Reflective vs. not Reflective)

3. Sensing group (Sensing vs. not Sensing)
4. Intuitive group (Intuitive vs. not Intuitive)
5. Visual group (Visual vs. not Visual)
6. Verbal group (Verbal vs. not Verbal)
7. Sequential group (Sequential vs. not Sequential)
8. Global group (Global vs. not Global)

The IVs consisted of ordinal data from Surveys I and II, student demographic information, discussion form usage statistics, posting contents categories and performance indicators.

### 3.9.5.1 ILS learning style dimension scales test-retest trial

It was important for this study to address concerns found in the literature regarding conflicting findings over the reliability of the Felder and Soloman ILS questionnaire results and its construct validity (Cook, 2005; Cook & Smith, 2006; Livesay, Dee, Felder, Hites, Nauman, & O'Neal, 2002; Van Zwanenberg, Wilkinson & Anderson, 2000; Zywno, 2003). While the issue of construct validity was discussed in section 2.5.1, a test-retest of the ILS questionnaire was undertaken in order to examine the reliability of the ILS results over time. At the end of the semester, 11 weeks after they had completed the initial ILS questionnaire, 33 students were randomly selected and asked to complete the ILS questionnaire for a second time.

As explained in section 2.3, the ILS questionnaire examines 4 learning style dimensions: Active/Reflective (ActRef), Sensing/Intuitive (SenInt), Visual/Verbal (VisVerb), and Sequential/Global (SeqGlob). In table 3.2 the results of the Pearson correlation show that in the test-retest (N=33), the scores on all 4 dimensions showed a large correlation. Hence, the ILS questionnaire results were deemed reliable, at least over the 11 week time span between the tests.

**Table 3.2: Paired Samples Correlations**

		N	Correlation	Sig.
Pair 1	ActRef1 & ActRef2	33	.64	<0.001
Pair 2	SenInt1 & SenInt2	33	.78	<0.001
Pair 3	VisVerb1 & VisVerb2	33	.75	<0.001
Pair 4	SeqGlob1 & SeqGlob2	33	.75	<0.001

The ILS questionnaire is composed of 44 dichotomous response questions: 11 for each of the 4 learning style dimensions. The internal consistency reliability of these 11

questions can be determined using the Cronbach's Alpha ( $\alpha$ ) calculation. As explained in section 2.4.1, the Cronbach's  $\alpha$  is a coefficient used to assess how well a set of items on a scale, such as Felder and Soloman's ILS learning style dimensions, can measure a single underlying construct, and when evaluating scales related to attitude tests,  $\alpha = .50$  is recommended as the cut-off for internal consistency reliability (Tuckman, 1999; George & Mallery, 2001).

**Table 3.3: ILS Scales Test - Retest**

	N=33	N=66
Active/Reflective scale	$\alpha = .62$	$\alpha = .51$
Sensing/Intuitive scale	$\alpha = .75$	$\alpha = .73$
Visual/Verbal scale	$\alpha = .73$	$\alpha = .70$
Sequential/Global scale	$\alpha = .55$	$\alpha = .50$

Using the data from the ILS test-retest trial, the internal consistency reliability of the ILS learning style dimension measurement was examined. As table 3.3 shows, the original test score calculations (N=33), when added the retest scores (N=66), both met the criteria for internal consistency reliability. Although the sample is small, these scores are comparable to scores from other studies as described by Felder and Spurlin (2005) and Litzinger, Lee, Wise and Felder (2005).

3.9.6 The discussion forum content data analysis

As described in section 3.8.3.2, the data for each discussion forum posting included a coding of the message content, an indication of the frequency and type of socially-related comments in the messages, the frequency of statements containing instructions or suggestions for organising the online discussion, and the number of referenced articles and website hyperlinks quoted. Descriptive statistics were used to illustrate trends in the data, and Pearson correlation calculations were used to examine relationships among the categories. DFA calculations were also conducted to see if any IVs, such as the categories formed by the discussion forum data analysis, could be used as predictors of membership to DV groups, such as learning style preference groups, demographic groups, high and low performance groups and discussion format preference groups.



### 3.9.7 The survey questionnaire data analysis

The design of the surveys is discussed in section 3.5. As well as using descriptive statistics to show trends in the nominal data, the relationships between questions in each survey questionnaire, and between the two questionnaires themselves, were also examined. It was important to look at correlations within the surveys because a number of the questions were designed to address the same issues. As well, it was essential to look at the correlations and the differences between the means of paired questions between the surveys in order to examine whether attitudes towards using online discussions had changed over the course of the semester.

To determine whether any of the Survey I and Survey II MCQs were predictors of membership to DV groups such as learning style preference, demographics and student performance groups, the MCQ responses were used as IVs in DFA calculations. As well, a DV group was created using the responses to question 6 from Survey II, "For group collaboration on writing a paper for a tutorial assignment, I prefer..". Students who said they preferred the traditional face-to-face discussion format were compared with those who said they preferred the online discussion forum format.

Qualitative data from open answer questions was reviewed, coded, and tabulated. However, because the student answers were coded by the author, an inter-rater reliability check was also conducted in order to ensure the reliability of the coding.

### 3.9.8 The performance indicators data analysis

As discussed in section 3.8.3.5, the performance indicators included the continuous assessment (CA) marks and the frequency of posting in the discussion forums. As well as running descriptive statistics on the data, Pearson correlations were used to examine relationships between the performance indicators. DFA calculations were also run to see whether any performance indicators could be used as predictors of membership to DV groups, such as a learning style preference, student demographics groups and discussion format preference.

Finally, the students with the top 20 CA grades and the students with the bottom 20 CA grades were selected and assigned to the two categories of a DV group, and DFA calculations were run to see whether any IVs such as student characteristics and Survey

I and II MCQs results could be used as predictors of membership to high and low CA performance.

### **3.10 Summary**

In this chapter, the research methodology and the research questions were outlined and four hypotheses were proposed. The author postulated that based on a review of the literature, data from this study would support a significant positive correlation between Active learners and the peer rating component of the continuous assessment grade, between Intuitive learners and a preference for the small group online tutorial discussion format, between Sequential learners and an aversion to participating in the online discussion activity and between attitudes towards participating in the online discussion forum format and the peer evaluation of performance in discussion forums. As well, because the student's resistance to change in the teaching and learning strategies used were not being addressed, the author did not expect the level of satisfaction with the new tutorial discussion assignment format (from Survey I to Survey II) to increase over time.

Since this experiment was a field study in which subjects from a sample of convenience were observed in their actual setting as they proceeded through a graded out-of-classroom activity over the course of one semester, and a control group could not be created, the applicability of the findings is limited in scope. However, data from various sources, such as discussion forum usage statistics and transcripts, peer ratings of weekly postings and attitude survey questionnaires, was available throughout the 9 weeks of the treatment, and helped build a clearer picture of the issues and provide a better understanding of the relationships involved in the implementation of the small group online tutorial assignment activity.

During the semester, 165 third year health psychology students were assigned to small workgroups that were to use discussion forms to work collaboratively on the weekly tutorial assignments. One hundred forty-seven of these students agreed to participate in the study. They were asked to provide some personal background information, complete a Felder and Soloman (1991) index of learning styles (ILS) questionnaire and agree to have their postings monitored throughout the semester.

At the end of the semester, transcripts of the discussion forums were archived, printed and reviewed, and the Biggs structure of observable learning outcomes (SOLO) taxonomy (Biggs, 1995) was used to code the contents of the postings. The frequency and type of socially-related comments in messages, the frequency of messages containing instructions or suggestions for organising the online discussion, as well as the number of referenced articles and website hyperlinks quoted were also documented.

Both at the beginning and end of the semester, students were asked to complete online survey questionnaires. Both surveys were composed of MCQs and open-answer questions that focused on the ease of use of the technology, its reliability and usability, the quality of the online discussions, the preferred format for learning: online vs. face-to-face discussions, personal perceptions about online relationships and personal perceptions about collaborative learning. After the last assignment of the semester had been completed, a small number of students were interviewed.

Along with the descriptive statistics used to present the data, the procedures used to analyse the data included Pearson's correlation, paired samples correlations, t-tests and factor analysis. Discriminant function analysis calculations were also used to establish whether any independent variables taken from the data, such as posting contents, performance indicators, survey MCQs and student characteristics, were predictive of categories of dependent variables, such as learning style preference, demographics and performance groups. As well, a test-retest trial was conducted in order to address the internal consistency reliability of the Felder and Soloman ILS response scales.

In the following chapter, the data from the discussion forum usage statistics, the posting content categories and the performance indicators are analyzed. These include the frequency of postings (per group, per student, per week), "Factoid" type messages, "Proposition" type messages, referenced articles, web hyperlinks, statements for managing the discussion, "Friendly" and "Unfriendly" type statements, as well as the student's continuous assessment marks and peer ratings. Descriptive statistics and the findings from Pearson correlations, t-tests, and post hoc discriminant function analysis calculations are also presented.

## **Chapter 4**

### **DISCUSSION FORUM USAGE, POSTING CONTENTS AND PERFORMANCE DATA ANALYSIS**

#### **4.1 Overview**

In this chapter, the data from the discussion forum usage, the contents of the discussion forum postings and the performance indicators are examined. As described in section 3.8.2, from the third to the eleventh week of the semester, discussion forums were opened following each week's lecture and the students then had one week in which to post and reply to messages. Discussion forum usage statistics were automatically collated and all discussion forum postings were archived for later analysis. At the end of the semester, continuous assessment (CA) marks were made available for use in this research.

The frequency, range, mean, median and standard deviation calculations from the discussion forum posting categories are presented. The total and weekly postings per group and per student are then examined and the descriptive statistics from the discussion forum posting transcripts of the 147 students who had agreed to participate in the study are presented. As described in section 3.8.3.2, the posting transcripts were reviewed and coded according to the nature of their content and the presence of referenced articles, web hyperlinks, statements aimed at directing or managing the group, as well as friendly or unfriendly comments.

Following this, the descriptive statistics and findings from bivariate correlations between performance indicators, the CA components of the course grade and the total number of discussion forum postings submitted, are presented. And lastly, the performance indicators and discussion forum content analysis data are examined as independent variables (IVs) in a discriminant function analysis (DFA). The DFA was used to determine whether these IVs were predictors of a student's cognitive learning style preference, gender, principal language of communication, satisfaction with face-to-face and online discussion formats, or motivation for taking the course.

The statistics calculations were produced using the SPSS 14.0 computer application for Windows XP.

**4.2 Discussion Forum Usage**

The university learning management system automatically collated the discussion forum statistics including the total number of weekly postings per group, as well as per student. The resulting profile indicated that there was a substantial level of activity in the discussion forums throughout the semester: 165 students posted a total of 3,560 messages.

**4.2.1 Postings per Group**

Before the start of the semester, the 166 students enrolled in the course were randomly assigned to 14 groups of 9 and 5 groups of 8, however within the first week one student dropped out of the course, and consequently a group of 8 was reduced to 7 students. In the last few weeks of the tutorial activity, when the students from the groups of 8 and 7 were reassigned to other groups, their postings during that period continued to be recorded as statistics in their original group.

As figure 4.1 shows, the postings per group ranged from 101 to 312. The mean number of postings was 187, the median was 180 and the standard deviation was 61. However, it is important to note that while groups 1 to 14 had 9 students each, group 15 had 7 members and groups 16 to 19 had 8 members each.

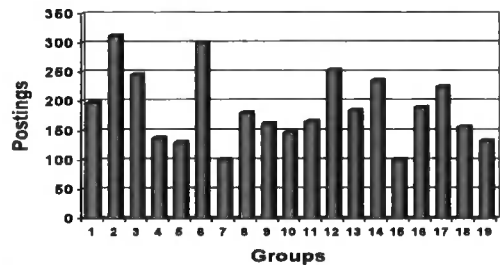


Figure 4.1: Discussion forum postings - per group

**4.2.2 Postings per Week**

As figure 4.2 shows, although postings dropped from 566 in the first week to 377 in week 4, weekly postings were above 300 postings per week thereafter. The mean was 398, the median was 374 and the standard deviation was 86.78.

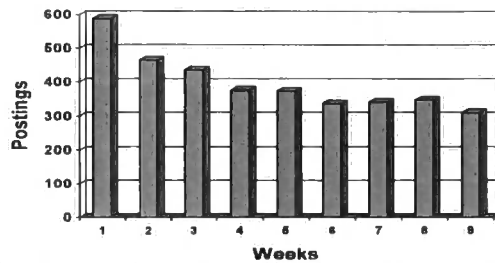


Figure 4.2: Discussion forum postings - per week

#### 4.2.3 Postings per Student

As figure 4.3 shows, throughout the semester, students posted as little as 2 and as many as 70 postings. The mean was 21.58, while the median was 20 and the standard deviation was 11.45.

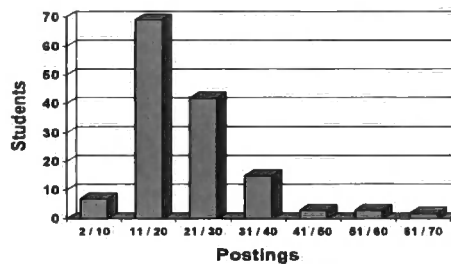


Figure 4.3: Discussion forum postings - per student

#### 4.2.4 Drop-out rate - weeks missed per student

Most students posted messages during all nine weeks of the tutorial assignments. As figure 4.4 shows, 100 students, or 61% of the class, participated every week, 37 students missed one week and 15 students missed two weeks. Only 13 students, or 8 % of the class, participated in less than 7 tutorial discussion sessions.

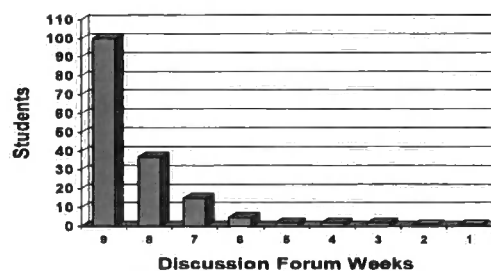


Figure 4.4: Discussion forum turnout - per student

### 4.3 Postings - Content Analysis

At the end of the semester, 3,238 postings from the 147 students who had signed up for the study were examined for their content. As figure 4.5 shows, contributions ranged from 3 to 64 postings per student. The mean was 21.97, the median was 20 and the standard deviation was 11.29.

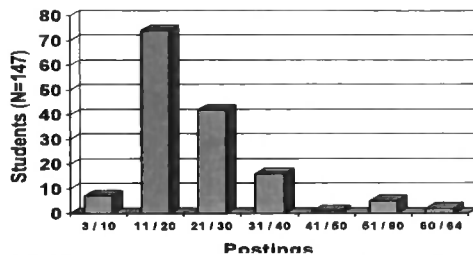


Figure 4.5: Discussion forum content analysis - postings per student

As explained in section 3.8.3.2, the content of each posting was reviewed and analyzed for evidence of the student’s contribution towards the topic of discussion. Postings that contained related or even loosely related facts about the topic being discussed were assigned to the “Factoid” category, while postings that showed evidence of a coherent analysis of the issues, of applying or integrating concepts central to the topic discussion to another context, or of theorizing from a clear understanding of the issues, were assigned to the “Proposition” category. The number of bibliographic references, web site hyperlinks, statements for directing or managing the group, and friendly or unfriendly comments were also noted.

#### 4.3.1 Factoid type postings

After analysing the content of the 3,238 postings, 2,234 were categorized as “Factoid”. The mean was 15.2, the median was 13 and the standard deviation was 7.68, and as figure 4.6 shows, students contributed between 0 and 44 “Factoid” postings.

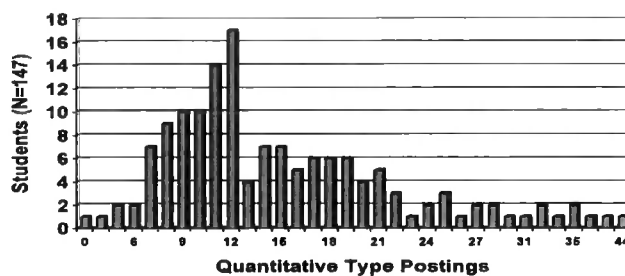


Figure 4.6: Quantitative type discussion forum - postings per student

#### 4.3.2 Proposition type postings

While only 301 postings were categorised as “Proposition” type postings, 109 students, or 74% of the research group, submitted at least one posting during the semester, and as figure 4.7 shows, some students contributed up to 14 postings. The mean number of “Proposition” type postings was 2.05, the median was 1 and the standard deviation was 2.45.

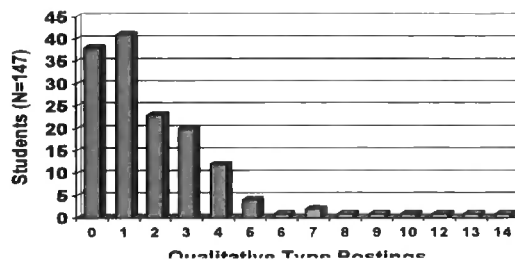


Figure 4.7: Qualitative type discussion forum - postings per student

### 4.3.3 Article References

As it was important for the leader to include a bibliography of references when submitting the assignment paper, group members were asked to include bibliographical information whenever they referred to an article in their postings. A total of 647 referenced articles were listed in postings, and while 40 students, or 27% of the research group, did not contribute any article references, as figure 4.8 shows, some students contributed far more than the norm. The mean number of article references was 4.4, the median was 2 and the standard deviation was 6.59.

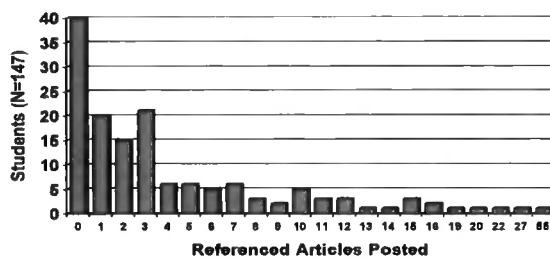


Figure 4.8: Referenced article - per student

### 4.3.4 Web Hyperlinks

As university students have come to rely on the World Wide Web for information, many included web hyperlinks in their postings. Even though 34 students, or 23% of the research group, did not provide any web hyperlink in their postings, a total of 546 web hyperlinks were included in postings throughout the semester. As figure 4.9 shows, of those who did supply a web link, some far exceeded the mean of 3.71. The median number for web hyperlinks was 2 and the standard deviation was 4.34.

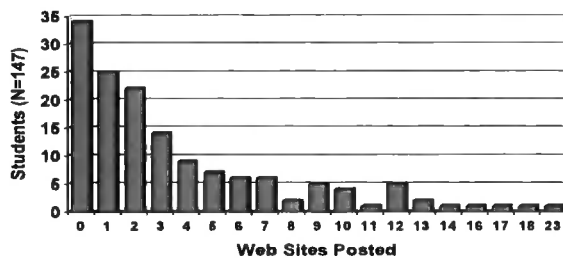


Figure 4.9: Web site hyperlinks - per student



4.3.5 Statements for directing or managing the group

In their postings, students not only contributed information and opinions about the topic of discussion, but also made suggestions as to how to approach the assignment tasks. These suggestions or instructions were often made by the group leaders, but on occasion, individual group members added their own comments or took charge if the group leader had not initiated the discussion early enough.

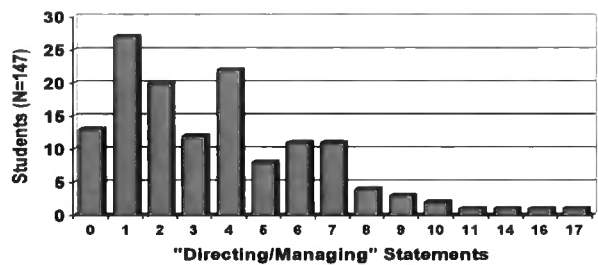


Figure 4.10: Statements aimed at directing or managing the group - per student

A total of 521 statements were categorised as requests or suggestions on how to approach the assignment. As figure 4.10 shows, while most students made at least one request, only 13 students, or 9% of the research group, did not. The mean number of requests was 3.57, the median was 3 and the standard deviation was 3.13.

4.3.6 Sociability

Since sociability in discussion forums could directly affect individual and group morale and thus influence attitudes towards using discussion forums, elements of sociability in each posting were noted. These included words of encouragement, acknowledgement or politeness directed towards an individual or to the group as a whole.

**Topic :** Identity Crises and Sexual Orientation

**From :** XXXXXX

**Date :** XXXXXX

Hi guys, thanks for your contributions thus far. I just thought that it would be interesting for us to discuss the issues of identity crises and sexual orientation, since those would be very significant, potentially traumatic stages in secondary students' psychosocial development. Am sure that we all have many stories to share - not necessarily personal experiences of course, but frens' experiences, personal observations and reflections... all are welcome! To complement Karren's contribution of life in a convent girls' school, I can share something about life in a boys' secondary school...

Figure 4.11: Example of “Friendly” comments in a discussion forum posting

In figure 4.11, this excerpt from a discussion forum posting shows a variety of social comments:

- 1. a group acknowledgement - “thanks for your contributions thus far”
- 2. an encouragement - “Am sure that we all have many stories to share... all are welcome!”

3. a personal acknowledgement - “To complement Karren's contribution of...”

Although it may be a reflection of South East Asian etiquette, overall the students were very polite and considerate towards their group members. The great majority of students, 137 students or 93% of the research group, included at least one “Friendly” type comment in their postings, and in total, 975 comments were categorised as “Friendly”, the mean was 6.63, the median was 5 and the standard deviation was 5.76. As figure 4.12 shows, some students were much more social than others.

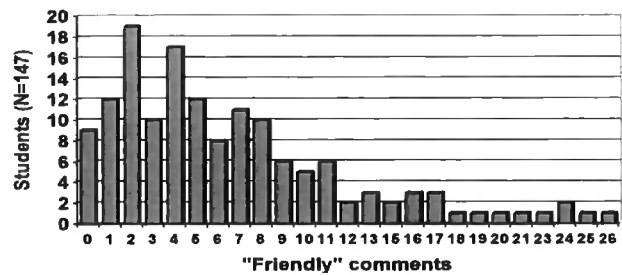


Figure 4.12: Example of sociability in a discussion forum posting

“Unfriendly” comments were also noted. These comments included complaints or negative, insensitive or spiteful remarks directed towards an individual or to the group as a whole. Figure 4.13 shows an excerpt from a discussion forum posting in which a student expresses his/her frustration in an insensitive manner. Only 12 students, or 8% of the research group, submitted “Unfriendly” type comments and throughout the semester, only 14 “Unfriendly” type comments were submitted.

**Topic :** Re: New guidelines.  
**From :** XXXXXX  
**Date :** XXXXXX  
Gawd man, i really pity you, initially reading the question, i was thinking weee, it isn't that bad, but when i followed the discussion, i got more and more lost, more and more doubts arose from the whole topic qn in itself. and yes, thankfully you had new guidelines or else it feels like trying to beat a strawberry with a baseball bat --> absolutely unnecessary!  
So there we go, i'll try my best to answer the questions u've lay out in the guidelines...

Figure 4.13: Example of “Unfriendly” comments in a discussion forum posting

4.4 Performance Categories

As explained in section 3.8.3.5, the continuous assessment marks of the students in the research group were made available for the study. These included the course instructor’s mark for the tutorial assignment paper, the critique of a tutorial assignment paper from a student in another online discussion group, and the average from the 8 peer ratings received throughout the semester. The performance categories also included the total number of postings submitted throughout the semester.

#### 4.4.1 Tutorial paper assignment marks

As figure 4.14 shows, students in the research group received marks ranging from 57 to 82. The mean grade for the research group was 69.9, the median was 70 and the standard deviation was 5.47.

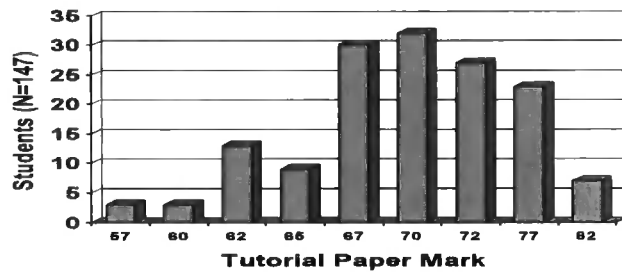


Figure 4.14: Tutorial paper marks for the research group

#### 4.4.2 Critique assignment marks

As figure 4.15 shows, students in the research group received marks ranging from 57 to 82. The mean grade for the class was 72.1, the median was 72 and the standard deviation was 6.19.

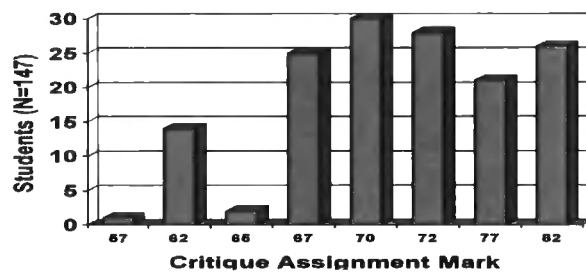


Figure 4.15: Critique assignment marks for the research group

#### 4.4.3 Peer Ratings

As figure 4.16 shows, 26 students from the research group received a rating of less than 50% for their contributions to the topics of discussion. The ratings ranged from 9% to 89%. The mean rating for the class was 60.2, the median was 62.5 and the standard deviation was 13.39.

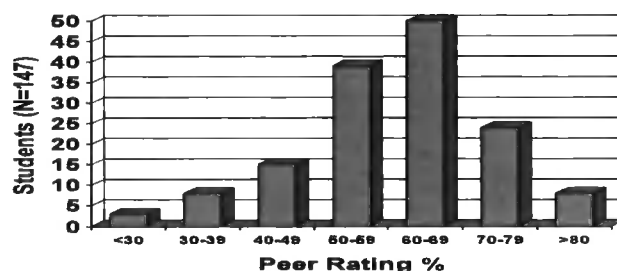


Figure 4.16: Peer ratings (%) for the research group

#### 4.4.4 Performance Correlations

Correlations between the marks received for the tutorial assignment paper, the critique of another student's paper, the discussion forum peer ratings and the frequency of

postings were investigated. As described in section 4.2.3, some students had submitted few postings while others had posted far more than the norm. Nine of these cases were far removed from the norm (in 4 cases the students had submitted less than 10 postings and in 5 cases they had submitted more than 51 postings) and since these outliers would have an undue influence on Pearson correlations (Devlin, Gnanadesikan & Kettering, 1975), they were removed from the correlation calculations.

**Table 4.1:** Performance Correlations: research group (N=138)

		Paper	Critique	Peer Rating	Postings
Paper	Correlation	1	.37**	.24**	.30**
	Sig. (2-tailed)		<0.001	.005	<0.001
Critique	Correlation	.37**	1	.14	.05
	Sig. (2-tailed)	<0.001		.102	.530
Peer Rating	Correlation	.24	.14	1	.45**
	Sig. (2-tailed)	.005	.102		<0.001
Postings	Correlation	.30**	.05	.45**	1
	Sig. (2-tailed)	<0.001	.530	<0.001	

\*\* p<0.01 level (2-tailed)

In table 4.1, moderate and small significant correlations ( $p<0.01$ ) are observed. The moderate correlation between the frequency of posting and the peer rating (.45,  $p<0.01$ ) is noteworthy and may indicate that, as group leaders, students were influenced by the number of postings a group member had submitted during the week’s discussion: as such, the greater the number of postings, the higher the rating.

#### 4.5 Learning Style Preference as DFA Dependent Variables

As described in section 3.9.5, students from the research sample had completed the Felder and Soloman (1991) Index of Learning Style (ILS) questionnaire and the results from the questionnaire were used to assign individuals to groups based on their learning style preferences. The learning style preference DV groups included the Active group, the Reflective group, the Sensing group, the Intuitive group, the Visual group, the Verbal group, the Sequential group and the Global group.

As explained in section 3.9.3, discriminant function analysis (DFA) calculations were used in order to look at differences among DV groups, identify variables that were related to group membership, classify cases into groups with a better than chance degree of accuracy and predict group membership from the set of predictors. Next, the DFA was then used to examine performance indicators and discussion forum content

categories as predictors of learning style preference. A calculation of effect size was used to express the magnitude of the statistically significant effects.

#### 4.6 Learning Style Groups as DVs and Performance Indicators as IVs

With the ILS preference groups as DVs, a DFA was run to determine whether any performance indicators were predictive of a learning style preference. The performance categories, described in section 4.3, included the tutorial assignment paper grade, the critique assignment grade, the student's peer rating and the student's total number of postings.

As explained in section 4.4.4, nine cases from the performance indicators data were identified as being outliers, and since the DFA calculation is highly sensitive to outliers ((McGarigal, Cushman & Stafford, 2000; Tabachnick & Fidell, 1996), these cases were removed from the calculations. In every DFA calculation that showed one or more significant discriminants in the IVs, the Box's M test showed  $p(M) < 0.05$ , and consequently the null hypothesis was accepted and the assumption of homogeneity of variance was upheld.

##### 4.6.1 The Active learning style group as the DV

As table 4.2 shows, in the Active group, with 6 cases in the "Active" category and 132 cases in the "not Active" category, the DFA showed that the students total number of postings ( $p < 0.01$ ) had the highest F value (6.78) and the lowest Wilks' Lambda value (.95).

**Table 4.2:** Tests of Equality of Group Means - DV Active, IVs Performance Indicators

	Wilks' Lambda	F	df1	df2	Sig.
Tutorial Paper Grade	.99	1.57	1	136	.21
Critique Grade	1.00	.20	1	136	.66
Peer Rating	1.00	.34	1	136	.56
<b>Total Postings</b>	<b>.95</b>	<b>6.78</b>	<b>1</b>	<b>136</b>	<b>.01</b>

The group statistics indicated that Active learners ( $N=6$ ; mean:12.83; median:13; SD:3.49) had fewer postings than the other students ( $N=132$ ; mean:20.86; median:19; SD:7.49). The effect size was large ( $d = -1.09$ ) and classification statistics showed that 95.7% of the original grouped cases were correctly classified with the discriminant function. Hence, students who were Active learners were not inclined to submit many postings. Because of the great disparity in the group numbers, a logistic regression was

run on the data (Press & Wilson, 1978) and the results confirmed the findings of the DFA. However, since Active learners amounted to only 4% of the research sample, further research is needed in order to validate this finding.

#### 4.6.2 The Reflective learning style group as the DV

As table 4.3 shows, in the Reflective group, with 51 cases in the “Reflective” category and 87 cases in the “not Reflective” category, the DFA showed that the critique assignment grade ( $p<0.05$ ) had the highest F value (5.43) and the lowest Wilks' Lambda value (.96).

**Table 4.3:** Tests of Equality of Group Means - DV Reflective, IVs Performance Indicators

	Wilks' Lambda	F	df1	df2	Sig.
Tutorial Paper Grade	1.00	.37	1	136	.54
<b>Critique Grade</b>	<b>.96</b>	<b>5.43</b>	<b>1</b>	<b>136</b>	<b>.02</b>
Peer Rating	1.00	.00	1	136	1.00
Total Postings	1.00	.05	1	136	.83

The group statistics indicated that Reflective learners ( $N=51$ ; mean:73.8; median:72; SD:6.43) received a higher grade on the critique of a paper from a peer than the other students ( $N=87$ ; mean:71.29; median:70; SD:5.94). The effect size was small ( $d=0.41$ ) and classification statistics showed that 64.5% of the original grouped cases were correctly classified with the discriminant function. Hence, students who were Reflective learners tended to receive higher grades on the critique of a paper.

#### 4.6.3 The Verbal learning style group as the DV

As table 4.4 shows, in the Verbal group, with 8 cases in the “Verbal” category and 130 cases in the “not Verbal” category, the DFA showed that the critique assignment grade ( $p<0.05$ ) had the highest F value (5.17) and the lowest Wilks' Lambda value (.96).

**Table 4.4:** Tests of Equality of Group Means - DV Verbal, IVs Performance Indicators

	Wilks' Lambda	F	df1	df2	Sig.
Tutorial Paper Grade	1.00	.14	1	136	.71
<b>Critique Grade</b>	<b>.96</b>	<b>5.17</b>	<b>1</b>	<b>136</b>	<b>.03</b>
Peer Rating	.98	3.32	1	136	.07
Total Postings	.98	2.91	1	136	.09

The group statistics indicated that Verbal learners ( $N=8$ ; mean:77; median:77; SD:5.35) had a higher critique assignment grade than the other students ( $N=130$ ; mean:71.92; median:70; SD:6.17). The effect size was large ( $d=0.83$ ) and classification statistics showed that 93.5% of the original grouped cases were correctly classified with the

discriminant functions. Hence, students who were Verbal learners tended to receive higher grades on the critique of a paper.

Because there was a great disparity in group numbers, a logistic regression was run on the data. The results not only confirmed the findings of the DFA, but also indicated that the peer rating IV was a significant ( $p < 0.05$ ) discriminant at the second step of the forward stepwise procedure. Since the DFA group statistics indicated that Verbal learners had a lower peer rating (mean:54.46; median:53.6; SD:9.35) than the other students (mean:60.41; median:62.5; SD:12.1), then it would seem that Verbal learners also tended to receive lower peer ratings from their group leaders. However, while the effect size was medium ( $d = -0.50$ ), since Verbal learners made up only 5% of the research sample, further research is needed in order to validate these findings.

#### 4.6.4 The Sequential learning style group as the DV

As table 4.5 shows, in the Sequential group, with 33 cases in the “Sequential” category and 105 cases in the “not Sequential” category, the DFA showed that the critique assignment grade ( $p < 0.01$ ) had the highest F value (7.02) and the lowest Wilks' Lambda value (.95).

**Table 4.5: Tests of Equality of Group Means - DV Sequential, IVs Performance Indicators**

	Wilks' Lambda	F	df1	df2	Sig.
Paper Grade	.96	6.40	1	136	.01
<b>Critique Grade</b>	<b>.95</b>	<b>7.02</b>	<b>1</b>	<b>136</b>	<b>.01</b>
Peer Rating	.98	2.93	1	136	.09
Total Postings	1.000	.001	1	136	.97

The group statistics indicated that Sequential learners ( $N=33$ ; mean:74.67; median:72; SD:5.7) had a higher grade on the critique assignment than the other students ( $N=105$ ; mean:71.45; median:70; SD:6.2). The effect size was medium ( $d=0.53$ ) and classification statistics showed that 76.1% of the original grouped cases were correctly classified with the discriminant function. Hence, students who were Sequential learners tended to receive higher grades on the critique of a paper.

#### 4.6.5 Learning style preference groups and non-significant performance indicators

The DFA run on the Sensing, Intuitive, Visual and Global learning style groups did not find any significant difference between the means of the IVs.

4.7 Learning Style Groups as DVs and Postings Content Categories as IVs

Using the ILS preference groups as DVs, a DFA was run on the discussion forum postings content analysis categories described in section 3.8.3.2. The discussion forum postings content analysis included the “Factoid” type postings, the “Proposition” type postings, “Friendly” comments, “Unfriendly” comments, statements for directing or managing the group, referenced articles and web hyperlinks.

In every DFA calculation that showed one or more significant discriminants in the IVs, the Box’s M test showed  $p(M)<0.05$ , and consequently the null hypothesis was accepted and the assumption of homogeneity of variance was upheld.

4.7.1 The Reflective learning style group as the DV

As table 4.6 shows, in the Reflective group, with 51 cases in the “Reflective” category and 87 cases in the “not Reflective” category, the DFA revealed two significant discriminant IVs. The proposition IV category was significant ( $p<0.01$ ) at the first step of the calculation while the websites IV category was significant ( $p<0.01$ ) at the second step.

Table 4.6: Stepwise Statistics - DV Reflective, IVs Discussion Forum Content Categories

Step	Entered	Wilks' Lambda							
		Statistic	df1	df2	df3	Exact F			
						Statistic	Df1	Df2	Sig.
1	Proposition	.95	1	1	143	7.15	1	136	.008
2	Websites	.93	2	1	143	5.60	2	136	.005

At each step, the variable that minimizes the overall Wilks' Lambda is entered. Maximum number of steps is 14. Minimum partial F to enter is 3.84. Maximum partial F to remove is 2.71. F level, tolerance, or VIN insufficient for further computation.

The group statistics indicated that Reflective learners (N=51; mean:2.73; median:2; SD:2.97) submitted more proposition type postings than other students (N=87; mean:1.62; median:1; SD:2.01), and also provided more website hyperlinks (mean:4.67; median:3; SD:4.94) than other students (mean:3.12; median:2; SD:3.85). In both cases, the effect size was small ( $d=0.46$  and  $d=0.36$ ) and classification statistics showed that 68.3% of the original grouped cases were correctly classified with the discriminant function. Hence, students who were Reflective learners tended to contribute postings that contained critical perspectives and provide more web site hyperlinks in their postings.



#### 4.7.2 Learning style groups and non-significant discussion forum content categories

The Active group did not meet the requirements for conducting a DFA and the DFA run on the Sensing, Intuitive, Visual, Verbal, Sequential and Global groups did not find any significant difference between the means of the IVs.

### 4.8 Student Demographic Information as DFA Dependent Variables

On the Student Information sheet, along with general demographic information such as gender, age and principal language of communication, students were also asked to rate their satisfaction with face-to-face and online discussion groups, and to rank order a number of reasons for choosing to enrol in the course.

As described in section 3.9.4., the dichotomous groups that were created included gender, principal language of communication, face-to-face tutorial discussion and online tutorial discussion satisfaction ratings, and motivations for choosing to take the course. Using performance indicators and discussion forum content categories as IVs, DFA calculations were conducted.

### 4.9 Student Demographic Groups as DVs and Performance Indicators as IVs

Using the student demographic information groups as DVs, a DFA was run to examine whether any performance indicators were predictive of a group membership. As explained in section 4.4.4, nine cases from the research group were identified as being outliers and these cases were removed from the calculations. In every DFA calculation that showed one or more significant discriminants in the IVs, the Box's M test showed  $p(M) < 0.05$ , and consequently the null hypothesis was accepted and the assumption of homogeneity of variance was upheld.

#### 4.9.1 Rating for online discussion group as the DV

As table 4.7 shows, in the rating for online discussion group, with 19 cases in the "enjoyed" category and 17 cases in the "not enjoyed" category, the DFA revealed that peer rating ( $p < 0.01$ ) had the highest F value (7.72) and the lowest Wilks' Lambda value (.82). The group statistics indicated that students who said they enjoyed using online discussions prior to the study ( $N=19$ ; mean:56.09; median:61; SD:10.85) nonetheless received lower peer ratings than those students who said they had disliked using discussion forums in the past ( $N=17$ ; mean:65.41; median:68; SD:9.28).

**Table 4.7:** Tests of Equality of Group Means - DV Online discussion rating, IVs Performance Indicators

	Wilks' Lambda	F	df1	df2	Sig.
Paper Grade	1.00	.004	1	34	.95
Critique Grade	.98	.61	1	34	.44
<b>Peer Rating</b>	<b>.82</b>	<b>7.72</b>	<b>1</b>	<b>34</b>	<b>.009</b>
Total Postings	1.00	.000	1	34	.98

The effect size was large ( $d=-0.90$ ) and classification statistics showed that 58.3% of the original grouped cases were correctly classified with the discriminant function. Hence, students who indicated that they had enjoyed using online discussion forums in the past tended to receive lower peer ratings than those students who said they had disliked using discussion forums in the past.

**4.9.2 Motivation B group as the DV**

As table 4.8 shows, in the motivation B group, with 33 cases in the “I can achieve a high grade” category and 105 cases in the “Other” category, the DFA revealed that the total postings ( $p<0.05$ ) had the highest F value (5.63) and the lowest Wilks' Lambda value (.96).

**Table 4.8** Tests of Equality of Group Means - DV Motivation B, IVs Performance Indicators

	Wilks' Lambda	F	df1	df2	Sig.
Paper Grade	.99	1.97	1	136	.16
Critique Grade	1.00	.02	1	136	.88
Peer Rating	.99	.81	1	136	.37
<b>Total Postings</b>	<b>.96</b>	<b>5.65</b>	<b>1</b>	<b>136</b>	<b>.02</b>

The group statistics indicated that students who chose the course because they believed they could achieve a high grade ( $N=33$ ; mean:23.19; median:23; SD:8.79) submitted more postings than other students ( $N=105$ ; mean:19.67; median:19; SD:6.93). The effect size was small ( $d=0.48$ ) and classification statistics showed that 76.8% of the original grouped cases were correctly classified with the discriminant function.

Hence, students who said that achieving high grades was a motivating factor for taking the course tended to submit more postings during the semester. However, since there was a disparity between the group numbers, a logistic regression was run on the data and the results confirmed the findings of the DFA.

4.9.3 Motivation C group as the DV

As table 4.9 shows, in the motivation C group, with 11 cases in the “I believe the workload is light” category and 127 cases in the “Other” category, the DFA revealed that the paper grade ( $p<0.01$ ) had the highest F value (8.60) and the lowest Wilks' Lambda value (.94).

**Table 4.9:** Tests of Equality of Group Means - DV Motivation C, IVs Performance Indicators

	Wilks' Lambda	F	df1	df2	Sig.
<b>Paper Grade</b>	<b>.94</b>	<b>8.60</b>	<b>1</b>	<b>136</b>	<b>.004</b>
Critique Grade	.98	3.25	1	136	.07
Peer Rating	1.00	.43	1	136	.51
Total Postings	1.00	.27	1	136	.60

The group statistics indicated that students who chose the course because they believed the workload was light ( $N=11$ ; mean:65.36; median:67; SD:2.94) received a lower grade for their tutorial paper than other students ( $N=127$ ; mean:70.32; median:70; SD:5.52). The effect size was large ( $d=-0.92$ ) and classification statistics showed that 92% of the original grouped cases were correctly classified with the discriminant function.

Hence, students who said they chose the course because they believed the workload would be light tended to receive a lower grade on their tutorial assignment paper. However, since there was a disparity between the group numbers, a logistic regression was run on the data and the results confirmed the findings of the DFA.

4.9.4 Motivation D group as the DV

As table 4.10 shows, in the motivation D group, with 25 cases in the “I can work and submit assignments from home” category and 113 cases in the “Other” category, the DFA revealed that the paper grade ( $p<0.05$ ) had the highest F value (5.78) and the lowest Wilks' Lambda value (.96).

**Table 4.10:** Tests of Equality of Group Means - DV Motivation D, IVs Performance Indicators

	Wilks' Lambda	F	df1	df2	Sig.
<b>Paper Grade</b>	<b>.96</b>	<b>5.78</b>	<b>1</b>	<b>136</b>	<b>.02</b>
Critique Grade	1.00	.59	1	136	.45
Peer Rating	.99	1.74	1	136	.19
Total Postings	.99	.98	1	136	.33

The group statistics indicated that students who chose the course because they liked the fact that they could work and submit assignments from home (N= 25; mean:67.56; median:67; SD:5.75) received a lower tutorial paper grade than other students (N=113; mean:70.44; median:70; SD:5.35). The effect size was medium ( $d=-0.53$ ) and classification statistics showed that 81.9% of the original grouped cases were correctly classified with the discriminant function.

Hence, students who said that working and submitting assignments from home was a major motivating factor for taking the course tended to do poorly on the tutorial paper assignment. However, since there was a disparity between the group numbers, a logistic regression was run on the data and the results confirmed the findings of the DFA.

#### 4.9.5 Student demographic groups and non-significant performance indicators

The DFA run on the Gender, Primary language, Rating for face-to-face discussion, and Motivation A groups did not find any significant difference between the means of the IVs.

#### 4.10 Student Demographic Groups as DVs and Postings Content as IVs

Using the student demographic information groups described in section 4.8 as DVs, a DFA was run on the discussion forum content categories as IVs. As mentioned in section 4.7, the discussion forum content analysis included “Factoid” type, and “Proposition” type postings, “Friendly” and “Unfriendly” comments, statements for directing or managing the group, referenced articles and the web hyperlinks.

##### 4.10.1 Motivation D group as the DV

As table 4.11 shows, in the motivation D group, with 28 cases in the “I can work and submit assignments from home” category and 117 cases in the “Other” category, the DFA revealed 2 significant discriminants.

**Table 4.11:** Stepwise Statistics - DV Motivation D, IVs Discussion Forum Content

Step	Entered	Wilks' Lambda							
		Statistic	df1	df2	df3	Exact F			
						Statistic	df1	df2	Sig.
1	Factoids	.96	1	1	143	5.35	1	143	.02
2	Statements for managing	.92	2	1	143	5.85	2	142	.004

At each step, the variable that minimizes the overall Wilks' Lambda is entered. Maximum number of steps is 14. Minimum partial F to enter is 3.84. Maximum partial F to remove is 2.71. F level, tolerance, or VIN insufficient for further computation.

The factoid type posting was significant ( $p < 0.05$ ) at the first step of the calculation, while the statements for managing was significant ( $p < 0.01$ ) at the second. Since the Box's M test showed  $p(M) < 0.05$ , the null hypothesis was accepted and the assumption of homoscedasticity upheld.

The group statistics indicated that students who said that working and submitting assignments from home was a major motivating factor for taking the course ( $N=28$ ; mean:12.43; median:11.5; SD:4.35) made fewer factoid type postings than other students ( $N=117$ ; mean:16.07; median:14; SD:8.03), and provided more statements for directing or managing the online discussion (mean:4.39; median:4; SD:3.17) than others (mean:3.32; median:2.5; SD:3.07). In both cases, the effect size was small ( $d=-0.49$  and  $d=0.35$ ) and classification statistics showed that 80.7% of the original grouped cases were correctly classified with the discriminant function.

Hence, students who said they were motivated by being able to work and submit assignments from home tended not to provide as many factual information type postings as others, and to make more suggestions for managing the online discussion. Because of the disparity between group numbers, a logistic regression calculation was run on the data and the results supported the findings of the DFA.

#### 4.10.2 Student demographic groups and non-significant postings content categories

The DFA run on the Gender, Principal Language, Rating for online discussion, Rating for face-to-face discussion, and Motivation A, B, and C groups did not find any significant difference between the means of the IVs.

### 4.11 Summary

This chapter examined the relationships between the discussion forum usage statistics, the discussion forum posting contents and the performance indicators. As well as presenting descriptive statistics and bivariate correlations, discriminant function analysis (DFA) was used to determine whether any independent variable (IV), such as the tutorial assignment paper grades, critique assignment grades, discussion forum peer ratings, total postings and discussion forum posting content categories, could be used as a predictor of an ILS learning style preference group or student demographics information group.

The discussion forum usage statistics revealed a substantial level of activity in the discussion forums, as 61% of the class participated in all 9 discussions. During the semester, the 147 students in the research group submitted 3,238 postings and the analysis of the contents showed that 2,234 of these were “Factoid” type postings, 301 were “Proposition” type postings and the remaining 703 postings were communications in which the students did not offer any information or ideas about the topic under discussion. The posting contents also showed that the students had included 647 referenced articles, 546 web hyperlinks and made 512 statements directed at managing the group, 975 “Friendly” type comments and 14 “Unfriendly” type comments.

Correlations between the marks received for the tutorial assignment paper, the critique assignment, the discussion forum participation (peer ratings) and the number of postings submitted revealed a moderate significant correlation between the frequency of posting and the peer rating (.45,  $p < 0.01$ ), indicating that as group leaders, the students seemed to be influenced by the number of postings a group member had submitted during the week’s discussion.

A discriminant function analysis (DFA) was run with the learning style preferences as the dependent variables (DVs) and the performance indicator categories and discussion forum content analysis categories as the independent variables (IVs). These DFA calculations revealed that: a) Active learners were not inclined to submit many postings, b) Reflective learners tended to do better on the critique assignment, submitted more postings that addressed issues through a critical perspective and included more web hyperlinks in their postings, c) Verbal learners tended to do better on the critique assignment, but received lower peer ratings for their contributions to the discussion and d) Sequential learners tended to do better on the critique assignment.

With student demographic information groups as the DVs, the performance indicator categories and discussion forum content analysis categories were examined as IVs in a DFA. These DFA calculations revealed that a) students who had indicated that they enjoyed using online discussion forums before the study tended to receive lower peer ratings during the semester, b) students who had said that achieving high grades was a motivating factor for taking the course tended to submit more postings during the semester, c) students who had said that they chose the course because they believed the

workload would be light tended to receive a lower grade on their tutorial assignment paper and d) students who had said that working and submitting assignments from home was a major motivating factor for taking the course tended to do worse on the tutorial paper assignment, submitted fewer factual information type postings, but provided more suggestions for managing the online discussion.

In the following chapter, the data from the survey questionnaire multiple choice questions is analysed. Survey I and Survey II descriptive statistics, correlations and factor analysis calculations are presented and comparisons between repeated questions in both surveys are examined. Paired significance tests, including paired samples correlations, t-tests and effect size calculations were also conducted and those findings are presented.

## **Chapter 5**

### **ANALYSIS OF SURVEY QUESTIONNAIRE MCQS**

#### **5.1 Overview**

In this chapter the MCQ responses from the two online survey questionnaires administered during the semester are examined. As explained in section 3.5, while the first questionnaire was designed to investigate student's attitudes towards the ease of use of the technology, the quality of the online discussions, online vs. face-to-face tutorial discussions, online social relationships and learning from participating in the discussion forums, the second questionnaire revisited these issues and looked for any changes. Even though participation in the surveys was voluntary, a large number of students completed the online questionnaires, with 157 students completing Survey I and 132 students completing Survey II.

The MCQ response descriptive statistics are presented and the within-survey relationships are examined using Pearson correlation and factor analysis calculations. Because 126 students completed both surveys, paired samples statistics were used to explore changes in attitudes over the 9 week period, and the between-survey relationships were examined using paired samples correlations, t-tests and effect size calculations. Copies of Survey I and II questionnaires are attached as appendix B and appendix C.

#### **5.2 Survey I - Descriptive Statistics for MCQs**

As explained in section 3.5.1, the survey was divided into 5 sections: 1) Ease of use of the technology, 2) Quality of the online discussions, 3) Comparing online versus face-to-face discussions, 4) Perceptions about online relationships and 5) Perceptions about learning. One hundred fifty-seven students submitted Survey I. Descriptive statistics were run on the MCQ questions (questions 1, 4, 5, 6, 7, 9, 11, 13, 15, 17 and 19) and the total number of valid responses and their frequency distribution in percentage are presented.



5.2.1 Ease of use of technology MCQs

The first section of the survey was designed to determine whether the students had encountered difficulties accessing the discussion forums and the peer evaluation website. From the information gathered at the start of the semester when the students were briefed on the assignment, it was established that a majority of students (88%) had more than 3 years experience using ICT. Hence, while a few technical problems were experienced, it was not surprising that 87% of the respondents said that accessing the discussion forums was trouble free, and that only 5% of the respondents were not satisfied with the usability of the peer rating website.

5.2.2 Quality of online discussion MCQs

In the second section of the survey, the quality of the online discussions was examined. Question 5 asked the students whether they had clearly understood what the other discussion group members had posted. While 59% of the respondents indicated that they clearly understood the postings, as figure 5.1 shows, 26% of the respondents were not sure and 15% said they had experienced some level of difficulty.

5. In the IVLE discussion forum, I can clearly understand what the other group members have contributed to the tutorial topic.

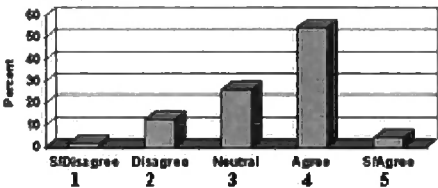


Figure 5.1: Survey I - Ques.5

6. I have difficulty expressing myself clearly when posting a message on the IVLE discussion forum.

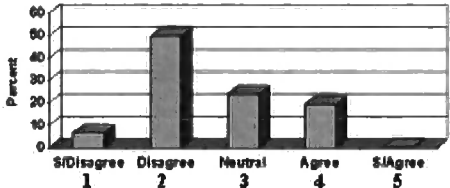


Figure 5.2: Survey I - Ques.6

Question 6 asked the students whether they had difficulty expressing themselves clearly when posting a message on the discussion forum. As figure 5.2 shows, 56% of the respondents indicated that they were comfortable with the format, while 20% said that they had found it difficult to express themselves clearly.

5.2.3 Comparing online with face-to-face tutorial discussions MCQs

This section of the questionnaire consisted of two Likert type questions, and was designed to query the students about the amount of work they had contributed when participating in the online discussions. Question 7 asked the students to compare their past experience of the traditional face-to-face tutorial discussion format with that of the online discussion forum format, and to indicate whether they had contributed more opinions in the online format. Figure 5.3 shows that 56% of the respondents indicated

that they had contributed more opinions to the discussions, while 22% disagreed with the statement.

7. Compared to face-to-face discussions, when using the IVLE discussion forum I have contributed more opinions on the tutorial topic.

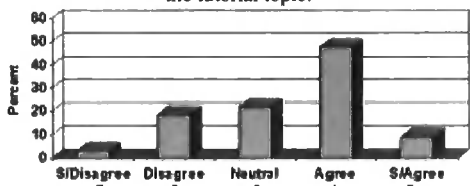


Figure 5.3: Survey I – Ques.7

9. Compared to face-to-face discussions, when using the IVLE discussion forum I have spent more time gathering information on the tutorial topic.

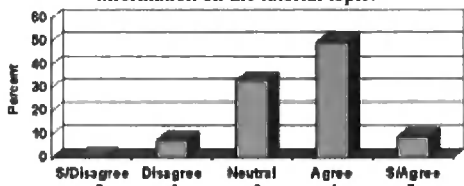


Figure 5.4: Survey I – Ques.9

In question 9, the students were asked if they had spent more time gathering information for online discussions as compared to preparing for a traditional face-to-face discussion. Figure 5.4 shows that 59% of the respondents said they had spent more time gathering information to prepare for the online discussion, and only 8% disagreed with that statement.

5.2.4 Perceptions about online relationships MCQs

The next section of the questionnaire was designed to probe social relationship issues between students who, as a consequence of participating in discussion forums, were working without seeing or synchronously interacting with their team mates. Question 11 asked if students trusted their team mates to make good contributions to the discussion. Figure 5.5 shows that 40% of the respondents were not sure (neutral), 40% were trusting, and 20% did not trust their team mates.

11. When using the IVLE discussion forum to work on our tutorial assignments, I feel that I can trust most group members to make good contributions.

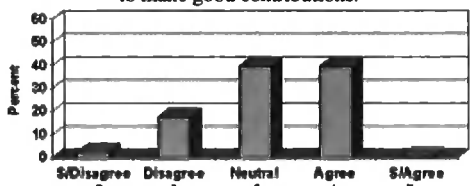


Figure 5.5: Survey I – Ques.11

13. When using the IVLE discussion forum to work on our tutorial assignments, I feel insecure about expressing my opinion on the tutorial topic.

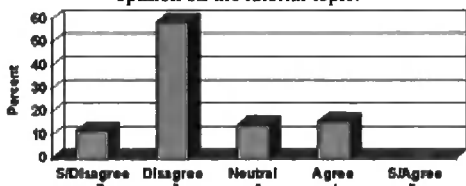


Figure 5.6: Survey I – Ques.13

In question 13, students were asked if they felt insecure about expressing their opinions while participating in an online discussion forum. As figure 5.6 shows, 70% of the respondents indicated that they felt confident (agreed and strongly agreed), while 16% said that they felt insecure and a further 14% were uncertain (neutral). Because earlier research had indicated that students found working in discussion forums to be impersonal (Bishop & Doiron, 2003), question 15 asked the students whether their online relationships with the other group members felt like formal business dealings.

15. When using the IVLE discussion forum to work on our tutorial assignments, I feel my relationship with other group members is very “business like” and impersonal.

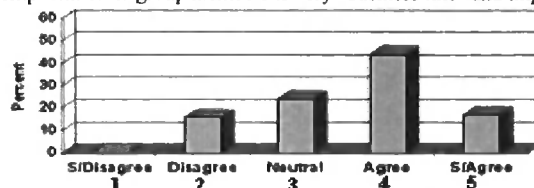


Figure 5.7: Survey I – Ques.15

As figure 5.7 shows, only 16% of the respondents disagreed, while 61% agreed and strongly agreed that their discussion forum relationships were very “business like” and impersonal.

### 5.2.5 Perceptions about learning MCQs

The last section of the questionnaire explored perceptions about learning. Question 17 asked whether the students believed that, when compared to their experience of traditional face-to-face tutorials discussions, they had learned more about the topics through their participation in the online discussion forum format.

17. I believe that I learn more about a tutorial topic from participating in the IVLE discussion forum rather than in the face-to-face discussion format.

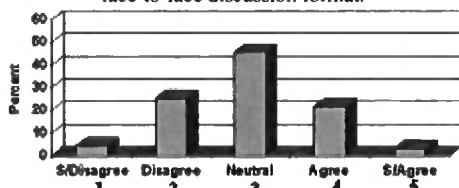


Figure 5.8: Survey I – Ques.17

19. I believe that I remember more about a tutorial topic from participating in the IVLE discussion forum rather than in the face-to-face discussion format.

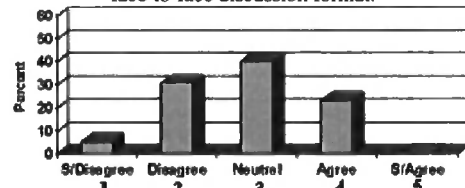


Figure 5.9: Survey I – Ques.19

In figure 5.8, the data shows that many students did not believe that either format had an advantage. Slightly more students disagreed than agreed, while 46% did not express a preference (neutral). Students were also asked if they remembered more about a topic because they had participated in the online discussion forum format. As figure 5.9 shows, a total of 36% of the respondents disagreed, while only 24% believed that they had remembered more.

22. I believe that playing the role of a member of a team of “consultants” assigned to give advice on the topic of the tutorial is a good strategy for learning.

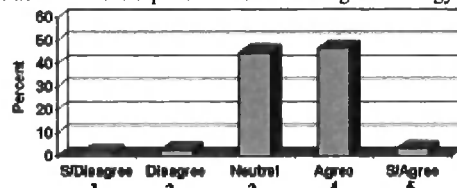


Figure 5.10: Survey I – Ques.22

Finally, in question 22 the students were asked if they considered peer collaboration to be a good or bad strategy for learning. As figure 5.10 shows, only 4% of the

respondents disagreed and strongly disagreed, while 51% believed that playing the role of a “consultant” team member was a good strategy for learning.

### 5.3 Survey I - Correlations of MCQs

An analysis of bivariate correlations using a 2-tailed Pearson correlation coefficient test was run on questions 5, 6, 7, 9, 11, 13, 15, 17 and 19. These questions can be viewed in appendix B. The data was analysed and as table 5.1 shows, most questions correlated well. This section describes the relationships among the data.

**Table 5.1:** Pearson Correlations - Survey I MCQs (N=157)

	Ques.5	Ques.6	Ques.7	Ques.9	Ques.11	Ques.13	Ques.15	Ques.17	Ques.19
Ques.5	1	-.48**	.22**	.08	.17*	-.32**	-.11	.07	.22**
Sig.		.00	.01	.35	.04	.00	.17	.37	.01
Ques.6	-.48**	1	-.27**	-.18*	-.19*	.41**	.09	-.10	-.14
Sig.	.00		.00	.03	.02	.00	.25	.22	.08
Ques.7	.22**	-.27**	1	.35**	.23**	-.25**	-.22**	.36**	.42**
Sig.	.01	.00		.00	.00	.00	.01	.00	.00
Ques.9	.08	-.18*	.35**	1	.17*	-.06	-.05	.43**	.26**
Sig.	.35	.03	.00		.04	.46	.54	.00	.00
Ques.11	.17*	-.19*	.23**	.17*	1	-.23**	-.19*	.19*	.22**
Sig.	.04	.02	.00	.04		.00	.02	.02	.01
Ques.13	-.32**	.41**	-.25**	-.06	-.23**	1	.25**	-.21**	-.27**
Sig.	.00	.00	.00	.46	.00		.00	.01	.00
Ques.15	-.11	.09	-.22**	-.05	-.19*	.25**	1	-.16*	-.13
Sig.	.17	.25	.01	.54	.02	.00		.03	.12
Ques.17	.07	-.10	.36**	.43**	.19*	-.21**	-.18*	1	.42**
Sig.	.37	.22	.00	.00	.02	.01	.03		.00
Ques.19	.22**	-.14	.42**	.26**	.22**	-.27**	-.13	.42**	1
Sig.	.01	.08	.00	.00	.01	.00	.12	.00	

\*\* p<0.01 level, \* p<0.05 (2-tailed)

#### 5.3.1 Question 5 - significant correlations

Question 5 showed a moderate negative significant correlation with questions 6 (-.48) and 13 (-.32). Hence, individuals who said that they had clearly understood what the other discussion forum group members had written were also likely to think that they were expressing themselves clearly in discussion forums and felt confident about expressing their opinions.

Question 5 also showed a small significant correlation with questions 7 (.22), 19 (.22), and 11 (.17). Thus, clearly understanding what the other discussion forum group members had written was to some extent associated with having contributed more opinions in the discussion forums, feeling that the other group members were

trustworthy and believing that participation in the online discussions was helpful in committing facts about the tutorial topics to memory.

### 5.3.2 Question 6 - significant correlations

In addition to the significant correlation with question 5, question 6 showed a moderate significant correlation with question 13 (.41), and a small negative significant correlation with questions 7 (-.27), 11 (-.19) and 19 (-.14). Hence, individuals who said they had difficulty expressing themselves clearly in discussion forums were also somewhat likely to have said that they felt insecure about expressing their opinions in discussion forums, contributed fewer opinions in discussion forums than in face-to-face tutorial discussions, felt that their group members were not trustworthy and believed that they had not remembered more about the tutorial topics as a result of their participation in the online discussions.

Question 6 also showed a small negative significant correlation with question 9 (-.18). Thus, there was a minor association between having difficulty expressing oneself in discussion forums and not spending more time gathering information for online discussions as compared to the face-to-face discussion format.

### 5.3.3 Question 7 - significant correlations

Question 7 showed a significant correlation with all of the questions. Besides the correlations with questions 5 and 6, question 7 showed a moderate correlation with questions 9 (.35), 17 (.36) and 19 (.42), a small correlation with question 11 (.23), and a small negative correlation with questions 13 (-.25) and 15 (-.22).

This data indicates that, when comparing the experience of participating in discussion forums with face-to-face tutorial discussions, individuals who said they had contributed more opinions when using discussion forums were also more likely to also have said that they clearly understood the postings from other discussion group members, spent more time gathering information, felt their group members were trustworthy, and learned and remembered more as a result of their participation in the online discussions.

Contributing a greater number of opinions in the discussion forums also had a positive significant correlation with expressing oneself clearly in discussion forums, feeling

confident about expressing one's opinions and feeling that one's relationship with the other discussion forum group members was friendly.

#### 5.3.4 Question 9 - significant correlations

In addition to the significant correlation with questions 6 and 7, question 9 also showed a significant moderate correlation with question 17 (.43), and a small correlation with questions 19 (.26), and 11 (.17). Thus, when comparing the experience of participation in discussion forums with face-to-face tutorial discussions, individuals who said they had spent more time gathering information as a result of participating in the discussion forums were also likely to have indicated that they trusted their discussion forum group members and believed they had learned and remembered more about the tutorial topics because of their participation in the discussion forums.

#### 5.3.5 Question 11 - significant correlations

Along with the significant correlations with question 5, 6, 7 and 9 which have already been discussed, question 11 also showed a small significant correlation with questions 17 (.19) and 19 (.22), and a small negative significant correlation with questions 13 (-.23) and 15 (-.19). This indicates that there is a minor link between trusting one's discussion forum group members and being confident about expressing one's opinions in the discussion forums. Individuals who trusted their discussion forum group members felt that their relationships with them were friendly, and they also believed that they had learned and remembered more about the tutorial topics as a result of participating in the discussion forums.

#### 5.3.6 Question 13 - significant correlations

Along with the significant correlations already discussed, question 13 showed a small significant correlation with question 15 (.25), and a small negative significant correlation with questions 17 (-.21) and 19 (-.27). Thus, individuals who said that they felt insecure about expressing their opinions in discussion forums possibly felt that their relationship with the other group members was impersonal. They also tended to believe that they had not learned or remembered more about the tutorial topics from having participated in the online discussions.

#### 5.3.7 Question 15, 17 and 19 - significant correlations

While all of the significant correlations with question 19 have been discussed, data for questions 15 and 17 showed that along with the relationships already discussed,

question 15 showed a small negative significant correlation with question 17 (-.18), and question 17 showed a moderate significant correlation with question 19 (.42). Thus, the data from question 15 indicates that students who felt that their relationships with the other discussion forum group members had been impersonal were also likely to believe that they had not learned more about the topics while working in discussion forums. The data from question 17 highlighted the positive significant correlation between learning more and remembering more about the topics as a consequence of participation in the discussion forums.

#### 5.4 Survey I – Factor Analysis of MCQs

Along with Pearson correlations, the relationships between questions within the survey MCQs were examined through a factor analysis calculation. As explained in section 3.9.1, the purpose of factor analysis was to analyze interrelationships among a large number of variables and to explain these variables in terms of their common underlying dimensions, referred to as factors. When as in this case, the goal of the factor analysis is to discover the underlying factor structure, the principal axis factoring is the preferred method for extracting factors from the set of variables (Costello & Osborne, 2005; Fabrigar, Wegener, MacCallum & Strahan, 1999).

**Table 5.2: Survey I MCQs Total Variance Explained (Eigenvalues >1)\***

Factor	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	2.90	32.19	32.19	2.28	25.29	25.29	1.65	18.29	18.29
2	1.38	15.32	47.51	.81	9.02	34.30	1.44	16.01	34.30

\* Extraction Method: Principal Axis Factoring

Hence, Survey I MCQs were examined using the principal axis factoring and as table 5.2 shows, the analysis revealed that after extraction two factors accounted for 34% of the total variance. A Varimax rotation with Kaiser normalization established that factor one accounted for 18% of the variance, while factor two accounted for 16%.

##### 5.4.1 Interpreting factors

The constructs in the Survey I MCQs can be expressed as follows:

- Question 5 (Q5)
  - clearly understanding what discussion forum group members wrote
- Question 6 (Q6)

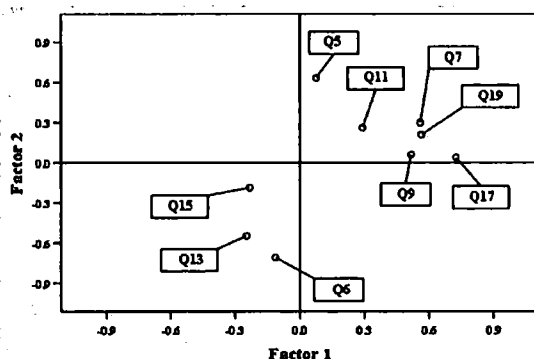
- difficulty expressing oneself clearly in discussion forums
- Question 7 (Q7)
  - contributing more opinions when using discussion forums
- Question 9 (Q9)
  - spending more time gathering information for discussion forums
- Question 11 (Q11)
  - trusting discussion forum group members
- Question 13 (Q13)
  - feeling insecure about expressing one's opinion in discussion forums
- Question 15 (Q15)
  - believing that relationships in discussion forum groups are impersonal
- Question 17 (Q17)
  - believing that one learns more from participation in discussion forums
- Question 19 (Q19)
  - believing that one remembers more from participation in discussion forums

**Table 5.3:** Survey I MCQs Rotated Factor Matrix - Principal Axis Factoring with Varimax Rotation\*

	Ques.5	Ques.6	Ques.7	Ques.9	Ques.11	Ques.13	Ques.15	Ques.17	Ques.19
<b>Factor 1</b>	.08	-.11	.56	.52	.29	-.25	-.23	.73	.57
<b>Factor 2</b>	.63	-.71	.30	.06	.26	-.55	-.19	.04	.21

\*Rotation converged in 3 iterations.

In table 5.3, and graphically in figure 5.11, the factor loadings show relationships among the MCQs that reflect the positive and negative correlations presented in section 5.3.



**Figure 5.11:** Survey I MCQs Factor Plot in Rotated Factor Space

The first factor points to the belief that one learns more (Q17=.73), remembers more (Q19=.57), contributes more (Q7=.56), and works more (Q9=.52), through participating



in discussion forums; so the common thread throughout seems to be an expression of the “effectiveness” of the tutorial discussion forum format. The analysis shows that this “effectiveness” contrasts with feelings of insecurity about expressing one’s opinions ( $Q13=-.25$ ) and perceptions of impersonal relationships with the other discussion forum team members ( $Q15=-.23$ ). A Cronbach’s Alpha calculation of  $\alpha = .70$  further confirmed that questions 17, 19, 7 and 9 were measuring the same construct (George & Mallery, 2001; Messick, 1995; Trochim, 2004; Tuckman, 1999; Zywno, 2003).

The second factor highlights the relationship between clearly understanding discussion forum posting contents ( $Q5=.63$ ) and having difficulty expressing oneself in the discussion forums ( $Q6=-.71$ ). Hence the underlying construct in this factor centres on communication and the inability to work effectively in the discussion forum environment due to feelings of inadequacy.

## **5.5 Survey II - Descriptive Statistics for MCQs**

As explained in section 3.5.2, the survey was divided into 5 sections: 1) Technical reliability and usability, 2) Quality of the online discussions, 3) Comparing online versus face-to-face discussions, 4) Perceptions about online relationships and 5) Perceptions about learning. Descriptive statistics were run on questions 3, 4, 5, 6, 8, 9, 11, 12, 14, 15, 17, 18, 19 and 20. One hundred thirty-two students completed Survey II, and the total number of valid responses and their frequency distribution as percentages are presented in this section. A copy of the survey questionnaire is attached as appendix C.

### **5.5.1 Technical reliability and usability MCQs**

As explained in section 3.5.2, the first section of the questionnaire was designed to find out whether the students were still having difficulty accessing the discussion forum and whether they were satisfied with the changes that had been made to the peer rating website as a result of feedback from Survey I. In question 3, 84% of the respondents said they had encountered only minor problems while working with discussion forums, and in question 4, 86% of the respondents indicated that they were satisfied with the user-friendliness of peer rating website.

5.5.2 Quality of discussion MCQs

The following three questions examined the quality of the online discussions. Question 3 asked the students if they had understood what the other discussion group members had posted. While 70% of respondents said that they had understood what the others communicated in the discussion forums, figure 5.12 shows that 7% still had some difficulty.

3. In the IVLE discussion forum, I can understand clearly what the other discussion group members have contributed to the tutorial topic.

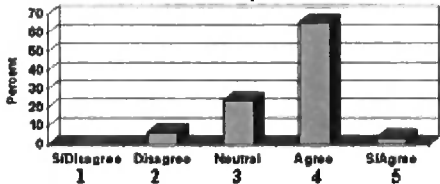


Figure 5.12: Survey II – Ques.3

4. I have difficulty expressing myself clearly when posting a message on the IVLE discussion forum.

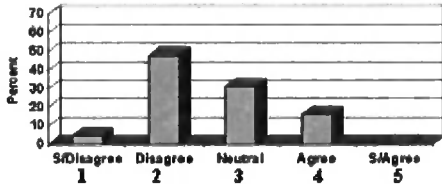


Figure 5.13: Survey II – Ques.4

Question 4 asked the students if they had difficulty expressing themselves clearly in the discussion forum postings. As figure 5.13 shows, a total of 52% of the respondents indicated that they could express themselves clearly in discussion forums, while 17% said that they still had difficulty.

5. Generally, the messages in the IVLE discussion forum have been relevant to the topic being discussed.

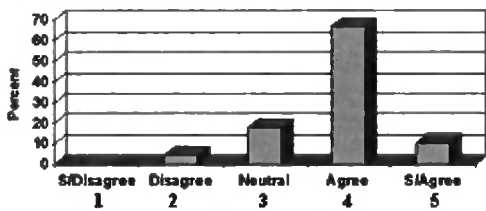


Figure 5.14: Survey II – Ques.5

Question 5 was designed to examine whether students had gone “off track” or engaged in non-relevant “chit-chat” during the weeks’ discussion. As figure 5.14 shows, only 5% of the respondents felt the discussions had gone off topic, while a total of 78% agreed that the messages in the discussion forums had generally been relevant to the topic being discussed.

5.5.3 Comparing online with face-to-face tutorial discussions MCQs

This section of the questionnaire had only one nominal response type MCQ. Students were asked to indicate which format they preferred for collaboration on assignment papers. While 44% of the respondents did not have any preference, as figure 5.15 shows, 35%, preferred the face-to-face format, while the online discussion forum format was popular with only 21% of the respondents.

6. For group collaboration on writing a paper for a tutorial assignment, I prefer:

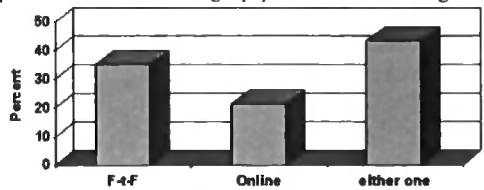


Figure 5.15: Survey II – Ques.6

5.5.4 Perceptions about online relationships MCQs

In this section of the questionnaire, the students were asked about their feelings of trust towards their group members, their confidence about expressing their opinions in the forums, whether the relationships in their discussion forums was ‘impersonal’ and how these feelings had changed over the course of the semester.

8. When using the IVLE discussion forum to work on our tutorial assignment, I feel that I can trust the other group members to do their share of the work.

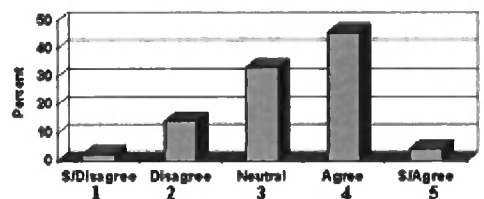


Figure 5.16: Survey II – Ques.8

Question 8 asked the students if they trusted their team mates to make worthwhile contributions to the discussion forum. Figure 5.16 shows that a total of 50% of the respondents indicated that they trusted their team mates, while 17% did not and 33% were unsure (neutral).

9. Has your trust in your group members increased, decreased or remained the same since the start of the semester?

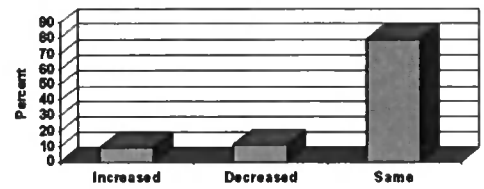


Figure 5.17: Survey II – Ques.9

However, as figure 5.17 shows, when directly asked in question 9 if their level of trust had changed over the course of the semester, only 9% of the respondents indicated an increase in trust, while 11% said that their trust had decreased.

11. When using the IVLE discussion forum to work on our tutorial assignment, I feel insecure about expressing my opinion on the tutorial topic.

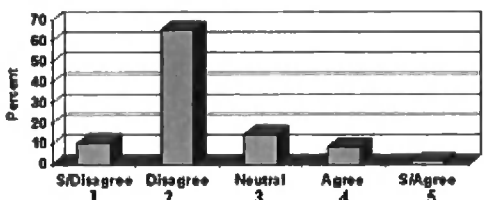


Figure 5.18: Survey II – Ques.11

Question 11 asked the students if they felt insecure about expressing their opinions in the discussion forum. Figure 5.18 shows that a total of 76% of the respondents felt confident about expressing their opinions, while 10% still felt insecure.

12. Has your confidence in expressing your opinion increased, decreased or remained the same since the start of the semester?

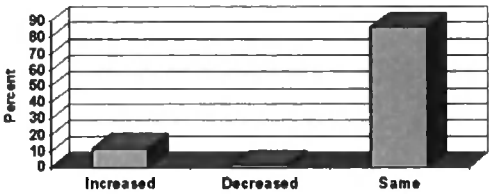


Figure 5.19: Survey II – Ques.12

In question 12, 86% of the respondents indicated that their level of confidence had not changed throughout the semester. However, as figure 5.19 shows, 12% believed their confidence level had increased, and only 2% said it had decreased.

14. When using the IVLE discussion forum to work on our tutorial assignment, I feel my relationship with the other group members is very "business like" and impersonal.

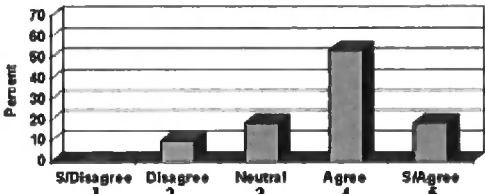


Figure 5.20: Survey II – Ques.14

In question 14, students were asked if they felt that their relationship with the other discussion group members had been ‘business like’ and impersonal. The data in figure 5.20 shows that only 10% of the respondent felt their relationships were friendly, while most (72%) felt their connection with the other group members was impersonal.

15. Has your relationship with the other group members become more impersonal, less impersonal or unchanged since the start of the semester?

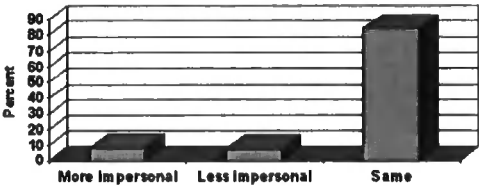


Figure 5.21: Survey II – Ques.15

In question 15 students were asked whether their relationships with their group members had changed. As figure 5.21 shows, only 8% of the respondents said that they felt their relationships had improved to become less impersonal, while 84% indicated no change in attitude and 8% felt that their relationships had become more impersonal.

5.5.5 Perceptions about Learning MCQs

In the last section of this questionnaire, the students were asked about learning and remembering through attending the traditional face-to-face tutorial discussions, and how they felt about working collaboratively within a group, and critiquing an assignment from another student.

17. I believe that I learn more about a tutorial topic from attending a face-to-face tutorial discussion than from participating in the IVLE tutorial group discussion forum format.

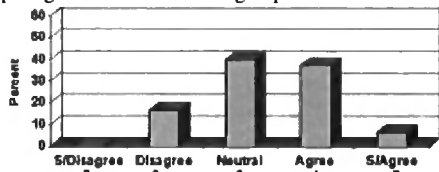


Figure 5.22: Survey II – Ques.17

18. I believe that I remember more about a tutorial topic from attending a face-to-face tutorial discussion than from participating in the IVLE tutorial group discussion forum format.

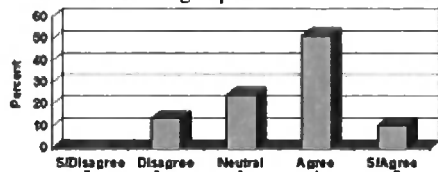


Figure 5.23: Survey II – Ques.18

In figure 5.22, the data shows that 44% of the respondents felt they learned more from the face-to-face format, while only 17% of the respondents disagreed with the statement. Similarly, figure 5.23 shows that 62% of the respondents felt they remembered more from attending face-to-face tutorial discussions, and only 14% of respondents disagreed with the statement.

19. From my experience at participating in the IVLE discussion forum groups, I believe that I have learned more through collaborating within a group, than if I had worked alone.

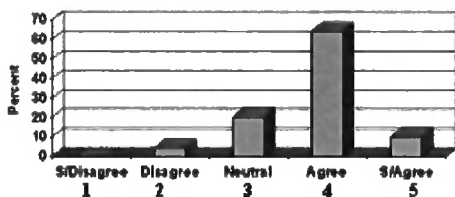


Figure 5.24: Survey II – Ques.19

In question 19, the students were asked if they had learned more through collaborating within a group rather than from working alone. As figure 5.24 shows, 75% of the respondents agreed that collaborating online was better, while only 5% disagreed with the statement.

20. If during the semester, you wrote a critique of a tutorial topic paper, did you find this to be a good learning experience, not useful, or did it leave you indifferent?

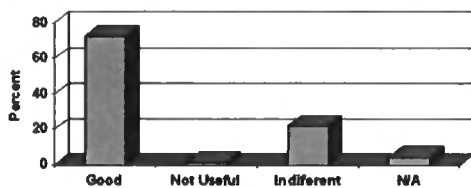


Figure 5.25: Survey II – Ques.20

One of the CA assignments was the critique of a tutorial paper from a student in another discussion forum group. As figure 5.25 shows, 73% of the respondents thought it was a good learning experience, while only 5% did not.

## 5.6 Survey II - Correlations of MCQs

An analysis of bivariate correlations using a 2-tailed Pearson correlation coefficient test was run on the ordinal data provided from questions 3, 4, 5, 8, 11, 14, 17, 18 and 19. These questions can be viewed in appendix C. The data was analysed and as table 5.4 shows, most questions correlated well. This section describes the relationships among the data.

**Table 5.4: Pearson Correlations – Survey II MCQs (N=132)**

	Ques.3	Ques.4	Ques.5	Ques.8	Ques.11	Ques.14	Ques.17	Ques.18	Ques.19
Ques.3	1	-.38**	.36**	.42**	-.24**	-.09	-.33**	-.32**	.21*
Sig.		.00	.00	.00	.01	.33	.00	.00	.02
Ques.4	-.38**	1	-.23**	-.16	.46**	.08	.19*	.14	-.19*
Sig.	.00		.01	.07	.00	.35	.03	.12	.03
Ques.5	.36**	-.23**	1	.20*	-.06	-.13	-.22*	-.15	.26**
Sig.	.00	.01		.02	.48	.15	.01	.09	.00
Ques.8	.42**	-.16	.20*	1	-.04	-.10	-.28**	-.28**	.26**
Sig.	.00	.07	.02		.62	.25	.00	.00	.00
Ques.11	-.24**	.46**	-.06	-.04	1	.03	.24**	.18*	-.20*
Sig.	.01	.00	.48	.62		.72	.01	.04	.02
Ques.14	-.09	.08	-.13	-.10	.03	1	.15	.22*	-.00
Sig.	.33	.35	.15	.25	.72		.	.10	.97
Ques.17	-.33**	.19*	-.22*	-.28**	.24**	.15	1	.52**	-.11
Sig.	.00	.03	.01	.00	.01	.10		.00	.21
Ques.18	-.32**	.14	-.15	-.28**	.18*	.22*	.52**	1	-.11
Sig.	.00	.12	.09	.00	.04	.01	.00		.20
Ques.19	.21*	-.19*	.26**	.26**	-.20*	-.003	-.11	-.11	1
Sig.	.02	.03	.00	.00	.02	.97	.21	.20	

\*\* p<0.01 level, \* p<0.05 (2-tailed)

### 5.6.1 Question 3 - significant correlations

Question 3 showed a moderate negative significant correlation with questions 4 (-.38), 17 (-.33) and 18 (-.32), and a small negative significant correlation with question 11 (-.24). Hence, students who had clearly understood what the other discussion forum group members had written were also likely to think they had expressed themselves clearly in discussion forums, felt confident about expressing their opinions, and did not believe they had learned or remembered more when participating in the traditional face-to-face tutorial discussion format.

Question 3 also had a moderate significant correlation with questions 5 (.36) and 8 (.42), and a small significant correlation with questions 19 (.21). Thus, understanding what other discussion forum group members had written was linked to believing that

the discussion forum postings had been relevant to the topics being discussed, and to trusting fellow group members to make valuable contributions to the discussions.

#### 5.6.2 Question 4 - significant correlations

In addition to the significant correlation with question 3, question 4 showed a moderate significant correlation with questions 11 (.47), a small significant correlation with question 17 (.19), and a small negative significant correlation with questions 5 (-.23), and 19 (-.19). Not surprisingly, this data indicates that students who had difficulty expressing themselves clearly in discussion forums also felt insecure about expressing their opinions online.

These students were also likely to believe that working in the traditional face-to-face tutorial discussion format was more conducive to learning than working in the discussion forums, felt that the discussion forum postings were generally not relevant to the topics being discussed, and preferred working alone rather than collaborating with their peers.

#### 5.6.3 Question 5 - significant correlations

As well as its significant correlations with questions 3 and 4, question 5 showed a small significant correlation with questions 19 (.26), and 8 (.20), and a small significant negative correlation with question 17 (-.22). This data shows that students who thought the discussion forum postings were generally relevant to the topics being discussed, were also likely to trust their discussion forum group members, believe they had learned more through online collaborative peer learning than if they had worked alone, and did not believe that the traditional face-to-face tutorial discussion format was more conducive to learning than working in the discussion forums.

#### 5.6.4 Question 8 - significant correlations

In addition to the significant correlations already discussed, question 8 showed a small significant correlation with question 19 (.26), and a small negative significant correlation with questions 17 (-.28), 18 (-.28). This data shows that students who trusted their group members believe that working in the traditional face-to-face tutorial discussions format was less conducive to learning or recall and felt they had learned more from collaborating online than if they had worked alone.

5.6.5 Question 11 - significant correlations

In addition to the significant correlations with questions 3 and 4 that have already been discussed, question 11 showed a small significant correlation with questions 17 (.24) and 18 (.18) and a small negative significant correlation with question 19 (-.20). Hence, students who felt insecure about expressing their opinion in discussion forums were also likely to feel that the traditional face-to-face tutorial discussion format was more conducive to learning, and preferred working alone rather than collaboratively online.

5.6.6 Question 14 - significant correlations

Question 14 had only one small significant correlation with question 18 (.22). This indicates that students who thought their relationships in discussion forums were impersonal also felt that they had remembered more when working in the traditional face-to-face tutorial discussion format.

5.6.7 Question 17, 18 and 19 - significant correlations

While all of the significant correlations with question 19 have been discussed, the only significant correlation not yet addressed is the large correlation between question 17 and 18 (.52). This correlation indicates, quite logically, that students who said they believed that working in the traditional face-to-face tutorial discussion format was more conducive to learning, also believed that they had remembered more from attending these face-to-face discussions.

5.7 Survey II – Factor Analysis of MCQs

As in section 5.4, the relationships between questions within the survey MCQs were examined through a factor analysis calculation.

Table 5.4: Survey II MCQs Total Variance Explained (Eigenvalues >1)\*

Factor	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	2.80	31.06	31.06	2.26	25.03	25.03	1.23	13.66	13.66
2	1.20	13.34	44.40	.74	8.18	33.22	1.22	13.52	27.18
3	1.07	11.88	56.28	.51	5.69	38.90	1.06	11.73	38.90

\*Extraction Method: Principal Axis Factoring

The principal axis factoring method was used and as figure 5.4 shows, the analysis revealed that after extraction, 3 factors accounted for 39% of the total variance. A



Varimax rotation with Kaiser normalization showed 14% of the variance in factor one, 13% in factor two and 12% in factor three.

5.7.1 Interpreting factors

The constructs in the Survey II MCQs can be expressed as follows:

- Question 3 (Q3)
  - clearly understanding what discussion forum group members wrote
- Question 4 (Q4)
  - difficulty expressing oneself clearly in discussion forums
- Question 5 (Q5)
  - believing that discussion forum postings were on topic
- Question 8 (Q8)
  - trusting discussion forum group members
- Question 11 (Q11)
  - feeling insecure about expressing one’s opinion in discussion forums
- Question 14 (Q14)
  - believing that relationships in discussion forum groups are impersonal
- Question 17 (Q17)
  - believing that one learns more from attending face-to-face tutorial sessions
- Question 18 (Q18)
  - believing that one remembers more from attending face-to-face tutorial sessions
- Question 19 (Q19)
  - believing that one learns more through collaboration in an online group

**Table 5.5:** Survey II MCQs Rotated Factor Matrix - Principal Axis Factoring with Varimax Rotation\*

	Ques.3	Ques.4	Ques.5	Ques.8	Ques.11	Ques.14	Ques.17	Ques.18	Ques.19
Factor 1	.66	-.38	.47	.48	-.06	-.09	-.23	-.14	.34
Factor 2	-.26	.06	-.13	-.28	.13	.23	.57	.81	-.08
Factor 3	-.20	.51	-.06	.004	.82	.005	.20	.09	-.17

\*Rotation converged in 5 iterations.

Table 5.5 and figure 5.26 show the relationships among the MCQs as reflected in the positive and negative correlations presented in section 5.3.

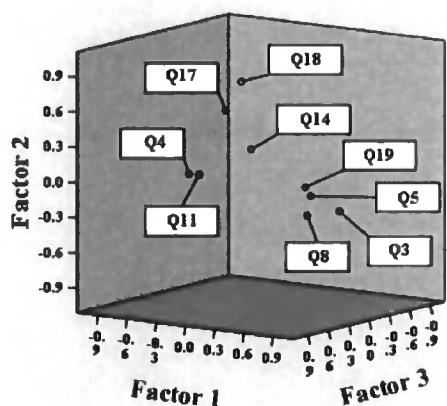


Figure 5.26: Survey II MCQs Factor Plot in Rotated Factor Space

In factor one, clearly understanding what discussion forum group members wrote (Q3=.66), had the highest loading, while difficulty expressing oneself clearly in discussion forums (Q4=-.38) had the lowest loading. Hence, this factor focuses on the student’s ability to work effectively in the discussion forum environment.

The second factor is linked to trusting discussion forum group members (Q8=-.28), understanding what discussion forum group members wrote (Q3=-.26), believing that the forum discussion postings were on topic (Q5=-.13), and that one learned more by collaborating within a group (Q19=-.08). These aspects of the construct express an attitude of self-confidence towards participation in discussion forum group work, as opposed to believing that one learns more (Q17=.57) and remembers more (Q18=.81) through participating in the traditional face-to-face tutorials. A Cronbach’s Alpha calculation of  $\alpha = .60$  further confirmed that while the factor loadings were low, questions 8, 3, 5 and 19 were a measure of the same construct.

Lastly, factor three showed that insecurity about expressing one’s opinions in the discussion forums (Q11=.82), as well as difficulty in expressing oneself clearly in these forums (Q4=.51) were at odds with understanding what discussion forum group members wrote (Q3=-.20), and the belief that one learned more through collaborating within a group (Q19=-.17). Here, the greatest load factor points to an inability to work effectively in the discussion forum environment because of difficulties in using the medium and a lack of self-confidence.

5.8 Survey I and Survey II - Comparing MCQs

In order to look at changes in the student attitudes over time, many of the questions from Survey I were repeated in Survey II. This section looks at the data, compares the results and discusses the changes that occurred over the 6 week interval between the surveys. As explained in section 3.8.3.3, 126 students completed both surveys.

5.8.1 Quality of online discussions

In Survey II, students were again asked whether they understood clearly what the other discussion group members had posted and if they still had difficulty expressing themselves clearly when posting a message in the forum. As figure 5.27 shows, only 7% of the Survey II respondents, down from 15% of the Survey I respondents, said they still had difficulty, while 69% of respondents of the Survey II respondents, up from 60% of the Survey I respondents, said they did not.

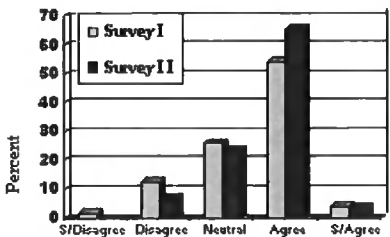


Figure 5.27: Survey I Ques.5 & Survey II Ques.3

In figure 5.28, the data shows that 17% of the Survey II respondents, down from 20% in Survey I, said they still had difficulty expressing themselves clearly when posting a message. The number of students who disagreed and strongly disagreed also fell from 56% in Survey I to 52% in Survey II.

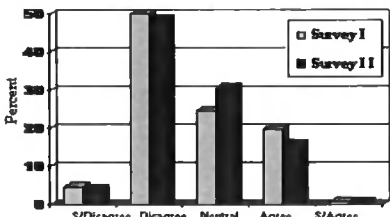


Figure 5.28: Survey I Ques.6 & Survey II Ques.4

5.8.2 Perceptions about online relationships

In this section of the questionnaire, as explained in section 5.2.4, the students were asked whether they trusted their team-mates to make good contributions to the discussion forum.

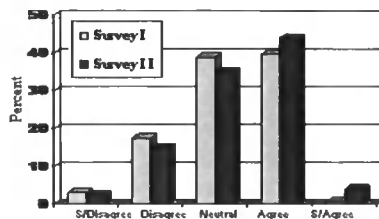


Figure 5.29: Survey I Ques.11 & Survey II Ques.8

As figure 5.29 shows, 50% of the respondents in Survey II, up from 40% in Survey I, were still trusting, while 17% of the respondents in Survey II, down from 20% in Survey I, were not.

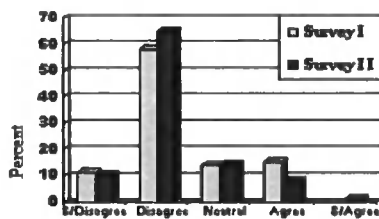


Figure 5.30: Survey I Ques.13 & Survey II Ques.11

Were students still insecure about expressing their opinions in the discussion forum? Figure 5.30 shows that there was an increased level of confidence as the number of students who disagreed and strongly disagreed with the statement increased from 70% in Survey I to 76% in Survey II. Moreover only 10% of the respondents in Survey II, down from 16% in Survey I, indicated that they still felt insecure.

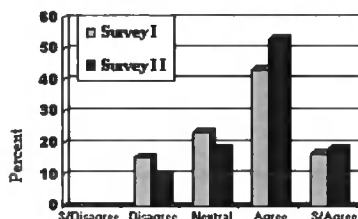


Figure 5.31: Survey I Ques.15 & Survey II Ques.14

The following question asked the students if they felt that their relationship with the other group members had been ‘business like’ and impersonal. The data in figure 5.31 shows that students who indicated that they had felt their relationships were personal decreased from 16% of respondents in Survey I to 10% in Survey II. However, the number of students who said their relationships were impersonal increased from 61% of the respondents in Survey I to 72% of the respondents in Survey II.

### 5.8.3 Perceptions about learning

The formulation of questions 17 and 19 in Survey I had focused on the discussion forum format and students were asked to compare their experience of working in online discussion forums with the traditional face-to-face tutorial discussions. In Survey II the

order of the comparison was reversed, in questions 17 and 19 students were asked to compare their experience of the traditional face-to-face tutorial discussions with the online discussion forum activity.

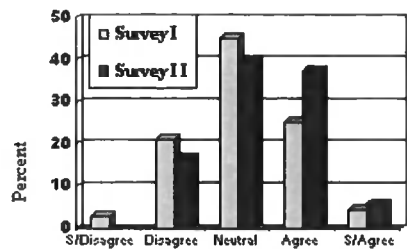


Figure 5.32: Survey I Ques.17 & Survey II Ques.17

In figure 5.32 the data shows that 44% of the respondents in Survey II agreed and strongly agreed with the statement that they learned more about the topics from participating in the traditional face-to-face tutorial discussions, while only 30% of the respondents in Survey I said the discussion forum format was better. In Survey I, 24% of the respondents did not believe that the discussion forum format was better, while in Survey II only 17% of the respondents did not believe that the traditional face-to-face tutorial discussion format was better.

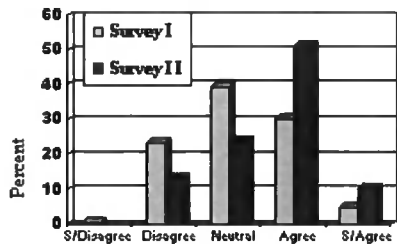


Figure 5.33: Survey I Ques.19 & Survey II Ques.18

Figure 5.33 shows that 62% of the respondents in Survey II agreed and strongly agreed with the statement that they remembered more about the tutorial topics from participating in the traditional face-to-face tutorial discussions, while only 36% of the respondents in Survey I said the discussion forum format was better. In Survey I, 24% of the respondents did not believe that the discussion forum format was better, while in Survey II only 14% of the respondents did not believe that the traditional face-to-face tutorial discussion format was better.

**5.9 Survey I and Survey II – Paired Group Significance Tests of MCQs**

As Survey I and Survey II were independent measures and provided data from a repeated sample, paired samples correlations and t-tests were carried out. In order to determine if any significant difference between the means of groups was practical and

meaningful, an effect size calculation was conducted. In this section, paired samples correlations, t-test and calculations of effect size are presented.

### 5.9.1 Paired samples correlations

As table 5.6 shows, all of the paired questions produced significant correlations ( $p < 0.01$ ) ranging from large to moderate.

**Table 5.6: Paired Samples Correlations**

Question Pairs	N	Correlation	Sig.
Survey I Ques.5 & Survey II Ques.3	125	.47	<.000
Survey I Ques.6 & Survey II Ques.4	124	.54	<.000
Survey I Ques.11 & Survey II Ques.8	126	.43	<.000
Survey I Ques.13 & Survey II Ques.11	125	.54	<.000
Survey I Ques.15 & Survey II Ques.14	125	.44	<.000
Survey I Ques.17 & Survey II Ques.17	125	-.47	<.000
Survey I Ques.19 & Survey II Ques.18	126	-.49	<.000

The last two question pairs showed a negative correlation because in Survey II these questions were rewritten in the reverse order.

### 5.9.2 Paired samples t-test

In table 5.7, the results of the paired samples t-test revealed that 3 pairs of questions showed a significant ( $p < 0.01$ ) difference between the means.

**Table 5.7: Paired Samples T-Test**

Question Pairs	Mean	SD	Std. Error	T	df	Sig. 2-tailed)
Survey I Ques.15 & Survey II Ques.14	-.22	.93	.08	-2.69	124	.008
Survey I Ques.17 & Survey II Ques.17	-.38	1.42	.13	-3.03	124	.003
Survey I Ques.19 & Survey II Ques.18	-.81	1.46	.13	-6.24	125	<.000

Hence, the paired questions, a) "I feel my relationship with the other discussion group members is very "business like" and impersonal", b) "I believe that I learn more about a tutorial topic..." and c) "I believe that I remember more about a tutorial topic...", indicated a significant change in student attitudes from one survey to the next. Because multiple t-tests are subject to Type I errors, rejecting  $H_0$  when no difference between the means exists, an ANOVA with a post hoc multiple comparisons was run on the data (Thomas, 1974), and the results supported the t-test findings.

5.9.3 Effect size

In order to establish whether the significant differences between the means described in the previous section were truly meaningful differences, a calculation of effect size was conducted. As explained in section 3.9.2, the effect size calculation used was Cohen’s *d*, and *d* values of .2, .5 and .8 were rated as a small, medium and large effect size (Cohen, 1988).

Table 5.8: Paired Samples - Effect Size (*d*)

Question Pairs	Survey I Mean	Survey II Mean	Survey I SD	Survey II SD	Effect Size ( <i>d</i> )
Pair 1 - Survey I Ques.15 & Survey II Ques.14	3.59	3.82	.92	.84	.26
Pair 2 - Survey I Ques.17 & Survey II Ques.17	2.97	3.35	.84	.82	.46
Pair 3 - Survey I Ques.19 & Survey II Ques.18	2.80	3.61	.84	.85	.96

The results of the effect size calculation are presented in table 5.8. The Cohen’s *d* calculations revealed small to large levels of magnitude in the difference between the means. These results highlight the fact that after a semester of using discussion forums for collaborating on tutorial assignments, more students a) readily agreed that their relationships with the other discussion group members was ‘business like’ and impersonal (Pair 1); and b) preferred the traditional face-to-face tutorial discussion format for ‘learning more’ (Pair 2); and c) ‘remembering more’ (Pair 3).

5.10 Survey I and Survey II –Factor Analysis of Paired MCQs

As in sections 5.4 and 5.7, a factor analysis was conducted in order to examine the relationships between the survey MCQs.

Table 5.9: Paired MCQs Total Variance Explained (Eigenvalues >1)\*

Factor	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	4.05	28.93	28.93	3.53	25.22	25.22	2.11	15.12	15.12
2	1.74	12.43	41.35	1.26	8.97	34.20	1.91	13.65	28.77
3	1.46	10.45	51.80	.95	6.76	40.95	1.51	10.79	39.56
4	1.37	9.79	61.59	.87	6.24	47.19	1.07	7.64	47.19

\* Extraction Method: Principal Axis Factoring

In this section, the paired MCQs described in section 5.9 were examined using the principal axis factoring and as figure 5.9 shows, the analysis revealed that after extraction, four factors accounted for 47% of the total variance. A Varimax rotation with Kaiser normalization showed 15% of the variance in factor one, 14% in factor two, 11% in factor three and 7% in factor four.

### 5.10.1 Interpreting factors

The constructs in the Survey I and Survey II paired MCQs can be expressed as follows:

- Survey I Question 5 & Survey II Question 3 (1SQ5 & 2SQ3)
  - clearly understanding what discussion forum group members wrote
- Survey I Question 6 & Survey II Question 4 (1SQ4 & 2SQ4)
  - difficulty expressing oneself clearly in discussion forums
- Survey I Question 11 & Survey II Question 8 (1SQ11 & 2SQ8)
  - trusting discussion forum group members
- Survey I Question 13 & Survey II Question 11 (1SQ13 & 2SQ11)
  - feeling insecure about expressing one's opinions in discussion forums
- Survey I Question 15 & Survey II Question 14 (1SQ15 & 2SQ14)
  - believing that relationships in discussion forum groups are impersonal
- Survey I Question 17 & Survey II Question 17 (1SQ17 & 2SQ17)
  - believing that one learns more through participating in discussion forums
  - believing that one learns more through attending face-to-face tutorials
- Survey I Question 19 & Survey II Question 18 (1SQ19 & 2SQ18)
  - believing that one remembers more through participating in discussion forums
  - believing that one remembers more through attending face-to-face tutorials

**Table 5.10: Paired MCQs Rotated Factor Matrix - Principal Axis Factoring with Varimax Rotation\***

	<b>Factor 1</b>	<b>Factor 2</b>	<b>Factor 3</b>	<b>Factor 4</b>
Survey I Ques.5 (1SQ5)	-.42	-.04	.49	-.13
Survey II Ques.3 (2SQ3)	-.38	-.13	.574	.07
Survey I Ques.6 (1SQ6)	.73	-.06	-.24	-.06
Survey II Ques.4 (2SQ4)	.60	.14	-.19	.05
Survey I Ques.11 (1SQ11)	-.10	-.18	.31	-.15
Survey II Ques.8 (2SQ8)	<.000	-.14	.71	.00
Survey I Ques.13 (1SQ13)	.62	.24	-.01	.15
Survey II Ques.11 (2SQ11)	.64	.25	-.02	.06
Survey I Ques.15 (1SQ15)	.15	.27	.08	.64
Survey II Ques.14 (2SQ14)	-.01	-.06	-.16	.71
Survey I Ques.17 (1SQ17)	-.24	-.57	-.08	-.03



Survey II Ques.17 (2SQ17)	.13	.69	-.21	.14
Survey I Ques.19 (1SQ19)	-.11	-.71	.22	.05
Survey II Ques.18 (2SQ18)	.04	.56	-.36	.23

\* Rotation converged in 6 iterations.

As table 5.10 and figure 5.34 show, in factor one, difficulty expressing oneself clearly in discussion forums (1SQ6=.73; 2SQ4=.60) and feeling insecure about expressing one’s opinions in discussion forums (1SQ13=.62; 2SQ11=.64) had the highest loading, while understanding clearly what the discussion forum group members wrote (1SQ5=-.42; 2SQ3=-.38) had the lowest.

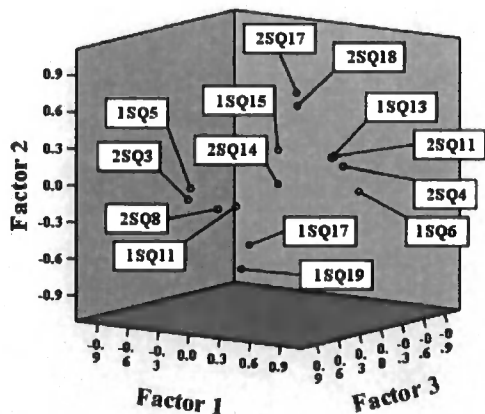


Figure 5.34: Paired MCQs Factor Plot in Rotated Factor Space

Hence, this factor, much like factor two in the Survey I MCQ factor analysis and factor 3 in the Survey II MCQ factor analysis, focuses on the inability to work effectively in the discussion forum environment due to difficulties in using the online forum as a medium of communication and a lack of self-confidence. A Cronbach’s Alpha calculation of  $\alpha = .76$  further confirmed that questions 6 and 13 of Survey I and questions 4 and 11 of Survey II were a measure of the same construct.

The second factor points to the belief that one learns more (1SQ17=-.57) and remembers more (1SQ19=-.71) from participation in discussion forums, as opposed to the belief that one learns more (2SQ17=.96) and remembers more (2SQ18=.56) from attending traditional face-to-face tutorials. This factor shows a clear split between the perceived educational effectiveness of the discussion forum format as opposed to the traditional face-to-face tutorial discussion format.

In factor three, trusting discussion forum group members (1SQ11=.31; 2SQ8=.71) and clearly understanding what discussion forum group members write (1SQ5=.49;

2SQ3=.57) were opposed by the belief that one learns more (2SQ17=-.21) and remembers more (2SQ18=-.36) from the traditional face-to-face tutorials. Hence, this factor, much like factor two in the Survey II MCQ factor analysis, highlights the association between trust and understanding how to use the online forum as a medium of communication, and feelings of satisfaction/dissatisfaction about working in the discussion forum format. A Cronbach's Alpha calculation of  $\alpha = .65$  further confirmed that questions 5 and 11 of Survey I, and questions 3 and 8 of Survey II, were a measure of the same construct.

Lastly, factor four shows that the belief that relationships in discussion forum groups were impersonal (1SQ15=.64; 2SQ14=.71) was at opposites with clearly understanding what discussion forum group members wrote (1SQ5=-.13; 2SQ3=.07) and trusting the discussion forum group members (1SQ11=-.15; 2SQ8=.001). Here, the factor construct focuses on the link between the nature of human relationships (impersonal/trusting) and the effectiveness online of communication.

## 5.11 Summary

The data presented this chapter explored the findings from the Survey I and Survey II MCQ responses. The within-survey associations were examined using Pearson correlation and factor analysis calculations, and the between-survey associations were examined using paired samples correlations, t-tests and effect size calculations.

In Survey I, descriptive statistics showed that early in the semester, many of the 157 respondents were dissatisfied with their participation in discussion forums.

- 15% said they had difficulty understanding discussion forum postings
- 20% said they had difficulty expressing themselves clearly in postings
- 22% said they had not contributed as many opinions
- 8% said they had not spent more time gathering information
- 20% said they did not trust the other group members to be conscientious
- 16% said they felt insecure about expressing their opinions online
- 60% said that their relationships with the other group members were impersonal
- 30% believed they learned more in the face-to-face tutorial discussions
- 36% believed they remembered more from face-to-face tutorial discussions

Pearson correlations calculations on Survey I MCQs revealed small to moderate correlations, and a factor analysis showed that two factors accounted for 34% of the total variance. The first factor contrasts the belief that one learns more, remembers more, contributes more, and works more through participation in discussion forums, as opposed to feelings of insecurity in expressing one's opinion in discussion forums and perceptions of impersonal relationships with other discussion forum team members. The second factor highlights the relationship between clearly the understanding discussion forum postings contents and having difficulty in expressing oneself in the discussion forums.

In Survey II, descriptive statistics showed that by the end of the semester, many of the 132 respondents were still dissatisfied with their participation in discussion forums.

- 7% still had difficulty understanding discussion forum postings
- 17% still had difficulty expressing themselves clearly in postings
- 5% felt the discussion forums had gone off topic
- 35% said they preferred the traditional face-to-face tutorial discussions
- 17% still did not trust the other group members to be conscientious
- 10% still felt insecure about expressing their opinions online
- 71% still felt that their relationships with other group members were impersonal
- 44% believed they had learned more in the face-to-face tutorial discussions
- 62.1% believed they remembered more from the face-to-face tutorial discussions

However, the peer learning and peer assessment aspects of the discussion forum format were nevertheless well received: 75% of the respondents said they had learned more by collaborating within a group rather than working alone, while only 5% disagreed; 73% of the respondents thought that reviewing the assignments from other students was a good learning experience, while only 5% did not.

Pearson correlations calculations on Survey II MCQs revealed small to large correlations, and a factor analysis showed that three factors accounted for 38.9% of the total variance. The first factor points to the ability to work effectively in the discussion forum environment. Clearly understanding what discussion forum group members write had the highest loading, while difficulty expressing oneself clearly in discussion forums had the lowest. The second factor focuses on an attitude of self-confidence towards

participating in discussion forum group work, while the third factor centres on the lack of confidence and the difficulty that students have in expressing their opinions in discussion forums. Here, the greatest load factor points to an inability to work effectively in the discussion forum environment due to poor online communication skills and the lack of self-confidence.

Survey I and Survey II had a number of paired questions and these were examined for changes in attitudes. The data showed that by the end of the semester more students trusted their discussion forum group members to be conscientious and fewer students felt insecure about expressing their opinions in the discussion forums. However, more students felt that their relationship with the other group members were impersonal, and substantially more students believed that they had learned more and remembered more about a tutorial topic through the traditional face-to-face tutorial discussions.

Correlations of the paired questions revealed moderate to large associations. T-tests showed a significant difference between the means for three of the pairs, and the effect size calculations indicated a small level of magnitude for two of the pairs and a large level of magnitude for the other. Hence, after a semester of using discussion forums for collaborating on tutorial assignments, the data indicates that students more readily agreed that their relationships with the other discussion group members were impersonal, believed that the traditional face-to-face tutorial discussion format was more conducive to learning, and strongly believed that the traditional face-to-face tutorial discussion format was better for increasing recall.

The paired questions data was also submitted to a factor analysis and the results showed that 4 factors accounted for 47.2% of the total variance. The relationships that were identified included:

- the inability to work effectively in the discussion forum environment due to difficulties in using the online forum as a medium of communication and a lack of self-confidence (Factor 1)
- the split between the perceived educational effectiveness of the discussion forum format as opposed to the traditional face-to-face tutorial discussion format (Factor 2)

- the association between trust and understanding how to use the online forum as a medium of communication, and feelings of satisfaction/dissatisfaction about working in the discussion forum format (Factor 3)
- the link between the nature of human relationships (impersonal/trusting) and the effectiveness of online communication (Factor 4)

In both Survey I and Survey II, open-ended type questions were designed to delve more deeply into the issues raised by some of the Likert response type questions that were examined in this chapter. In the next chapter, the data from these open-ended survey questions is presented and analysed. Other qualitative data about student attitudes was gathered through audio taped interviews at the end of the semester and the transcripts and notes from these interviews are also discussed.

## **Chapter 6**

### **OPEN-ENDED SURVEY QUESTIONS AND INTERVIEWS**

#### **6.1 Overview**

In this chapter the qualitative data from the two online survey questionnaires administered during the semester and the end-of-semester interviews are examined. As discussed in section 3.5, the questions in Survey I and II were designed to investigate student's attitudes towards using online discussion forums, and to explore their impressions about the quality and value of communicating online, the relationships in discussion forums and the effectiveness of online peer collaboration. In both surveys, some of the Likert response type questions were followed by an open-ended type question that was designed to probe more deeply into the issue(s) raised by the question that preceded it. See appendix B for a copy of Survey I and appendix C for a copy of Survey II.

These open answers were collated and categorized to reflect the key concepts under which they could be grouped. Because the student answers were coded by the author, two other coders were recruited to participate in an inter-rater reliability check. To help clarify the coding, examples of student answers are presented. See appendix D for the transcripts of the answers to the open-ended questions.

Other qualitative data on student attitudes was gathered through audio taped interviews at the end of the semester. Students from the top 20 and bottom 20 of the peer assessment ranking were invited to give details of their experiences in using discussion forums for the course tutorial assignments, and 8 students from the top ranking group and 9 students from the bottom ranking group accepted the invitation. Due to the poor sound quality of the recording and the poor enunciation of English from some of the students, transcribing the audio tapes of the sessions was very difficult. However, notes were also taken during the interviews and along with the usable recordings, these were used to summarise the information gained from the interviews. See appendix E for the transcripts of the interviews.

## 6.2 Coding and Rater Reliability

A survey can make use of open-ended questions in order to gather more subjective information when exploring complex issues that cannot be adequately expressed with pre-scripted objective responses (Carey, 1994). This is especially relevant when eliciting comments relating to an individual's own experience and point of view.

Many researchers (Barrett, 2001; Bernard, 1994; Burke & Dunlap, 2002; Carey, 1994, 1995; Cohen, 1960, 1968; Glass & Hopkins, 1996; Hayes & Hatch, 1999; Hopkins, 1998; Landis & Koch, 1977; Miles & Huberman, 1994; Stemler, 2001, 2004) have described systematic methods for analyzing written narratives such as those gathered in Survey I and Survey II of this study. Their recommendations include coding the qualitative data by assigning specific labels or concise descriptive classifications to represent qualitatively different ideas, and then using these codes as a scoring rubric to enable different raters to classify the data. Thus, the reliability of the coding can be determined by the level of agreement or consensus between the raters.

As pointed out by Stemler (2004), good thematic categories are important in setting up nominal data for consensus estimates. Hence, answers to the open-ended questions from Survey I and Survey II were first reviewed and a set of codes that reflected a reference to, or an expression of, shared perspectives was developed. These codes were short descriptive labels that were seen as expressing, in general terms, what students had stated as specific occurrences.

### 6.2.1 Survey I and Survey II response codes

In both surveys, several Likert response type questions were followed by an open-ended type question. These open-ended questions were designed to identify the reasons or perspectives associated with the Likert scale response. While there were only 12 open-ended questions, 8 in Survey I and 4 in Survey II, the questions in both surveys addressed a wide range of issues. In total, these open-ended questions generated 327 responses.

These responses were collated and reviewed, and the reasons for supporting a particular perspective were assigned to 1 of 2 categories: Category A, indicating support for the

online discussion forum format, and Category B, indicating support for the face-to-face tutorial discussions. The category titles for each question are presented in table 6.1.

**Table 6.1:** Open-ended question responses - Category A & Category B

Question	Answer Category A	Answer Category B
Survey I Question 8	More opinions online	Fewer opinions online
Survey I Question 10	More preparation for online	Less preparation for online
Survey I Question 12	Feel trust online	Feel distrust online
Survey I Question 14	Feel confident online	Feel insecure online
Survey I Question 16	Personal relationships online	Impersonal relationships online
Survey I Question 18	Learn more online	Learn more face-to-face
Survey I Question 20	Remember more online	Remember more face-to-face
Survey I Question 22	Like peer collaboration	Dislike peer collaboration
Survey II Question 7	Prefer online	Prefer face-to-face
Survey II Question 10	Increase in trust online	Decrease in trust online
Survey II Question 13	Increase in confidence online	Decrease in confidence online
Survey II Question 16	Better relationships online	Worse relationships online

The student answers were coded using descriptors which encapsulated the statements that conveyed some support for either the online discussion forum format or the traditional face-to-face tutorial discussion format. The author, in consultation with Ms Lisa-Angelique Lim and Mr Emil Cheong Shen-Li, research assistants in the publications section of the university teaching and learning centre, developed the 54 descriptors (codes) that are presented in the frequency tables throughout sections 6.3 and 6.4.

### 6.2.2 Inter-rater reliability

The objective of inter-rater reliability testing is to verify that different observers share a common interpretation of a construct. Raters are expected to be in agreement as to how the various levels of a scoring rubric are to be applied to the freely expressed explanations of personal attitudes and behaviours. As pointed out by Stemler (2004), when trying to establish whether raters have reached an appropriate level of consensus in the interpretation of a nominal scale, a percentage based on the frequency of agreements can be applied.

After an initial review of the data and the development of the coding descriptors, the author coded all of the responses. Subsequently, Ms. Lim and Mr. Shen-Li, were recruited to apply the codes to a 20% sample of the responses, however, before



beginning their rating task, they were consulted on the appropriateness of the codes used. For the most part, the two raters were in agreement with the original coding descriptors, but after some debate, some changes in the wording of a few descriptors were made for the sake of clarity. After the author made the requested changes, Ms. Lim and Mr. Shen-Li each rated a 10 % sample from each question. Hence, 20% of the answers were rated a second time.

**Table 6.2: Answers to Open-ended Question– Rater Scores**

Question	Rater A	%	Rater B	%	Total	%
Survey I Question 8	21 of 23	91%	21 of 23	91%	42 of 46	91%
Survey I Question 10	13 of 15	86%	13 of 14	93%	26 of 29	90%
Survey I Question 12	12 of 14	86%	12 of 13	92%	24 of 27	88%
Survey I Question 14	14 of 14	100%	12 of 13	92%	26 of 27	96%
Survey I Question 16	16 of 17	94%	15 of 15	100%	31 of 32	97%
Survey I Question 18	19 of 20	95%	16 of 16	100%	25 of 26	96%
Survey I Question 20	13 of 14	93%	13 of 15	86%	26 of 29	90%
Survey I Question 22	16 of 17	94%	12 of 13	92%	28 of 30	93%
Survey II Question 7	15 of 16	94%	13 of 15	86%	28 of 31	90%
Survey II Question 10	5 of 5	100%	4 of 4	100%	9 of 9	100%
Survey II Question 13	3 of 3	100%	3 of 3	100%	6 of 6	100%
Survey II Question 16	3 of 3	100%	3 of 3	100%	6 of 6	100%
Totals	149 of 161	93%	137 of 147	93%	286 of 308	93%

Table 6.2 presents the rater scores on each question and their totals. For example in Survey I Question 8, Rater A and Rater B each rated an independent sample of 23 answers and their ratings concurred with the author’s in 91% of the cases. In total, Rater A and Rater B were both in agreement with the original rating by the author in 93% of the statements they reviewed. This level of rater consensus is considered very high (Stemler, 2004).

### 6.3 Survey I - Descriptive Statistics for Open-Ended Questions

Answers to questions 8, 10, 12, 14, 16, 18, 20 and 22 in Survey I were categorized and coded. In this section, each question is examined, and the frequency distribution of the codes and examples of the student responses are presented.

#### 6.3.1 Why have you contributed more or fewer opinions?

In question 8 from Survey I, students were asked to explain why they had contributed either more or fewer opinions when using the online discussion forums. The total

number of students who submitted an answer was 102, and as table 6.3 shows, the answers generated 110 statements with a reason for having contributed more opinions and 50 statements with a reason for having contributed fewer opinions.

**Table 6.3:** Survey I - Question #8 - Code Frequency Distribution

Reasons stated for contributing more/fewer opinions in online discussions vs. face-to-face.				
Rank	Contributing more opinions	Freq.	Contributing fewer opinions	Freq.
1	More time	44	Inefficient	21
2	Reduced fear	24	Too much work	8
3	More flexibility	23	Poor writing skills	8
4	Work was graded	10	Not motivated	6
5	No interruptions	4	Impersonal relationships	6
6	Prefer writing	3	Dislike computers	1
7	Motivated	2		
	<b>Total</b>	<b>110</b>	<b>Total</b>	<b>50</b>

As the top ranking reason for having contributed more opinions, students said that online discussions allowed them more time to work on formulating an answer (44 statements). For example one student wrote: “... because there is more time to look for research and think through ideas given by others.”, and another student explained: “I have time to organize my thoughts and to look up for more materials to substantiate my points”.

For some students, online discussions were less stressful than face-to-face discussions (24 statements). Of those who expressed a fear of speaking up in the face-to-face context, some believed that online discussions saved them from embarrassment. One student wrote: “In the case of face-to-face discussions, I am afraid that I would stutter while contributing.”, and another student explained that they had: “... a slight phobia in bringing up ideas in front of strangers so IVLE (online) discussions can spare me from such agony”.

While some students pointed to the flexibility and convenience of online access for submitting work (23 statements), others believed that they contributed more opinions because the work was graded (10 statements), or that they could express themselves without interruptions (4 statements). A small number of statements indicated that some students preferred writing about issues as opposed to talking about them (3 statements), while for some, participating in the online discussions was in itself a motivation to contribute more (2 statements).

The top ranking reason for having contributed fewer opinions was that online discussions seemed to interrupt the flow of ideas (21 statements). One student wrote, “It is hard to know where the direction of the discussion is. Many times there doesn't seem to be a direction to where the discussion is heading.”, and another student explained, “The time lag between posts and replies is a bit too long and the flow of thought is thus interrupted”.

Other reasons for contributing fewer opinions included complaints that working online was too much work (8 statements) and that writing was not the preferred mode of communication (8 statements). Finally, while some students believed that the online discussions negatively affected their motivation (6 statements) and others were uncomfortable with its impersonal nature (6 statements), one statement pointed to a resistance in adopting information technology in general. That student wrote, “...because it's online and I hate to use the computer”.

### 6.3.2 Why have you spent more time or less time gathering information?

In question 10 from Survey I, students were asked to explain why they had spent either more or less time gathering information on the tutorial topic. Ninety students submitted an answer, and as table 6.4 shows, these answers generated 80 statements with a reason for having spent more time gathering information, and 11 statements with a reason for having spent less time.

**Table 6.4:** Survey I - Question #10 - Code Frequency Distribution

Reasons stated for spending more/less time gathering information for online discussions.				
Rank	Spending more time	Freq.	Spending less time	Freq.
1	Peer pressure/accountability	36	Not accountable	4
2	More flexibility	20	Others did the work	3
3	Work was graded	10	Copied from web sites	2
4	Motivating	10	Procrastination	1
5	Easy access to web info	4	Impersonal relationships	1
Total		80	Total	11

Interestingly, the top ranking reason stated for having spent more time gathering information was that the students felt pressured to produce quality postings (36 statements). One student wrote, “... because everybody else contributes a fair amount to the forum therefore there is peer pressure to keep up”, another student explained, “I do

not want to be seen as a member who contributes low quality ideas”, and one student, being more self-conscious wrote, “...because my answers are written down, I feel they have to be more presentable”.

Having a more flexible time schedule was the second ranking reason for spending more time gathering information (20 statements). One student wrote, “Because the discussion is held over a week, it allows more time for individuals to collect information”. Other reasons included references to the work being graded (10 statements), that the work in itself was motivating (10 statements), while for some, the fact that they were already logged onto the web was an incentive to take more time to gather information (4 statements).

The top ranking reason for spending less time gathering information was that some students felt they were working in an impersonal environment and were therefore not part of, or accountable to, the team (4 statements). One student wrote, “I think because of the fact that I don't see the other members, I don't feel as accountable for providing extra information”, and another student explained, “I spent less time because I have less obligations to the group”.

Some students said that they let others do the work (3 statements), and as one student said, “... others are doing the research and contributing what I wanna say”. Finally, while some students said that they just copied and pasted from web sites (2 statements), the lack of time management skills and a dissatisfaction with the impersonal nature of the online discussions were also stated as reasons for spending less time gathering information for the online discussions (1 statement each).

### 6.3.3 Why do you feel that you can trust or not trust the other group members?

In question 12 from Survey I, students were asked to explain why they trusted, or did not trust, their group members to make good contributions to the discussions. Fifty-five students submitted an answer, and as table 6.5 shows, these answers generated 47 statements with a reason for trusting, and 12 statements with a reason for not trusting their group members.

**Table 6.5:** Survey I - Question #12 Frequency Distribution

Reasons stated for feeling trust/distrust of online discussion group members.				
Rank	Feel trust	Freq.	Feel distrust	Freq.
1	Work was graded	27	Unreliable group members	8
2	Responsible to group members	12	Impersonal relationships	4
3	Peer pressure/accountability	8		
Total		47	Total	12

The belief that the weekly grading of contributions to the online discussion would pressure everyone to do their work was the top ranked reason for feeling that group members were trustworthy (27 statements). One student wrote, "... because they too know the leaders will grade them". Other students believed that their group members would be responsible individuals (12 statements), as one student put it, "I think everyone is motivated to learn from each other". Some students quoted peer pressure or accountability (8 statements), and as one student explained, "Because everyone in the group can see each posting made, there is social pressure for each member to perform adequately". Another student commented that, "...because everything is in the open, you can see the amount being contributed by everybody-no shirking of responsibility possible".

Feelings of distrust were expressed by some students who felt that other people were unreliable (8 statements), and as one student wrote, "... because I know that when there is an overload of homework, most will try to take the easiest way out and do the minimal". Others students thought that due to the impersonal relationships they were experiencing, the atmosphere in the online discussions was not conducive to establishing a trusting relationship (4 statements), and as one student complained, "I can't. It's hard because we do not get to interact with the others much and we do not really know each other personally".

#### 6.3.4 Why do you feel confident or insecure about expressing your opinion?

In question 14 from Survey I, students were asked to explain why they felt either insecure or confident about expressing their opinions while working in the discussion forums. Sixty-five students submitted an answer, and as table 6.6 shows, these answers generated 27 statements with a reason for feeling confident, and 22 statements with a reason for feeling insecure.

**Table 6.6:** Survey I - Question #14 Frequency Distribution

Reasons stated for feeling insecure/confident about expressing one's opinion in the online discussions.				
Rank	Feel confident	Freq.	Feel insecure	Freq.
1	Collegial atmosphere	14	Peer pressure/accountability	16
2	Better prepared	11	Lack of immediate feedback	4
3	Prefer writing	2	Feared being ignored	1
4			Poor writing skills	1
Total		27	Total	22

However, regardless of the mode of interaction, whether in face-to-face or online discussions, some students indicated that they were innately self-confident (10 statements). One student wrote, "I never have problems with what I want to say. I don't have that problem in person or on the computer, especially when it comes to academically related topics. Everyone's opinion is a valuable perspective in my opinion, so I am not afraid to say what I think".

Those who indicated that they felt confident about expressing their opinions, most often mentioned the friendly and non-threatening atmosphere of the discussions (14 statements). One student wrote, "The forum allows for all members to air their personal opinions with little or no chance of feeling opposed on a personal level", and another student explained, "It is easier and less pressuring to express opinions without face to face contact as a 'wrong' opinion will not be attacked immediately".

Being better prepared ranked as the second reason that the students felt confident (11 statements), and as one student put it, "Since I make sure that I have relevant materials before I post my opinion, I have more confidence in my opinion". Lastly, a few comments pointed to the fact that some students felt more confident expressing themselves in writing rather than speaking (2 statements).

The most often stated reason for feeling self-conscious about expressing one's opinion was the fact that postings produced a written record and made students feel accountable for what they had said. Hence, writing down their thoughts and opinions for everyone else to see made some students nervous (16 statements). One student wrote, "Because, unlike spoken words which could possibly be forgotten after said, everyone can see the stupid comments that I make simply by referring back to my post. Hence, I feel very insecure as to what judgments people might make of me and my posts.", and another

student explained, “I think it's because in the forum, everything you read is kind of down in black and white. I’m not sure when my words will come back to haunt me”.

Other students felt uncomfortable because the online discussions provided no visual cues or real-time conversation dynamics (4 statements), and as one student said, “There is some insecurity due to the inability to receive direct response from the rest of the group members. Body language cannot be observed, and yet in my opinion, body language sometimes provides information as to whether your opinion is supported or not. Direct feedback is important to me and this lack of instantaneous feedback makes me less confident of expressing myself. I tend to be more careful with my expression as such”.

6.3.5 Why do you feel your relationships with the other group members were either friendly or impersonal?

In question 15 from Survey I, students were asked to explain why they felt that their relationships with other group members in the online discussions were either friendly or impersonal. Seventy-six students submitted an answer, and as table 6.7 shows, these answers generated 19 statements with a reason for feeling that the relationships were friendly and 70 statements with a reason for feeling the relationships were impersonal.

Table 6.7: Survey I - Question #16 Frequency Distribution

Reasons stated for agreeing/disagreeing that relationships within the online discussions were impersonal.				
Rank	Friendly	Freq.	Impersonal	Freq.
1	Collegial	14	Not collegial	52
2	Comfortable	5	Uncomfortable	14
3			Not motivating	4
	Total	19	Total	70

Students who felt that the online discussions were not impersonal expressed a feeling of collegiality about their relationships (14 statements). For example, one student pointed out, “It's cordial and we learn from each other”, and another student was particularly observant and wrote, “Maybe it's just me, but I can somehow see personalization of writing styles that might reflect quite well on the writer himself/herself. If there's personalization, this discussion cannot be said to be impersonal”. Lastly, some students felt that discussion forums were less stressful, and that they were a comfortable atmosphere in which to interact (5 statements).

The top reason for feeling that the relationships were impersonal was that the online environment was not conducive to initiating or supporting any social interactions, and many students felt that the technology acted as a barrier rather than an enabler of social interactions (52 statements). One student wrote, “There is no relationship. We don’t know who the names belong to. All we see are threads of opinions and we’re only responding to that - not having anyone in mind”, and another student explained, “There is not much of a relationship actually. It’s like we are strangers contributing to the discussion. Feelings cannot be conveyed online. I prefer face-to-face discussion where everyone can get to know one another better and this may help towards contributing to the discussion”.

Other students just felt uncomfortable (14 statements). As one student put it, “I don’t like not having a face to put with a name. I am still not familiar with differentiating these people, and I think it hinders the comfort level a bit when the human contact is removed. I feel like I’m more having a conversation with my computer than other human beings sometimes”. Other students indicated that the impersonal nature of the online discussions had a negative impact on their enthusiasm and motivation (4 statements), and as one student complained, “I feel less capable of posting good opinions as compared to others and this can act as a self fulfilling prophecy when phrasing my post”.

### 6.3.6 Why do you believe that you learn more from either participating in the discussion forums or attending face-to-face tutorial discussions?

In question 18 from Survey I, students were asked to explain why they believed they had learned more about the tutorial topics from their participation in either the online discussions or the traditional face-to-face tutorial sessions.

**Table 6.8: Survey I - Question #18 Frequency Distribution**

Reasons stated for learning more from online/face-to-face tutorial discussions.				
Rank	Learn more online	Freq.	Learn more face-to-face	Freq.
1	More time	15	Easier to follow	17
2	More people contributed	9	Tutor is available	13
3	Encourages reflection	8	Efficient	12
4	Peer pressure/accountability	7	Effective	5
5	Easier to follow	5	More personal	3
Total		44	Total	50



Seventy-eight students submitted an answer, and as table 6.8 shows, these answers generated 44 statements with a reason for “learning more” from in the discussion forum format, and 50 statements with a reason for “learning more” through traditional face-to-face tutorial sessions.

As the number one reason for believing they had learned more from participating in the online discussions, students said that the online access gave them greater flexibility with managing their time (15 statements). For some students this meant that they could spend more time researching and discussing the assignments: hence “learning more”. One student wrote, “Given the opportunity to do research online and not just reading from materials recommended has indeed helped widen the scope of my understanding of certain aspects in the various topics”.

Others students noted that having many people expressing various perspectives was very helpful (9 statements), and as one student pointed out, “I think I learn more from participating in the IVLE discussion forum because everyone has so many fresh and interesting perspectives on the issues at hand. Indeed, making discussions 'online' seems to encourage people to speak up. As people speak up more, the more perspectives one gets, and the more you'll learn”.

Some students enjoyed the opportunity to reflect (8 statements), and as one student explained, “I can take my time to think through the issues. In "normal" tutorials, there is not much time for me to delve into my thoughts”. Accountability and peer pressure (7 statements) were also mentioned, and as one student said, “More homework and research is done before posting and since the full name is used, you have an identity in the forum. What you say is what people think of you”.

Rounding out the category, a few comments mentioned that information submitted for online discussions was better organized and easier to follow (5 statements), and as one student explained, “Information is a little more coherent in the IVLE discussion forum. Perhaps this has to do with the difference between how people write vs. how they speak to convey the same message. Namely, I suspect that people are a little more formal and careful with grammar and clarity when writing than when speaking”.

Those students who believed that the traditional face-to-face tutorials were more conducive to learning said that real-time interaction was easier to follow (17 statements), and as one student wrote, “Face-to-face discussions generate more responses and it can be a two-way discussion unlike online discussion”, and another pointed out that, “Discussing points seem more tiring as one has to wait for the person to come online, and answer whatever question one may pose, whereas in face to face discussions, discussion is instantaneous”. Some students felt reassured that in face-to-face tutorials the tutor could be relied upon for guidance (13 statements), and as one student put it, “In a face-to-face discussion, I’m able to clear and clarify any doubts there and then, and am able to ask questions directly and immediately to the tutor/lecturer”.

Some students thought the traditional face-to-face tutorial discussions were a more efficient way to learn (12 statements), and as one student wrote, “In the face-to-face discussion format, ideas and thoughts are conveyed more accurately and easily. Group members can brainstorm together, throw out ideas during discussion time where everyone is gathered together”. Other students believed they ‘learned more’ from the traditional face-to-face tutorial discussions because it was a more effective way to learn (5 statements). For example, as some people rely on non-verbal cues for conveying meaning, one student pointed out that “... nonverbal communication is also very important, such as facial and hand gestures. From there, it is easier to understand what the others are trying to say”, and another student mentioned learning preferences, saying that they preferred “... to learn by listening instead of reading”.

Lastly, a few statements stressed the importance of physical proximity as being a catalyst for learning through friendship-building (3 statements), and as one student explained, “I believe that a face to face thing works out better as stronger ties are created and such people put in more effort”.

#### 6.3.7 Why do you believe that you remember more from either participating in the discussion forums or from attending the face-to-face tutorial discussions?

In question 20 from Survey I, students were asked to explain why they believed they had remembered more about tutorial topics from either participating in the online discussions, or from attending traditional face-to-face tutorial sessions. Seventy students submitted an answer, and as table 6.9 shows, these answers generated 36 statements

with a reason for ‘remembering more’ from the discussion forum format, and 30 statements with a reason for ‘remembering more’ through the traditional face-to-face tutorial sessions.

**Table 6.9: Survey I - Question #20 Frequency Distribution**

Reasons stated for remembering more from online/face-to-face tutorial discussions.				
Rank	Remember more online	Freq.	Remember more face-to-face	Freq.
1	Encourages reflection	16	Efficient	17
2	Transcript useful/ convenient	11	More personal	9
3	Work was graded	5	Effective	4
4	Prefer writing/ reading	4		
Total		36	Total	30

Students said they remembered more from participating in the online discussions because they believed it encouraged deeper and longer reflection on the topics (16 statements), and as one student wrote, “We work at the topic for about a week and we discuss more and we are forced to think more and in greater depth even when not writing any comments”, and another student echoed, “Posting a contribution requires actually reading and understanding the topic. Forums follow on each other's heels and materials in one forum are often relevant to another, which helps integrating what I've learned and making associations. Besides, contributions may overlap and repeat stuff that are remembered through sheer repetition”.

Others students said that having a written record was useful and convenient (11 statements), and as one student explained, “I can print out the discussions and use it as additional information”, and another student said, “Perhaps because the ideas can easily be revisited”. Because the group leaders rated the group members based on their contributions to the online discussions, and that this rating made up 10% of the course CA grade, some students saw active participation as mandatory (5 statements), and as one student commented, “IVLE discussion makes sure you must type something in to contribute and that leaves a greater impression. Sometimes in face to face discussions, some people don't even speak at all”.

Some students indicated that they preferred writing and reading over speaking and listening (4 statements), and as one student explained, “... because remembering what I read is easier than remembering what I've heard”, while another student’s comment pointed to a learning style preference, saying that better recall was “... mostly due to the

visual stimulus. Such as seeing some author's name, or some figures on screen tends to remain in my mind longer than just listening to someone say the name or figure verbally in tutorial class”.

The top reason for believing that they remembered more from attending traditional face-to-face tutorial discussions was that the real-time discussions were more efficient (17 statements). For example, one student commented, “I believe that the voice and facial expressions that go into talking to other people play a big part in my memory. I’m a visual learner, and so I remember things much better if they are tied with a sight and even better with a sound”. Other students said that they remembered more through interacting directly with people (9 statements), and one student wrote, “Having a face to face format allows us to remember more since we would actually be in the learning situation ourselves... the discussion forum is rather detached and machine like.”.

Lastly, some students mentioned that attending traditional face-to-face tutorial discussions was a more effective way to ‘remember’ (4 statements), as one student explained, “...face to face enables me to remember more clearly the topics we have discussed. It makes a better impression”, and another student wrote, “... there're some things/comments so strong when said that it will be hard to forget.”

6.3.8 Why do you believe that playing the role of a member of a team of ‘consultants’ is either a good or a bad strategy for learning?

In question 22 from Survey I, students were asked to explain why they believed that working as of a member of a team was either a good or a bad strategy for learning. Eighty-one students submitted an answer, and as table 6.10 shows, these answers generated 61 statements with a reason for considering collaboration as a good method for learning, and 13 statements with a reason for not favouring a collaborative approach.

Table 6.10: Survey I - Question #22 Frequency Distribution

Reasons stated for considering the peer collaboration activity as a good/bad strategy for learning.				
Rank	Consider it a good strategy	Freq.	Consider it a bad strategy	Freq.
1	Practical	21	Ineffective	7
2	Motivating	18	Feel peers not qualified	3
3	Encourages reflection	17	Unreliable group members	2
4	Better organized	5	Impersonal	1
Total		61	Total	13

The most often stated reason for believing that peer collaboration was a good learning strategy was that it seemed practical (21 statements), as one student wrote, "... everyone contributes and more information is pooled together. Also more views are aired and more exposure is gained". Other students thought collaboration was a positive motivational factor (18 statements), and as one student explained, "... such a role enables one to assume some amount of responsibility for the information posted online, (and) hence we are more likely to look for credible sources of information".

Some students pointed out that collaboration encouraged reflection (17 statements). For example, one student wrote, "I think it is a good strategy because you get to hear other people's opinions and their reactions to yours. This enables one to clarify doubts and rethink one's stand", and another student commented that, "It makes me think more creatively and out of the text". Also, some students said they were better organised due to collaborating with others (5 statements).

Those students who said that collaborating with others in a team was a poor strategy for learning considered collaboration to be ineffective (7 statements), as one student explained, "People usually put up the same materials, it's boring when you are the leader and you got much more info from them. Especially when they just summarize the points from articles you have read and (are) not providing fresh ideas". Other students felt that their peers were not qualified (7 statements), and as one student put it "I don't feel that we have enough background on the topics to contribute substantially". Lastly, some students felt that their team members had not taken the role seriously (2 statements), and one student mentioned that this type of online collaboration was "very impersonal".

#### **6.4 Survey II - Descriptive Statistics for Open-Ended Questions**

Answers to questions 7, 10, 13 and 16 were categorized and coded. As in the previous section, each question is examined, and the frequency distribution of the codes and examples of the student responses are presented.

6.4.1 For collaborating on tutorial assignment papers, list your reasons for preferring one format over the other.

In question 7 from Survey II, students were asked to explain why they preferred one discussion format over the other for collaborating on tutorial assignment papers.

Seventy-one students submitted an answer, and as table 6.11 shows, these answers generated 27 statements with a reason for preferring the online discussion forum format, and 44 statements with a reason for favouring the traditional face-to-face tutorial discussion format.

**Table 6.11: Survey II Question #7 Frequency Distribution**

Reasons stated for preferring online/face-to-face.				
Rank	Prefer online	Freq.	Prefer face-to-face	Freq.
1	Efficient	14	Efficient	17
2	Effective	6	Effective	15
3	More comfortable	6	More personal	10
4	Peer pressure/accountability	1	Tutor is available	1
Total		27	Total	44

Students who favoured the online discussion forums claimed that this format was a more efficient (14 statements) and more effective (6 statements) way to work. One student explained, “During face to face discussion, it may be harder to note down what each member is saying. It is different in the case of the IVLE discussion format as everything is noted in words, and I can refer to them when needed”, and another student noted that, “The points are written down clearly... easier to refer to when writing a paper. All contributions made are clear and visible... won’t lose any information”.

Other students who preferred the online discussion format felt that it was a more comfortable environment to work in (6 statements), as one student explained, “... because it is with people that I am not familiar with, (that) I would prefer an IVLE format. This is because I would feel uneasy and embarrassed (in a face-to-face setting)”. One student pointed out that group members were held accountable for their contributions, commenting that, “... everyone's contribution is apparent to the rest”.

Interestingly, the reasons stated for preferring the traditional face-to-face tutorial discussion format were very similar to those stated for the online discussion format. The top two ranking reasons that students cited for preferring a face-to-face tutorial discussion were that it was a more efficient (17 statements), as well as a more effective (15 statements), way to work. For example, one student said that in face-to-face tutorial discussions it was, “... easier and faster to clear any misunderstandings or to explain things that we're not clear about”, and another student commented that it was, “... easier and more efficient to sort out disagreements, ideas etc”.

As already noted, some students preferred the face-to-face format because it was a more personal and comfortable environment in which to work (10 statements), and as one student wrote, “It is more personal; one latent function of group work is to know your group mates better and what better than face-to-face”. Finally, one student noted that the instructor was present in the traditional face-to-face tutorial discussions and that this “guidance” was sorely lacking in the online format.

6.4.2 If your trust in your group members has changed, list your reasons.

In question 10 from Survey II, students were asked to explain why trusting their group members to provide good contributions had changed during the semester. Twenty-six students submitted an answer, and as table 6.12 shows, these answers generated 11 statements with a reason for having experienced an increase in trust, and 14 statements with a reason for having experienced a decrease in trust.

**Table 6.12:** Survey II Question #10 Frequency Distribution

Reasons stated for increasing/decreasing trust towards other group members.				
Rank	Increase in trust	Freq.	Decrease in trust	Freq.
1	High quality postings	5	Fewer contributions	7
2	Increased enthusiasm	3	Low quality postings	4
3	Continued commitment	3	Unreliable group members	3
Total		11	Total	14

The high quality of contributions made by others ranked as the top reason for an increase in trust (5 statements). One student wrote, “They made very long and good comments which sometimes impressed me”. Other students mentioned the level of enthusiasm in the group (3 statements), and as one student commented, “I did not expect my group members to be so enthusiastic in the forum”.

Some students were amazed by the continued commitment of their team members (3 statements), for example one student noted that, “At first, I was sceptical about the amount of effort my group mates would put in, as everyone was anonymous and no one could hold them accountable for the quality of their work face-to-face. However, from the first post onwards, I found my group mates very involved and committed, thus I changed my opinion of the online discussion format very quickly”.

Students who were disappointed with their team mates said that there had been a decrease in the number of postings as the semester progressed (7 statements), and one student complained that, “Some have been very diligent in posting comments in the beginning but as the semester comes to an end, the same people do not contribute anymore. A bit unfair to those whose discussion topics and position papers have to be written towards the end of semester”.

Other students noted a decrease in the quality of what was being posted (4 statements), as one student put it “... people tend to cut and paste from websites with no personal opinions. The postings also tend to cluster around the day before the forum closes hence no time to verify info and further discussion”. Lastly, some students felt disappointed because some group members did not pull their weight (3 statements), as one student wrote, “There is always bound to be someone who does not contribute anything and I consider this to be irresponsible”.

6.4.3 If your confidence has changed, list your reasons.

In question 13 from Survey II, students were asked to explain why their confidence in expressing their opinions in discussion forums had changed during the semester. Eighteen students submitted an answer, and as table 6.13 shows, these answers generated 15 statements with a reason for having experienced an increase in confidence, and 2 statements with a reason for having experienced a decrease in confidence.

Table 6.13: Survey II Question #13 Frequency Distribution

Reasons stated for increasing/decreasing confidence in expressing one's opinion.				
Rank	Increase in confidence	Freq.	Decrease in confidence	Freq.
1	Better relationships	11	Unreliable group members	1
2	More familiar with the format	3	Others did the work	1
3	More time	1		
Total		15	Total	2

The top ranking reason for an increase in confidence in expressing one’s opinion in discussion forums was due to having better relationships with the other group members (11 statements), as one student put it, “Initially I was quite apprehensive, but after a few sessions, I learnt that I could just voice my opinions and people would support. Made my learning more active than before...”. Other students became more familiar with the enabling technology and its features (3 statements), and one student explained, “I have gotten used to the format of discussion and as I'm better able to adapt to this new



technology, it has been easier to contribute info so I'm more confident in expressing myself".

Only 2 students commented on why they had become more self-conscience or insecure. One student complained about being rebuked by insensitive group members, "I was chastised somewhere along the way by a few forumers who pointed out my suggestions were not practical. I kinda felt useless and definitely had the queasy feeling of inadequacy. After which, I practiced more caution in making my comments". The other student mentioned that adding opinions to the discussion was difficult, since all group members looked to the internet for information and others posted quickly; "... everyone searches the web so what you want to say may have already been stated".

6.4.4 If you feel that your relationship with the other group members has changed, list your reasons.

In question 16 from Survey II, students were asked to explain why their relationship with the other group members had changed during the semester. Twenty-one students submitted an answer, and as table 6.14 shows, these answers generated 9 statements with a reason for having experienced better relationships, and 8 statements with a reason for having experienced deterioration in relationships.

**Table 6.14: Survey II Question #16 Frequency Distribution**

Reasons stated for a having better/worst relationship with the other group members.				
Rank	Better relationships	Freq.	Worst relationships	Freq.
1	More personal	8	Impersonal	4
2	Responsible group members	1	Entirely work related	4
	<b>Total</b>	<b>9</b>	<b>Total</b>	<b>8</b>

Students who believed that their relationships had improved said they had gotten to know their group members better (8 statements), one student wrote, "After exchanging so many postings, these can be regarded as a form of interaction whereby we will get to understand (or at least form some impression) the people in my group better", and another student pointed out that "we get to know them more and some contributed personal experiences". Another student mentioned that group members were responsible, saying that, they "... are easy to get along with and are serious in their contributions".

Students who felt their relationships had worsened during the semester pointed to a lack of personal interaction (4 statements) and commented that the discussions had focused solely on the assignment tasks (4 statements), as one student put it, "We don't even know our group members beyond their names and without a face to attach a name... it is harder to remember the name. Furthermore, as the semester was extremely busy, people just type what they have to without any time for small talk", and another student complained that, "... communication more about getting your posts in and purely businesslike, without even the lightest of bantering".

## **6.5 End of Semester Interviews**

During the last week of the semester, one-to-one interviews were held with several of the students who had agreed to participate in the study. Since only a short period of time was available for this purpose, 17 students, or approximately ten percent of the research sample, were interviewed.

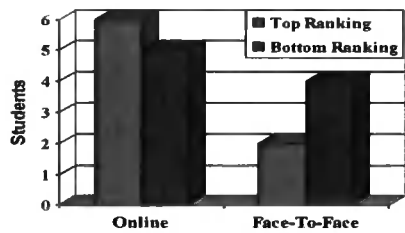
The objective of the interview was to gather information as to why particular individuals had done well and while others had done poorly on the peer assessment component of the discussion forum. During the semester, the assigned group leaders had anonymously marked each group member based on their individual contributions to that weeks' discussion. The cumulative score thus indicated those students who had been recognised by their peers for having made significant contributions throughout the semester, as well as those who had contributed little or nothing. Students from the top 20 and bottom 20 peer assessment ranking were invited to a private one-to-one interview session with the author, and 8 students from the top ranking group and 9 students from the bottom ranking group accepted the invitation.

At the start of the interview, the student's permission to audio tape the session was secured. Then to initiate the conversation, and as a means of eliciting comments on any major issues they felt strongly about, the students were asked to share anecdotes of their experiences using discussion forums for collaborating on their tutorial assignments. During the interview, if students did not address particular issues such as motivation, communication skills, adaptability to change and attitudes towards leadership without being prompted, the interviewer would ask questions about their level of motivation, the importance of the course marks towards their academic standing, their writing ability,

how they had adapted to the discussion forum as a mode of communication and their impressions about being the team leader.

Unfortunately, transcribing the audio tapes of the sessions was very difficult. Due to the poor sound quality of the recordings, and the weak command of the English language and poor enunciation from most of the interviewees, many audio segments were inaudible or indecipherable. As well, in one session, no audio was recorded due to an error in setting up the equipment. However, notes were taken during the interviews and a fair number of conversations were clear enough to be transcribed. The transcripts of the 16 recorded interviews are found in appendix E.

The information obtained during the interviews confirmed the feedback provided in one or both of the attitude surveys described in section 3.4., however, since the academic term was not yet over and the CA grades had not been made available to the students, the author was not in a position to ask why an interviewee had done either well or poorly in the peer rating. Hence, the information gathered from the interviews did not help explain why the top ranking students had done better on peer evaluations than the bottom ranking students.



**Figure 6.1:** Discussion Format Preference implied or stated during the interview

During the interviews, the students either stated, or were asked specifically, which tutorial discussion format they preferred more: the online or the face-to-face. As figure 6.1 shows, 6 top ranking and 5 bottom ranking students preferred the discussion forums, while 2 top ranking students and 4 bottom ranking students preferred the face-to-face tutorial discussion sessions. Interestingly, while the preference of bottom ranking students was almost evenly split between the two formats, the top ranking students preferred the online format by a margin of 3 to 1.

**6.5.1 Background information**

At the start of each interview session, the students were assured of complete confidentiality. The students were then asked to elaborate on their experiences in using

discussion forums during the semester. Here, as well as throughout the interview, the author encouraged the students to express themselves freely and honestly, and some students were quite forthcoming and candid in their comments, expressing their concerns on a number of issues.

#### 6.5.2 Interviews - student's general comments about their experiences

Reflecting on some of the benefits and drawbacks of discussion forums, student #1, a top ranked student who preferred the online discussion format, said, "I think it's quite fun, quite interesting for me...I find it quite exciting, I get a feeling of different view points and usually in traditional class I rarely get to see them and some people don't even prepare for the assignments, then they just come in and give smoke or crap. Kind of useless and so I find it (online discussions) more productive..."

Student #4, a top ranked student who preferred the face-to-face discussion format, was also concerned with productivity, but expressed frustration saying that, "... in the first week I was in charge... I was supposed to write the position paper. So because I was supposed to write the position paper I went to search for a lot of journals. Then I found other members, their contributions were actually more based on their own opinions than research, which to me I thought they weren't fully contributing so I didn't really think it was a good experience".

Time management was also seen as an important issue. Student #6, a bottom ranked student who preferred the online discussion format, said, "The problem is that not everyone contributed as much as the rest and if you're busy for that week you tend to forget to do your postings. Friday morning and it's like 'bam, uh-oh' you know what I mean....because there is no stipulated time for you to go in to do your stuff and you tend to forget and you tend to procrastinate....like 'oh, it's only Tuesday, I still have until Thursday'...but when Thursday comes and you have other assignments to do, you just forget. That happened to me one week and after that I thought okay, better do your posting on Tuesdays".

Finally, the importance of receiving a mark based on one's contribution to the weekly discussion forum topic brought out some interesting perspectives. Student #8, a bottom ranked student who preferred the face-to-face discussion format and who had therefore not contributed much in the discussion forums, commented that "when you go for

tutorials, right, no one really has to contribute because their attendance counts for the percentage as well, but with the discussion forum it's like every week you have to post something if not you'll be rated a zero." However, student #11, a top ranked student who preferred the online discussion format was more concerned about personal accountability and saw the grading as a minor issue, stating, "... but the motivation to do this (contribute to online discussions) actually does not arise from the 10% (grade) because all of us can calculate that this is only 1% per session, it's just 1%. So it's more like an obligation for everyone to contribute to the leader. I must at least do some research".

## **6.6 Summary**

This chapter focused on the qualitative data collected from the open-ended questions in Survey I and II and from the interviews conducted with 17 students at the end of the semester. In both cases, the focus of the questions was to delve more deeply into the student's attitudes by asking them to freely explain why they had particular preferences, and to draw out concrete examples that reflected these preferences.

The answers to the open-ended questions in Survey I and Survey II were collated and analysed, and one or more statements from each answer was assigned one of two categories: Category A, indicating support for the online discussion forum format, and Category B, indicating support for the face-to-face tutorial discussions. Two other raters were recruited to code 20% of the responses, and their scores indicated a very high level of consensus.

The results of the analysis showed that:

- the top reason for contributing more opinions in the online discussions was that online discussions allowed more time to work on formulating an answer; and for contributing fewer opinions was because the online discussions were seen as interrupting the flow of ideas
- the top reason for spending more time gathering information for the online discussions was that the students felt pressured to produce quality postings; and for spending less time was because the students felt they were working in an impersonal environment and hence were not accountable to the team

- the top reason for trusting the other discussion forum group members to be conscientious was that grading of contributions would pressure everyone to do their work; and for not trusting them was because the group members were unreliable
- the top reason for feeling confident about expressing one's opinion in online discussions was that the atmosphere in the forums was friendly and non-threatening; and for feeling insecure was because a written record of interactions made some students were uneasy about being accountable for what they had said
- the top reason for feeling that relationships in discussion forums were friendly was that the atmosphere in the forums was collegial; and for feeling that the relationships were impersonal was because the online environment was not conducive to initiating or supporting social interaction
- the top reason for claiming to learn more through participating in the online discussions was that accessing online gave students greater flexibility to manage their time; and for claiming to learn more from participating in the face-to-face tutorials was because the real-time interaction was easier to follow
- the top reason for claiming to remember more from participating in online discussions was that it encouraged deeper and longer reflection on the topics; and for claiming to remember more from participating in the face-to-face tutorials was because the face-to-face was a more efficient context for remembering
- the top reason for considering the peer collaboration activity to be a good learning strategy was that it seemed practical; and for considering it to be a poor strategy was that it seemed ineffective
- the top reason for preferring one format over the other was the same for both groups, each group believed their preferred format was a more efficient way to work
- the top reason for an increased level of trust in the discussion group members was that the group members made high quality of contributions; and for a decreased level of trust was because the number of postings had decreased as the semester progressed
- the top reason for an increase in confidence in expressing one's opinion in the discussion forums was that the relationship with the other group members had improved; and for a drop in confidence was because some group members had been insensitive
- the top reason for improved relationships with the discussion forum group members was that through their participation in the discussion forums, they had gotten to

know each other better; and for worsening relationships was because there was a lack of personal interaction in the discussion forums

During the semester, the assigned group leaders had anonymously rated each group member based on their individual contributions to the weekly discussion topics. The cumulative scores thus indicated those students who had been recognised by their peers for having made significant contributions throughout the semester, as well as those who had contributed little.

In order to gather information as to why certain individuals had done well while others poorly in this peer assessment component of the discussion forum, the author invited 20 top ranked and 20 bottom ranked students to attend a one-to-one end-of-semester interview. Eight students from the top ranking group and 9 students from the bottom ranking group accepted the invitation and were interviewed.

During the sessions, the interviewees further confirmed the feedback they had already provided through the online surveys, however regrettably, little information on why the top ranking students had done better than the bottom ranking students was discovered. Still, one notable finding was that the bottom ranking students were almost evenly split in their preference for the online or face-to-face discussion formats, while the top ranking students preferred the discussion forum format by a strong margin of 3 to 1.

The following chapter presents the discriminant function analysis of the cognitive learning style preference groups, student demographics groups, student high/low performance groups and discussion format preference groups as dependent variables. Independent variables including survey MCQs, student's ICT experience and student performance data are examined for their importance in discriminating between the dichotomous groups of these dependent variables.

## **Chapter 7**

### **DISTINGUISHING FEATURES OF COGNITIVE LEARNING STYLE PREFERENCE, STUDENT DEMOGRAPHICS, STUDENT PERFORMANCE AND DISCUSSION FORMAT PREFERENCE GROUPS**

#### **7.1 Overview**

This chapter focuses on a post hoc discriminant function analysis (DFA) in which ILS results, student demographic information, student performance data and data from question 6 in Survey II were used to set up dichotomous categories of dependent variable (DV) groups. As independent variables (IVs) in the DFA calculations, ordinal data from Survey I and Survey II MCQs, student characteristics, posting content categories and performance indicators were examined as predictors of membership to these DV groups. The DFA calculation and its underlying assumptions are discussed in section 3.9.3.

The first set of DVs investigated included groups in which students who had shown a particular cognitive learning style preference in their ILS results were compared to all the other students who had completed the ILS questionnaire. The second set of DVs was created from the student demographic information including gender, language of communication, satisfaction ratings for face-to-face discussion groups and online discussion groups, and selected reasons for taking the course.

Another DV group was created using the continuous assessment grade in which 30 of the top most performing students were compared with 30 of the worst performing students. The last DV group to be examined was created using the responses to the question 6 from Survey II: "For group collaboration on writing a paper for a tutorial assignment, I prefer". Students who said they preferred the traditional face-to-face discussion format were compared with those who said they preferred the online discussion forum format.

#### **7.2 Cognitive Learning Style Preferences as DVs**

As explained in section 3.7.1, the 147 students who agreed to participate in the research completed the Felder and Soloman (1991) Index of Learning Style (ILS) questionnaire,



and students who scored +5 or more, or -5 or less, on any dimension of the Felder and Soloman cognitive learning style scale were deemed to have a tendency towards those traits outlined in the associated profile. In order to examine the relationships between these profiles and the IVs in the research data, students were assigned to DV groups based on their learning style preferences.

Eight learning style preference DV groups were formed: the Active group, the Reflective group, the Sensing group, the Intuitive group, the Visual group, the Verbal group, the Sequential group and the Global group. In the following two sections, DFAs are used to explore the relationships between these cognitive learning style preference groups as DVs, and IVs drawn from the Survey I and Survey II MCQs and student demographics data.

### **7.3 Learning Style Groups as DVs and Survey I MCQs as IVs**

Questions 1, 4, 5, 6, 7, 9, 11, 13, 15, 17, and 19 from Survey I were investigated to see if any of them discriminated between categories of the dependant variables from the ILS learning style preference groups. Although 141 students completed both the ILS questionnaire and Survey I, only 96% of the cases were valid for statistical analysis. In every DFA calculation that showed one or more significant discriminants in the IVs, the Box's M test showed  $p(M) < 0.05$ , and consequently the null hypothesis was accepted and the assumption of homogeneity of variance was upheld.

#### **7.3.1 The Reflective learning style group as the DV**

As table 7.1 shows, in the Reflective group, with 49 cases in the "Reflective" category and 86 cases in the "not Reflective" category, question 11, "When using the IVLE discussion forum to work on our tutorial assignment, I feel that I can trust most group members to make good contributions.", ( $p < 0.01$ ) had the highest F value (7.26) and the lowest Wilks' Lambda value (.95).

The group statistics indicated that Reflective learners ( $N=49$ ; mean: 2.9; median: 3; SD: 0.9) were more in disagreement with the statement in question 11 than the other students ( $N=86$ ; mean: 3.29; median: 3; SD: 0.77). The effect size was small ( $d=-0.48$ ) and classification statistics showed that 66.2% of the original grouped cases were correctly classified with the discriminant function. Hence, students who were Reflective learners tended not to trust their group members to make good contributions.

**Table 7.1:** Tests of Equality of Group Means - DV Reflective, IVs Survey I MCQs

	Wilks' Lambda	F	df1	Df2	Sig.
Q1	1.00	.05	1	133	.82
Q4	1.00	<.00	1	133	.98
Q5	.995	.63	1	133	.43
Q6	.997	.36	1	133	.55
Q7	.996	.51	1	133	.48
Q9	.999	.10	1	133	.75
<b>Q11</b>	<b>.95</b>	<b>7.26</b>	<b>1</b>	<b>133</b>	<b>.008</b>
Q13	.997	.36	1	133	.55
Q15	.986	1.95	1	133	.17
Q17	.998	.28	1	133	.60
Q19	1.00	.01	1	133	.93

### 7.3.2 The Intuitive learning style group as the DV

As table 7.2 shows, in the Intuitive group, with 23 cases in the “Intuitive” category and 112 cases in the “not Intuitive” category, question 15, “When using the IVLE discussion forum to work on our tutorial assignment, I feel my relationship with the other group members is very "business like" and impersonal.”, ( $p < 0.01$ ) had the highest F value (8.30) and the lowest Wilks' Lambda value (.94).

**Table 7.2:** Tests of Equality of Group Means - DV Intuitive, IVs Survey I MCQs

	Wilks' Lambda	F	Df1	Df2	Sig.
Q1	.997	.34	1	133	.56
Q4	.999	.19	1	133	.67
Q5	.986	1.96	1	133	.16
Q6	.996	.49	1	133	.49
Q7	.992	1.03	1	133	.31
Q9	.978	2.96	1	133	.09
Q11	.960	5.52	1	133	.02
Q13	.993	.97	1	133	.33
<b>Q15</b>	<b>.941</b>	<b>8.30</b>	<b>1</b>	<b>133</b>	<b>.005</b>
Q17	1.00	<.00	1	133	.99
Q19	.993	.89	1	133	.35

The group statistics indicated that Intuitive learners ( $N = 23$ ; mean: 4.09; median: 4; SD: 0.9) were more in agreement with the statement in question 15 than the other students ( $N = 112$ ; mean: 3.48; median: 4; SD: 0.92). The effect size was medium ( $d = 0.67$ ) and

classification statistics showed that 82.9% of the original grouped cases were correctly classified with the discriminant function.

Hence, students who were Intuitive learners tended to believe that their relationships with group members were very "business like" and impersonal. However, since there was a great disparity in group numbers a logistic regression was run on the data (Press & Wilson, 1978) and the results confirmed the findings of the DFA.

### 7.3.3 The Visual learning style group as the DV

As table 7.3 shows, in the Visual group, with 79 cases in the “Visual” category and 56 cases in the “not Visual” category, question 11, “When using the IVLE discussion forum to work on our tutorial assignment, I feel that I can trust most group members to make good contributions.”, ( $p<0.05$ ) had the highest F value (5.81) and the lowest Wilks' Lambda value (.96).

**Table 7.3:** Tests of Equality of Group Means - DV Visual, IVs Survey I MCQs

	Wilks' Lambda	F	df1	df2	Sig.
Q1	1.00	.00	1	133	1.00
Q4	.99	1.31	1	133	.26
Q5	.99	.76	1	133	.39
Q6	.97	4.57	1	133	.03
Q7	.999	.10	1	133	.75
Q9	.998	.31	1	133	.58
<b>Q11</b>	<b>.96</b>	<b>5.81</b>	<b>1</b>	<b>133</b>	<b>.02</b>
Q13	.99	1.45	1	133	.23
Q15	1.00	.02	1	133	.89
Q17	1.00	.04	1	133	.85
Q19	.98	2.13	1	133	.15

The group statistics indicated that Visual learners (N=79; mean: 3.29; median: 3; SD: 0.75) were more in agreement with the statement in question 11 than the other students (N=56; mean: 2.95; median: 3; SD: 0.9). The effect size was small ( $d=0.42$ ) and classification statistics showed that 61.2% of the original grouped cases were correctly classified with the discriminant function. Hence, students who were Visual learners tended to trust their group members to make good contributions.

### 7.3.4 The Sequential learning style group as the DV

As table 7.4 shows, in the Sequential group, with 30 cases in the “Sequential” category and 105 cases in the “not Sequential” category, question 5, “In the IVLE discussion forum, I can clearly understand what the other group members have contributed to the tutorial topic.” ( $p < 0.05$ ) had the highest F value (6.21) and the lowest Wilks' Lambda value (.96).

The group statistics indicated that Sequential learners ( $N=30$ ; mean: 3.2; median: 3; SD: 0.81) were more in disagreement with the statement in question 5 than the other students ( $N=105$ ; mean: 3.61; median: 4; SD: 0.79). The effect size was medium ( $d = -0.52$ ) and classification statistics show that 75% of the original grouped cases were correctly classified with the discriminant function.

**Table 7.4:** Tests of Equality of Group Means - DV Sequential, IVs Survey I MCQs

	Wilks' Lambda	F	Df1	Df2	Sig.
Q1	.995	.63	1	133	.43
Q4	.99	1.91	1	133	.17
<b>Q5</b>	<b>.96</b>	<b>6.21</b>	<b>1</b>	<b>133</b>	<b>.01</b>
Q6	.997	.38	1	133	.54
Q7	.997	.34	1	133	.56
Q9	.998	.30	1	133	.59
Q11	.99	1.84	1	133	.18
Q13	.99	1.72	1	133	.19
Q15	.999	.12	1	133	.73
Q17	.996	.56	1	133	.44
Q19	.996	.59	1	133	.44

Hence, students who were Sequential learners were more inclined to say they had difficulty understanding what was happening in their discussion forums. However, since there was a great disparity in group numbers, a logistic regression was run on the data and the results confirmed the findings of the DFA.

### 7.3.5 Learning style groups and non-significant Survey I MCQs

The DFA run on the Active, Sensing, Verbal and Global learning style groups did not find any significant difference between the means of the IVs.

#### 7.4 Learning Style Groups as DVs and Survey II MCQs as IVs

Questions 1, 2, 3, 4, 5, 8, 11, 14, 17, 18 and 19 from Survey II were investigated to see if any of them discriminated between the categories of the dependant variables from the ILS learning style preference groups. Although 104 students completed both the ILS questionnaire and Survey II, only 92% of the cases were valid for statistical analysis. In every DFA calculation that showed one or more significant discriminants in the IVs, the Box's M test showed  $p(M) < 0.05$ , and consequently the null hypothesis was accepted and the assumption of homogeneity of variance was upheld.

##### 7.4.1 The Intuitive learning style group as the DV

As table 7.5 shows, in the Intuitive group, with 16 cases in the "Intuitive" category and 80 cases in the "not Intuitive" category, question 5, "Generally, the messages in the IVLE discussion forums have been relevant to the topics being discussed." ( $p < 0.01$ ) had the highest F value (11.18) and the lowest Wilks' Lambda value (.89). The group statistics indicated that Intuitive learners ( $N=16$ ; mean: 4.31; median: 4; SD: 0.48) were more in agreement with the statement in question 5 than the other students ( $N=80$ ; mean: 3.77; median: 4; SD: 0.62). The effect size was large ( $d=0.90$ ) and classification statistics indicated that 82.4% of the original grouped cases were correctly classified with the discriminant function.

**Table 7.5:** Tests of Equality of Group Means - DV Intuitive, IVs Survey II MCQs

	Wilks' Lambda	F	df1	Df2	Sig.
Q1	.98	2.10	1	94	.15
Q2	.98	1.95	1	94	.17
Q3	.97	3.18	1	94	.08
Q4	.99	1.30	1	94	.26
<b>Q5</b>	<b>.89</b>	<b>11.18</b>	<b>1</b>	<b>94</b>	<b>.001</b>
Q8	.97	2.98	1	94	.09
Q11	.99	1.48	1	94	.23
Q14	.997	.27	1	94	.61
Q17	.997	.27	1	94	.61
Q18	.98	1.69	1	94	.20
Q19	.996	.39	1	94	.53

Hence, students who were Intuitive learners were more inclined to think the postings had been relevant to the topics being discussed. Because there was a great disparity in group numbers, a logistic regression was run on the data and the results confirmed the

findings of the DFA. However, since Intuitive learners amounted to only 17% of the research sample, further research is needed in order to validate this finding.

7.4.2 The Sequential learning style group as the DV

As table 7.6 shows, in the Sequential group, with 21 cases in the “Sequential” category and 75 cases in the “not Sequential” category, question 17, “I believe that I learn more about a topic from attending a face-to-face tutorial session then from participating in the IVLE tutorial group discussion forum format.” ( $p<0.05$ ) had the highest F value (4.63) and the lowest Wilks' Lambda value (.95).

**Table 7.6:** Tests of Equality of Group Means - DV Sequential, IVs Survey II MCQs

	Wilks' Lambda	F	df1	Df2	Sig.
Q1	.995	.49	1	94	.49
Q2	.99	.67	1	94	.42
Q3	.97	3.19	1	94	.08
Q4	.999	.05	1	94	.82
Q5	.98	2.40	1	94	.13
Q8	.98	2.11	1	94	.15
Q11	.99	.93	1	94	.34
Q14	.997	.26	1	94	.61
<b>Q17</b>	<b>.95</b>	<b>4.63</b>	<b>1</b>	<b>94</b>	<b>.03</b>
Q18	.97	2.62	1	94	.11
Q19	.99	1.05	1	94	.31

The group statistics indicated that Sequential learners ( $N=21$ ; mean: 3.67; median: 4; SD: 0.66) were more in agreement with the statement in question 17 than the other students ( $N=75$ ; mean: 3.25; median: 3; SD: 0.81). The effect size was medium ( $d=0.54$ ) and discriminant function correctly classified 78.6% of the original grouped cases. Hence, students who were Sequential learners were more inclined to believe that they learned more about a tutorial topic from attending a face-to-face tutorial session than from participating in the online discussion forum format. However, since there was a great disparity in group numbers, a logistic regression was run on the data and the results confirmed the findings of the DFA.

7.4.3 Learning style groups and non-significant Survey II MCQs

The Active group did not meet the requirements for conducting a DFA and the DFA run on the Reflective, Sensing, Visual, Verbal and Global learning style groups did not find any significant difference between the means of the IVs.

## **7.5 Learning Style Groups as DVs and Student Information as IVs**

DFA calculations were conducted using the 8 ILS learning style preference groups described in section 7.2 as the DVs and the information the students had provided about their familiarity with ICT as the IVs. The IV categories included years of ICT experience; frequency of emailing, frequency of using online chat rooms, frequency of using online discussion forums, satisfaction rating of using face-to-face discussion groups for tutorial assignments and satisfaction rating of using online discussion groups for tutorial assignments. A copy of the student information sheet is attached as appendix A.

One hundred forty-seven students completed both the ILS questionnaire and the student information sheet. However, while the data from all of the cases was valid for the statistical analysis, the Active group did not meet the requirements for conducting a DFA and the DFA calculations on the other DV groups did not find any significant differences between the means of the IVs.

## **7.6 Student Demographic Groups as DVs.**

On the student information sheet, along with the ordinal data type demographic information used as IVs in section 7.5, nominal data type information was used to form groups of dependent variables.

As explained in section 3.9.4, the following 8 dichotomous groups were formed:

1. Gender (Female vs. Male)
2. Principal language of communication (English vs. Other)
3. Face-to-face tutorial discussion satisfaction rating (Negative vs. Positive)\*
4. Online tutorial discussion satisfaction rating (Negative vs. Positive)\*
5. Motivation A (no face-to-face tutorial vs. other reasons)\*\*
6. Motivation B (I can achieve a high grade vs. other reasons)\*\*
7. Motivation C (I believe the workload is light vs. other reasons)\*\*
8. Motivation D (I can work/submit assignments from home vs. other reasons)\*\*

\* These ratings used a 5 point Likert scale: Strongly disliked; Disliked; Indifferent; Enjoyed; Very much enjoyed. The scale was collapsed to 3 points: Negative (Strongly disliked & Disliked); Positive (Enjoyed & Very much enjoyed); Indifferent. \*\* These items were examined as second choices for taking the course because 97% of the students had ranked "Interested in the topics covered" as their first choice. Since this number one choice for taking the course did not produce viable dichotomous groups, the options selected as the second reason for taking the course were examined instead.

In the next two sections, the DFAs using student demographic groups as DVs and Survey I and Survey II MCQs as IVs are explored.

## 7.7 Student Demographic Groups as DVs and Survey I MCQs as IVs

The MCQs from Survey I, questions 1, 4, 5, 6, 7, 9, 11, 13, 15, 17 and 19, were investigated to see if any of these discriminated between the categories of the student demographic information groups described in section 7.6. Although 141 students completed both the student demographic information questionnaire and Survey I, only 96% of the cases were valid for statistical analysis.

In every DFA calculation that showed one or more significant discriminants in the IVs, the Box's M test showed  $p(M) < 0.05$ , and consequently the null hypothesis was accepted and the assumption of homogeneity of variance was upheld.

### 7.7.1 Principal language of communication group as the DV

As table 7.7 shows, in the principal language of communication group, with 93 cases in the "English" category and 42 cases in the "Other" category, question 15, "When using the IVLE discussion forum to work on our tutorial assignment, I feel my relationship with the other group members is very "business like" and impersonal.", ( $p < 0.05$ ) had the highest F value (4.48) and the lowest Wilks' Lambda value (.97).

**Table 7.7: Tests of Equality of Group Means - DV Language, IVs Survey I MCQs**

	Wilks' Lambda	F	df1	df2	Sig.
Q1	1.00	.06	1	133	.81
Q4	.999	.12	1	133	.73
Q5	.99	1.45	1	133	.23
Q6	.99	1.20	1	133	.28
Q7	.98	2.84	1	133	.09
Q9	.98	2.98	1	133	.09
Q11	.999	.16	1	133	.69
Q13	.998	.22	1	133	.64
<b>Q15</b>	<b>.97</b>	<b>4.48</b>	<b>1</b>	<b>133</b>	<b>.04</b>
Q17	.98	3.36	1	133	.07
Q19	.999	.20	1	133	.66

The group statistics indicated that students who had said English was their main language of communication (N=93; mean: 3.7; median: 4; SD: 0.92) were more in agreement with the statement in question 15 than the other students (N=42; mean: 3.06;



median: 3; SD: 0.86). The effect size was medium ( $d=0.71$ ) and classification statistics indicated that 70% of the original grouped cases were correctly classified with the discriminant function. Hence, students who were primary users of English felt that the relationships with their group members were more impersonal than students whose main language was Chinese, Malay or Tamil. Since there was some disparity in group numbers, a logistic regression was run on the data and the results confirmed the findings of the DFA.

### 7.7.2 Face-to-face discussion satisfaction rating group as the DV

As table 7.8 shows, in the face-to-face discussion satisfaction group, with 12 cases in the “Negative” category and 67 cases in the “Positive” category, question 7, “Compared to Face-to-face discussions, when using the IVLE discussion forum I have contributed more opinions on the tutorial topic.”, ( $p<0.01$ ) had the highest F value (12.13) and the lowest Wilks' Lambda value (.86).

**Table 7.8:** Tests of Equality of Group Means - DV FtoF discussion satisfaction rating, IVs Survey I MCQs

	Wilks' Lambda	F	df1	df2	Sig.
Q5	.996	.30	1	77	.58
Q6	.98	1.44	1	77	.23
<b>Q7</b>	<b>.86</b>	<b>12.13</b>	<b>1</b>	<b>77</b>	<b>.001</b>
Q9	.98	1.53	1	77	.22
Q11	.97	2.06	1	77	.16
Q13	1.00	.002	1	77	.97
Q15	.96	2.95	1	77	.09
Q17	.96	3.55	1	77	.06
Q19	.98	1.35	1	77	.25

The group statistics indicated that students who were negative about the face-to-face tutorial discussion format (N=12; mean: 4.25; median: 4; SD: 0.62) were more in agreement with the statement in question 7 than the other students (N=67; mean: 3.18; median: 3; SD: 1.03). The effect size was large ( $d=1.09$ ) and classification statistics showed that 85.2% of the original grouped cases were correctly classified with the discriminant function.

Hence, students who said they had not enjoyed traditional face-to-face tutorial discussions tended to feel that they had contributed more opinions in the online

discussions. Since there was a great disparity in group numbers, a logistic regression was run on the data and the results confirmed the findings of the DFA. However, because this group made up only 8% of the research sample, further research is needed in order to validate this findings.

### 7.7.3 Motivation B group as the DV

As table 7.9 shows, as a rationale for taking the course, the motivation B group, with 34 cases in the “I can achieve a high grade” category and 101 cases in the “all other reasons” category, question 19, “I believe that I remember more about a tutorial topic from participating in IVLE discussion forum rather than the face-to-face discussion format”, ( $p<0.01$ ) had the highest F value (7.28) and the lowest Wilks' Lambda value (.95).

**Table 7.9:** Tests of Equality of Group Means - DV achieve a high grade, IVs Survey I MCQs

	Wilks' Lambda	F	df1	Df2	Sig.
Q1	.99	1.03	1	133	.31
Q4	.997	.46	1	133	.50
Q5	.997	.34	1	133	.56
Q6	.99	1.03	1	133	.31
Q7	.997	.40	1	133	.53
Q9	.998	.28	1	133	.60
Q11	.996	.50	1	133	.48
Q13	.999	.08	1	133	.78
Q15	.999	.16	1	133	.69
Q17	.997	.45	1	133	.50
<b>Q19</b>	<b>.95</b>	<b>7.28</b>	<b>1</b>	<b>133</b>	<b>.008</b>

The group statistics indicated that students who chose “I can achieve a high grade” as a rationale for taking the course ( $N=34$ ; mean: 3.15; median: 3; SD: 0.82) were more in agreement with the statement in question 19 than the other students ( $N=101$ ; mean: 2.69; median: 3; SD: 0.86). The effect size was medium ( $d=0.54$ ) and classification statistics showed that 73.9% of the original grouped cases were correctly classified with the discriminant function. Hence, students who said they believed they could achieve a high grade in the course tended to think that the online discussion forums, as compared to the face-to-face tutorial discussion format, had been more conducive to learning. Since there was a great disparity in group numbers, a logistic regression was run on the data and the results confirmed the findings of the DFA.

#### 7.7.4 Motivation C group as the DV

As table 7.10 shows, as a rationale for taking the course, the motivation C group, with 13 cases in the “I believe the workload is light” category and 122 cases in the “all other reasons” category, question 4, “Using the IVLE discussion forum to post my message is easy.”, ( $p < 0.05$ ) had the highest F value (5.18) and the lowest Wilks' Lambda value (.96). The group statistics indicated that students who chose “I believe the workload is light” as a rationale for taking the course ( $N=13$ ; mean: 3.46; median: 3.5; SD: 0.52) were more in disagreement with the statement in question 4 than the other students ( $N=122$ ; mean: 3.94; median: 4; SD: 0.74).

**Table 7.10:** Tests of Equality of Group Means - DV believe workload is light, IVs Survey I MCQs

	Wilks' Lambda	F	df1	Df2	Sig.
Q1	.99	1.25	1	133	.27
<b>Q4</b>	<b>.96</b>	<b>5.18</b>	<b>1</b>	<b>133</b>	<b>.02</b>
Q5	.998	.21	1	133	.65
Q6	.97	4.13	1	133	.04
Q7	.997	.46	1	133	.50
Q9	.998	.23	1	133	.63
Q11	.999	.10	1	133	.75
Q13	.97	4.78	1	133	.03
Q15	.999	.19	1	133	.67
Q17	1.00	.003	1	133	.96
Q19	.99	1.39	1	133	.24

The effect size was medium ( $d = -0.66$ ) and classification statistics showed that 90% of the original grouped cases were correctly classified with the discriminant function. Hence, students who said they believed the workload for the course would be light were more likely to say that posting messages in the discussion forums had not been easy. Since there was a great disparity in group numbers, a logistic regression was run on the data and the results confirmed the findings of the DFA.

#### 7.7.5 Motivation D group as the DV

As table 7.11 shows, as a rationale for taking the course, the motivation D group, with 25 cases in the “I can work and submit assignments from home” category and 110 cases in the “all other reasons” category, question 1, “Accessing the IVLE discussion forum for discussing the tutorial topic is complicated.” ( $p < 0.05$ ), had the highest F value (6.78) and the lowest Wilks' Lambda value (.95).

**Table 7.11:** Tests of Equality of Group Means - DV submit assignments from home, IVs Survey I MCQs

	Wilks' Lambda	F	df1	Df2	Sig.
Q1	.95	6.78	1	133	.01
Q4	.98	2.88	1	133	.09
Q5	.995	.69	1	133	.41
Q6	.97	4.10	1	133	.05
Q7	.97	4.00	1	133	.05
Q9	.97	3.78	1	133	.05
Q11	.97	3.84	1	133	.05
Q13	.97	3.66	1	133	.06
Q15	.995	.73	1	133	.40
Q17	.98	2.41	1	133	.12
Q19	.99	1.52	1	133	.22

The group statistics indicated that students who chose working and submitting assignments from home as a rationale for taking the course (N=25; mean: 1.64; median: 2; SD: 0.7) were more in disagreement with the statement in question 1 than the other students (N=110; mean: 2.08; median: 2; SD: 0.78). The effect size was medium ( $d=0.57$ ) and classification statistics showed that 90% of the original grouped cases were correctly classified with the discriminant function. Hence, students who said they liked the idea of working and submitting assignments from home were more likely to say that accessing the discussion forum was easy. Since there was a great disparity in group numbers, a logistic regression was run on the data and the results confirmed the findings of the DFA.

#### 7.7.6 Student demographic groups and non-significant Survey I MCQs

The DFA run on the Gender, Rating for the online discussion and Motivation A groups did not find any significant difference between the means of the IVs.

### 7.8 Student Demographic Groups as DVs and Survey II MCQs as IVs

The MCQs from Survey II, questions 1, 2, 3, 4, 5, 8, 11, 14, 17, 18 and 19, were investigated to see if any of them discriminated between the categories of the student demographic groups described in section 7.6. Although 104 students completed both the student demographic information questionnaire and Survey II, only 92% of the cases were valid for statistical analysis.

7.8.1 Online discussion satisfaction rating group as the DV

As table 7.12 shows, in the online discussion satisfaction group, with 13 cases in the “Negative” category and 15 cases in the “Positive” category, question 14, “When using the IVLE discussion forum to work on our tutorial assignment, I feel my relationship with the other group members is very "business like" and impersonal.”, ( $p < 0.05$ ) had the highest F value (4.21) and the lowest Wilks' Lambda value (.86). Since the Box's M test showed  $p(M) < 0.05$ , the null hypothesis was accepted and the assumption of homoscedasticity upheld.

The group statistics indicated that students who were positive about the online discussion forum format ( $N=13$ ; mean: 4.07; median: 4; SD: 0.70) were more in agreement with the statement in question 14 than students in the negative category ( $N=15$ ; mean: 3.38; median: 4; SD: 1.04). The effect size was medium ( $d=0.72$ ) and classification statistics showed that 60% of the original grouped cases were correctly classified with the discriminant function.

**Table 7.12:** Tests of Equality of Group Means - DV Online discussion satisfaction rating, IVs Survey II MCQs

	Wilks' Lambda	F	df1	Df2	Sig.
Q1	.98	.54	1	26	.47
Q2	.99	.22	1	26	.65
Q3	1.00	.003	1	26	.95
Q4	.98	.63	1	26	.43
Q5	.99	.21	1	26	.65
Q8	.995	.14	1	26	.71
Q11	.998	.05	1	26	.84
<b>Q14</b>	<b>.86</b>	<b>4.21</b>	<b>1</b>	<b>26</b>	<b>.05</b>
Q17	.97	.84	1	26	.37
Q18	.99	.23	1	26	.63
Q19	.87	3.93	1	26	.06

Hence, students who at the start of the semester had said they enjoyed participating in online discussion forums tended to feel that relationships with the other discussion forum group members were very ‘business like’ and impersonal.

7.8.2 Student demographic groups and non-significant Survey II MCQs

The face-to-face discussion satisfaction rating group did not meet the requirements for conducting a DFA, and the DFA run on the Gender, Principal Language, and

Motivation A, B, C, and D groups did not find any significant difference between the means of the IVs.

7.9 Student Performance Group as the DV

A performance group with a Top” category and a “Bottom” category was created in order to examine if any of the IVs could be used as predictors of performance. Four (4) sets of IVs were investigated: 1) the MCQs from Survey I; 2) the MCQs from Survey II; 3) the student information described in section 7.5 and; 4) the posting content categories described in section 3.8.3.2.

Of the 147 students in the research sample, the 30 best CA performers were assigned to the “Top” category and the 30 worst CA performers were assigned to the “Bottom” category. While all cases from the student information and the posting content categories were valid for the statistical analysis, only 95% of the cases from Survey I and 85% of the cases from Survey II were valid. In every DFA calculation that showed one or more significant discriminants in the IVs, the Box’s M test showed  $p(M)<0.05$ , and consequently the null hypothesis was accepted and the assumption of homogeneity of variance was upheld.

7.9.1 Student performance group as the DV and Survey I MCQs as IVs

As table 7.13 shows, question 9, “Compared to face-to-face discussions, when using the IVLE discussion forum I have spent more time gathering information on the tutorial topic.” ( $p<0.05$ ) and question 17 “I believe that I learn more about a tutorial topic from participating in the IVLE discussion forum rather than in the face-to-face discussion format.” ( $p<0.05$ ) were significant discriminants at the first and second step of the DFA calculation.

Table 7.13: Stepwise Statistics - DV performance groups, IVs Survey I MCQs

Step	Entered	Wilks' Lambda							
		Statistic	df1	df2	df3	Exact F			
						Statistic	df1	df2	Sig.
1	Q9	.93	1	1	53	4.05	1	53	.05
2	Q17	.84	2	1	53	4.98	2	52	.01

At each step, the variable that minimizes the overall Wilks' Lambda is entered. Maximum number of steps is 22. Minimum partial F to enter is 3.84. Maximum partial F to remove is 2.71. F level, tolerance, or VIN insufficient for further computation.

The group statistics indicated that the top performing students were more in agreement with the statement in question 9 (N=30; mean: 3.75; median: 4; SD: 0.7), than the bottom performing students (N=30; mean: 3.33; median: 3; SD: 0.83). However, they were also more in disagreement with the statement in question 17 (mean: 2.79; median: 3; SD: 0.79), than the bottom performing students (mean: 3.04; median: 3; SD: 0.94). The effect size were medium ( $d=0.55$ ) and small ( $d=-0.29$ ), and classification statistics showed that 73.7% of the original grouped cases were correctly classified with the discriminant function. Hence, while the top performing students said they spent more time gathering information than the bottom performing students, they were also the group that was more sceptical about learning through the discussion forum format at the start of semester.

### 7.9.2 Student performance group as the DV and Survey II MCQs as IVs

As table 7.14 shows, question 1, “Only minor problems were encountered in accessing the IVLE discussion forums.” ( $p<0.05$ ), and question 5 “Generally, the messages in the IVLE discussion forum have been relevant to the topic being discussed.” ( $p<0.01$ ) were significant discriminants at the first and second step of the DFA calculation.

**Table 7.14: Stepwise Statistics - DV performance groups, IVs Survey II MCQs**

Step	Entered	Wilks' Lambda							
		Statistic	df1	df2	df3	Exact F			
						Statistic	df1	df2	Sig.
1	Q1	.89	1	1	47	5.89	1	47	.02
2	Q5	.80	2	1	47	5.74	2	46	.006

At each step, the variable that minimizes the overall Wilks' Lambda is entered. Maximum number of steps is 22. Minimum partial F to enter is 3.84. Maximum partial F to remove is 2.71. F level, tolerance, or VIN insufficient for further computation.

The group statistics indicated that the top performing students were more in agreement with the statement in question 1 (N=30; mean: 4.26; median: 4; SD: 0.69), than the bottom performing students (N=30; mean: 3.62 median: 4; SD: 1.10), and they were also more in agreement with the statement in question 5 (mean: 4.09; median: 4; SD: 0.29), than the bottom performing students (mean: 3.69; median: 4; SD: 0.79). The effect size in both cases were medium ( $d=0.70$  and  $d=0.67$ ), and classification statistics showed that 72.5% of the original grouped cases were correctly classified with the discriminant function. Hence, the top ranking performers seemed to feel more comfortable with accessing the technology and thought the discussion forum postings were more on topic than the bottom ranking performers.

### 7.9.3 Student performance group as the DV and student information as IVs

As table 7.15 shows, Chat ( $p<0.05$ ) had the highest F value (7.0) and the lowest Wilks' Lambda value (.89). The group statistics indicated that bottom performers ( $N=30$ ; mean: 3.17; median: 3; SD: 1.28) had a higher frequency of using Internet chat than the top performers ( $N=30$ ; mean: 2.38; median: 2; SD: 0.98). The effect size was medium ( $d=0.69$ ), and classification statistics indicated that 70.7% of the original grouped cases were correctly classified with the discriminant function.

**Table 7.15:** Tests of Equality of Group Means - DV performance groups, IVs student information

	Wilks' Lambda	F	df1	df2	Sig.
ICT yrs	1.00	.000	1	56	1.00
Email	.97	1.60	1	56	.21
<b>Chat</b>	<b>.89</b>	<b>7.00</b>	<b>1</b>	<b>56</b>	<b>.01</b>
Forums	.96	2.30	1	56	.14
FtoF	.95	2.89	1	56	.10
IVLE	.999	.06	1	56	.80

Hence prior to the start of the course, the worst performing students tended to use Internet chat more frequently than the best performing students.

### 7.9.4 Student performance group as the DV and posting content categories as IVs

As table 7.16 shows, Articles ( $p<0.01$ ) had the highest F value (14.62) and the lowest Wilks' Lambda value (.80).

**Table 7.16:** Tests of Equality of Group Means - DV performance groups, IVs posting contents

	Wilks' Lambda	F	df1	df2	Sig.
Factoid	.88	8.22	1	58	.006
Proposition	.88	7.87	1	58	.007
Friendly	.97	1.73	1	58	.19
Unfriendly	.96	2.45	1	58	.12
Managing	.92	5.28	1	58	.03
<b>Articles</b>	<b>.80</b>	<b>14.62</b>	<b>1</b>	<b>58</b>	<b>.000</b>
Webs	.97	2.05	1	58	.16

The group statistics indicated that the top performers ( $N=30$ ; mean: 6.97; median: 5; SD: 6.4) had a higher frequency of referenced articles than the bottom performers ( $N=30$ ; mean: 2.07; median: 1; SD: 2.89). The effect size was large ( $d=0.99$ ) and classification statistics indicated that 73.3% of the original grouped cases were correctly classified with the discriminant function. Hence, the best performing students tended to submit more referenced articles than the worst performing students.



## 7.10 Discussion Format Preference Groups as the DV

In order to examine if any of the IVs could be used as predictors of discussion format preference, a DV group was created using the responses to question 6 from Survey II, "For group collaboration on writing a paper for a tutorial assignment, I prefer:". Students who said they preferred the traditional face-to-face discussion format were then compared with those who said they preferred the online discussion forum format. As in the previous section, MCQs from Survey I and Survey II, student information and posting content categories were examined as IVs. In addition, the performance indicators described in section 3.8.3.5 were also examined as IVs in the DFA.

There were 74 students who indicated a discussion format preference; 46 students said they preferred the traditional face-to-face tutorial discussion format and 28 students said they preferred the discussion forum format. While all cases of the performance indicators as IVs were valid for statistical analysis, only 97% of the cases from Survey I, 88% of the cases from Survey II and 85% of the cases from the student information categories were valid for the statistical analysis. Since the posting content categories were associated with the total number of postings submitted, the cases that were identified as outliers in section 4.4.4 were removed from this particular DFA calculation.

In every DFA calculation that showed one or more significant discriminants in the IVs, the Box's M test showed  $p(M) < 0.05$ , and consequently the null hypothesis was accepted and the assumption of homogeneity of variance was upheld.

### 7.10.1 Discussion format preference as the DV and Survey I MCQs as IVs

As table 7.17 shows, question 17, "I believe that I learn more about a tutorial topic from participating in the IVLE discussion forum rather than in the face-to-face discussion format", and question 19, "I believe that I remember more about a tutorial topic from participating in the IVLE discussion forum rather than in the face-to-face discussion format." ( $p < 0.01$ ) were significant discriminants at the first and second step of the DFA calculation.

The group statistics indicated that the students who said they preferred face-to-face tutorial discussions ( $N=44$ ; Q17: mean: 2.8; median: 3; SD: 0.80; Q19: mean: 3.58;

median: 3.5; SD: 0.81) were more in disagreement with the statements in questions 17 and 18 than the students who said they preferred the discussion forum format (N=26; Q17: mean: 2.5; median: 2.5; SD: 0.82; Q19: mean: 3.23; median: 3; SD: 0.82).

**Table 7.17:** Stepwise Statistics - DV discussion format preference, IVs Survey I MCQs

Step	Entered	Wilks' Lambda							
		Statistic	df1	df2	df3	Exact F			
						Statistic	df1	df2	Sig.
1	Q17	.81	1	1	68	15.60	1	68	<.000
2	Q19	.76	2	1	68	10.39	2	67	<.000

At each step, the variable that minimizes the overall Wilks' Lambda is entered. Maximum number of steps is 24. Minimum partial F to enter is 3.84. Maximum partial F to remove is 2.71. F level, tolerance, or VIN insufficient for further computation.

The effect size in both cases were large ( $d=-0.97$  and  $d=-0.89$ ), and classification statistics showed that 76.4% of the original grouped cases were correctly classified with the discriminant function

Hence, in Survey I, students who later in the semester said they preferred the traditional face-to-face tutorial discussions format, were less likely to believe they had learned more or remembered more about a tutorial topic from participating in the discussion forums. Since there was some disparity in the group numbers, a logistic regression was run on the data and the results confirmed the findings of the DFA.

#### 7.10.2 Discussion format preference as the DV and Survey II MCQs as IVs

As table 7.18 shows, question 4, “I have difficulty expressing myself clearly when posting a message on the IVLE discussion forum.” ( $p<0.01$ ), question 5, “Generally, the messages in the IVLE discussion forum have been relevant to the topic being discussed.” ( $p<0.01$ ) and question 17, “I believe that I learn more about a tutorial topic from participating in the in the face-to-face discussion format rather than IVLE discussion forum” ( $p<0.01$ ) were significant discriminants at the first, second and third step of the DFA calculation.

The group statistics indicated that the students who said they preferred face-to-face tutorial discussions (N=40; Q4: mean: 2.85; median: 3; SD: 0.98; Q5: mean: 3.9; median: 4; SD: 0.67; Q17: mean: 3.58; median: 3.5; SD: 0.87) were more in agreement with the statements in questions 4, 5 and 17 than the students who said they preferred

the discussion forum format (N=26; Q4: mean: 2.19; median: 2; SD: 0.63; Q5: mean: 3.62; median: 4; SD: 0.9; Q17: mean: 3; median: 3; SD: 0.75).

**Table 7.18:** Stepwise Statistics - DV discussion format preference, IVs Survey II MCQs

Step	Entered	Wilks' Lambda							
		Statistic	df1	df2	df3	Exact F			
						Statistic	df1	df2	Sig.
1	Q4	.88	1	1	56	7.71	1	56	.007
2	Q5	.80	2	1	56	6.87	2	55	.002
3	Q17	.73	3	1	64	7.52	3	62	<.000

At each step, the variable that minimizes the overall Wilks' Lambda is entered. Maximum number of steps is 30. Minimum partial F to enter is 3.84. Maximum partial F to remove is 2.71. F level, tolerance, or VIN insufficient for further computation.

The effect size for question 4 and 17 were medium (Q4:  $d=0.77$  and Q17:  $d=0.7$ ) and small for question 5 (Q5:  $d=0.36$ ), and classification statistics showed that 73.2% of the original grouped cases were correctly classified with the discriminant function.

Hence, later in the semester, when compared to students who said they preferred the discussion forum format, the students who indicated that they preferred working in the traditional face-to-face tutorial discussion format were more likely to say that they had difficulty expressing themselves clearly in the discussion forums, that the postings had been relevant to the topic being discussed and that they learned more about a tutorial topic from participating in the traditional face-to-face tutorials. Since there was some disparity in the group numbers, a logistic regression was run on the data and the results confirmed the findings of the DFA.

### 7.10.3 Discussion format preference as the DV and posting content categories as IVs

As table 7.19 shows, Managing type postings ( $p<0.05$ ) and Proposition type postings ( $p<0.05$ ) were significant discriminants at the first and second step of the DFA calculation.

**Table 7.19:** Stepwise Statistics - DV discussion format preference, IVs Survey I MCQs

Step	Entered	Wilks' Lambda							
		Statistic	df1	df2	df3	Exact F			
						Statistic	df1	df2	Sig.
1	Managing	.93	1	1	60	4.60	1	60	.04
2	Proposition	.87	2	1	60	4.37	2	59	.02

At each step, the variable that minimizes the overall Wilks' Lambda is entered. Maximum number of steps is 14. Minimum partial F to enter is 3.84. Maximum partial F to remove is 2.71. F level, tolerance, or VIN insufficient for further computation.

The group statistics indicated that students who said they preferred the face-to-face tutorial discussions (N=40; Managing: mean: 4.08; median: 4; SD: 3.95; Proposition: mean: 2.59; median: 2.5; SD: 1.82) submitted more statements aimed at managing the discussion, than students who said they preferred the discussion forum format (N=22; Managing: mean: 1.53; median: 1.5; SD: 1.91; Proposition: mean: 2.41; median: 2; SD: 2.15). The effect size in the case of Managing was medium ( $d=-0.57$ ), while effect size in the case of Proposition was small ( $d=-0.44$ ), and classification statistics indicated that 67.7% of the original grouped cases were correctly classified with the discriminant function.

Hence, compared to students who indicated that they preferred working in the discussion forum format, students who said they preferred the traditional face-to-face tutorial discussion format were more likely to submit postings that included suggestions or requests on how to approach the assignment topic, but less likely to submit Proposition type postings. Since there was a disparity in the group numbers, a logistic regression was run on the data and the results confirmed the findings of the DFA

#### 7.10.4 Performance indicators and student information as IVs

The DFA run with performance indicators and student information as IVs did not find any significant difference between the means of the IVs.

### 7.11 Summary

This chapter presents the findings from the discriminant function analysis (DFA) calculations in which the Index of Learning Styles (ILS) questionnaire, the student demographics, the student performance and the discussion format preference results were used to form dichotomous groups as dependent variables (DVs) of the DFA. Survey I and Survey II questionnaire MCQ responses, student characteristics, posting content categories and performance indicators were the independent variables (IVs) examined in the DFA. The main objective of this post hoc analysis was to explore the IVs as predictors of categories of DV groups.

The findings revealed that:

- Reflective learners

- were more likely than others to think that their group members were not dependable enough to make good contributions to the online discussions
- Intuitive learners
  - were more likely than others to believe that their relationships with group members were "business like"
  - were more likely than others to think that the discussion forum postings had been relevant to the topics being discussed
- Visual learners
  - were more likely than others to think that their group members would be conscientious and make good contributions to the online discussion
- Sequential learners
  - were more inclined than others to say they had a difficult time understanding what was happening in the discussion forum
  - were more inclined than others to believe that they learned more about a tutorial topic from attending a face-to-face tutorial session than from participating in the online discussion forum format

The DFA using student demographic information groups as DVs showed that students who were primary users of English felt that the relationships with their group members were more impersonal than students whose main language was Chinese, Malay or Tamil; and students who said that they had not enjoyed the traditional face-to-face tutorial discussions in the past felt that they had contributed more opinions to the online discussions.

The DFA also showed that:

- Students who had enjoyed participating in online discussions forums in the past
  - were more inclined than others to say that their relationships with the other forum group members were more impersonal
- Students who were motivated to achieve a high grade in the course
  - were more inclined than others to believe that the online discussion forums had been more conducive to learning
- Students who were motivated by the belief that the course workload would be light

- were more likely than others to say that posting messages to the discussion forums had not been easy
- Students who were motivated by the idea of working and submitting assignments from home
  - were more likely than others to say that accessing the discussion forums had been easy

In order to examine issues related to student performance, a performance group was created with students from the research sample; 30 students with the highest CA grades were assigned to the “Top” category and 30 students with the worst CA grades were assigned to the “Bottom” category. The IVs included the MCQs from Survey I and Survey II, and the student information and the posting content categories.

The DFA calculations showed that while the top performing students said they spent more time gathering information than the bottom performing students, they were also the more sceptical group at the start of semester about discussion forums being more conducive to learning. However, they also thought that the discussion forum postings had been more on topic, felt more comfortable accessing the technology and tended to submit more referenced articles than the bottom performing students. Lastly, the data on student ICT experience revealed that the top performing students tended to have had less prior experience in using chat rooms.

The responses to question 6 from Survey II were used to form the final DV group: 46 students said they preferred the traditional face-to-face tutorial discussion format and 28 said they preferred the discussion forum format. Here again the IVs included the MCQs from Survey I and Survey II, student information and posting content categories. The DFA showed that students who preferred the traditional face-to-face tutorial discussion format were less likely early in the semester to believe they had learned more or remembered more about a tutorial topic through participating in the discussion forums. Later in the semester however, these students were more likely to say they had difficulty expressing themselves clearly in the discussion forums. They were also more likely to believe that the postings had been relevant to the topics being discussed and to say that they had learned more about a tutorial topic through participating in the traditional face-to-face tutorials. Students who preferred the traditional face-to-face tutorial discussion format were also more likely to submit postings that included suggestions or

requests on how to approach the assignment topic, and less likely than students who preferred the discussion format to submit Proposition type postings.

In the following chapter, highlights of the findings from chapters 4, 5, 6, and 7 are discussed. Relationships between quantitative and qualitative data, links to the results of the post hoc analysis and the implications of these findings are examined. Finally, the research questions and hypotheses are addressed.

## **Chapter 8**

### **SUMMARY AND CONCLUSIONS OF THE STUDY**

#### **8.1 Overview**

In this chapter, the findings from chapters 4, 5, 6, and 7 are discussed and the relationships between these findings are examined. An overview of the Learning Management System (LMS) usage statistics and an analysis of the posting contents revealed that the assigned small-group online tutorial discussions generated a substantial number of contributions from the students, and that the students seemed to work effectively without the intervention or mentoring of the class instructor. Pearson correlations also revealed a significant relationship between peer ratings and the number of postings submitted, and the DFA calculations showed that a number of independent variables were predictors of cognitive learning styles and student demographics.

Factor analysis calculations showed that two factors accounted for 34% of the total variance in Survey I MCQs; three factors accounted for 39% of the total variance in Survey II MCQs; and four factors accounted for 47% of the total variance in the paired Survey I and Survey II MCQs. The relationships between these factors and how they relate to the qualitative data gathered throughout the study is discussed.

Lastly, the post hoc discriminant function analysis calculations revealed a number of predictors for cognitive learning style preference groups, student demographics groups, high/low performance groups and discussion format preference groups. These predictors are compared to the expectations outlined in the literature review.

#### **8.2 Discussion Forum Usage, Learning Styles and Demographics Findings**

While research into the effects of moderated, mentored or peer-controlled online collaboration has shown that online peer-to-peer collaboration seems to be more productive when it is being mentored or moderated by a tutor (Cavallaro & Tan 2006; Zhang & Peck, 2003), this study revealed that students were able to work effectively without the intervention of the course instructor. During the semester, a total of 3,238 postings were submitted by 147 students and reviewed by the author. The contents of these postings revealed that most students were able to moderate the discussion of their



assigned topics and were unbiased in rating their group member's contributions to the topic. As well, the course instructor also noted that the students showed far greater involvement, and contributed more to the tutorial topic in the discussion forums, than they had in the face-to-face tutorial discussions of past semesters.

The post hoc DFAs examining learning style groups showed that Active learners tended to submit fewer postings than other students. Working in discussion forums tends to favour students who prefer to reflect and research before posting (Brunner, 2006; Concannon, Flynn & Campbell, 2005; Downing & Chim, 2004; Motteram, 2006), hence, Active learners, being individuals who are driven to take immediate action, might have felt frustrated with replies to postings that typically took days, and might therefore have made only the minimal effort required for participation.

Conversely, Reflective learners are seen as being more likely to favour working in an environment that allows them the time to think things through (Felder & Silverman, 1988), and accordingly, the DFA showed that these students were more likely to address issues from a critical perspective and include more web hyperlinks in their postings. In addition to being more amenable to working in the discussion forums, it was not surprising to find that Reflective learners also received high grades on the peer paper critique assignment.

Cunningham-Atkins, Powell, Moore, Hobbs and Sharpe (2004) found that in text-based computer-mediated conferences, "Verbalisers" did not post as many messages as "Imagers". While this may not help explain why Verbal learners achieved higher grades on the peer paper critique assignment, it may provide some explanation as to why they received lower peer ratings. As reported in section 4.4.4, peer ratings were correlated with the number of postings, hence discussion leaders did not favour those group members who did not post often. However, since Verbal learners made up only 5% of the research sample, further research is needed in order to validate these findings.

Other DFA calculations showed that Sequential learners were also more likely to do well on the peer paper critique assignment; a finding that is not supported in the literature. However, this finding might reflect a possible association between the Sequential-Global and the Sensing-Intuitive scales of the ILS (Cook, 2005; Cook & Smith, 2006; Livesay et al, 2002; Spurlin, 2002; Van Zwanenberg et al, 2000; Viola et

al, 2006; Zywno, 2003), in which Sequential learners, much like Sensing learners, may have found that being concrete thinkers, oriented towards facts and procedures, was beneficial to them for completing the critique assignment.

Interestingly, the DFA calculations examining student characteristics showed that students who said they had enjoyed using online discussion forums before the study, tended to receive lower peer ratings and were more inclined to submit “Unfriendly” comments in their postings. However, the lower peer ratings may be attributable to a pre-misconception by the students concerning the use of discussion forums. The purpose and expected outcomes of using the discussion forums were very different from what the students had probably experienced in the past. In this study, participation in the discussion forums was mandatory and conspicuous, and the students were using the forums as a graded collaborative activity workspace, rather than as a discretionary class bulletin board which was common to many of their other courses.

DFA calculations on student motivations for taking the course highlighted the following relationships. Students who said that achieving high grades in the course was important to them may have been motivated to work harder since they submitted more postings than others; while students who said they had enrolled in the course because they believed the workload would be light may have been less motivated to put in the effort since they tended to receive lower grades on their tutorial paper assignment. Therefore, the level of personal commitment to the course seemed important.

It is also interesting to note that students who said they were motivated by the convenience of working and submitting assignments from home did poorly on the tutorial paper assignment and submitted fewer factual information type postings. Thus, the collaborative nature of the discussion forum activity might not be beneficial for those who prefer working independently.

### **8.3 Survey MCQs Findings**

Considering that before the study 80% of the students in the research sample had had little experience in the use of discussion forums, within the context of this study it seemed that accessing the forums and posting was relatively simple and straightforward for most. However, several students had expressed apprehension about using discussion forums from the start, and findings from the analysis of the Survey I MCQs showed that

a number of them had difficulty understanding the discussion forum postings and expressing themselves clearly in their postings. Others did not trust their group members to be conscientious and some felt insecure about expressing their opinions online. Moreover, a substantial number of students indicated that they preferred the traditional face-to-face tutorial discussion format; 30% of the survey respondents thought that the discussion forums were not more conducive to learning and 36% thought that they did not offer a better environment in which to acquire information for later recall.

Pearson correlations on Survey I MCQs revealed small to moderate significant correlations, and a factor analysis showed that two factors accounted for 34% of the total variance. The first factor highlighted the contrast between students who were insecure about expressing their opinions in postings and/or perceived their relationships in the discussion forums as being impersonal, versus students who seemed to adapt well to working in this type of discussion forum activity. The second factor highlighted the contrast between students who clearly understood what was going on in the postings and those who had difficulty expressing themselves in writing. Overall, these two factors indicate a relationship between feelings of insecurity, difficulty in expressing oneself in writing, and not adapting well to the discussion forum activity.

Findings from the analysis of the Survey II MCQs indicated that a number of changes in student attitudes had occurred during the semester. While fewer students now had difficulty understanding the discussion forum postings and fewer still were insecure about expressing their opinions online, more students, up to 44% of the survey respondents, still believed that they had learned more, and 62% of respondents still believed they had remembered more, through participating in the traditional face-to-face tutorial discussions. However, the peer learning and peer assessment aspects of the discussion forum format were still well received.

Pearson correlations on Survey II MCQs revealed small to large significant correlations, and a factor analysis showed that three factors accounted for 39% of the total variance. The first factor pointed to the contrast between clearly understanding postings and having difficulty expressing oneself in writing; the second factor highlighted the contrast between self-confidence in participating in discussion forum group work and the preference for traditional face-to-face tutorial discussions; while the third factor was

the reverse of factor two. The third factor highlighted how insecurity and difficulty in expressing one's opinions in writing, was in contrast to working effectively and learning more through the discussion forum activity. Overall, these factors indicate a relationship between feelings of insecurity, difficulty in expressing oneself in writing and not adapting well to using the discussion forum activity.

Survey I and Survey II questionnaires were designed to include a number of paired MCQs which would serve as repeated measures. Moderate to large significant paired samples correlations were found, and t-tests showed a significant difference between the means for three of the paired questions. The findings indicated that compared to the start of semester, by the end of term more students felt that their relationships with the other discussion group members was more impersonal, and that the traditional face-to-face tutorial discussion format was still more conducive to learning and significantly better for stimulating recall.

Comments from the follow-up Survey II open-ended questions indicated that students believed the traditional face-to-face format was much easier to follow and provided more cues for recall. As well, during the end-of-semester interviews, one student mentioned her concern with the impersonal relationships in her discussion forum, saying, "If all my modules (had) this kind of system I think I'll have no friends at the end. I think it's quite sad. ...you get only fly-by friends", and another student complained, "Well to me, the most significant thing was that the longer it went, the less postings there were".

The paired questions data was also submitted to a factor analysis and the results showed that 4 factors accounted for 47% of the total variance. The first factor highlighted the students inability to work effectively in the discussion forum environment due to a lack of self-confidence and difficulties in composing the posting; the second factor pointed to the contrast between the student's initial perceptions about the educational effectiveness of the tutorial discussion forum format and their final impressions at the end-of-semester; the third factor emphasized the relationship between trusting group members, understanding what was communicated in the postings and feeling satisfied about working in the discussion forum format; and the fourth factor highlighted issues of trust and confidence when working with the other group members in the discussion forums.

Overall, the analysis of the survey MCQs indicated that there was a direct relationship between the students who felt uncomfortable expressing their opinions in discussion forums, those who had difficulty understanding what was being communicated in the postings, and those who didn't trust their group members to be conscientious. Data from both surveys indicated that these students clearly preferred the traditional face-to-face tutorials. As well, students who had initially thought the discussion forum format was a better context for learning and remembering later changed their minds and endorsed the traditional face-to-face tutorial discussion format as being better for learning and stimulating recall.

#### **8.4 Responses to Open-Ended Questions and Interview Findings**

Along with the answers to open-ended questions in Survey I and Survey II, the transcripts from the end-of-semester interviews offered further insight into the students' attitudes about working collaboratively in discussion forums. In their responses to the open-ended questions, students who favoured the discussion forums indicated that they had:

- made more contributions to the discussion because online discussions allowed them more time to work on formulating an answer
- spent more time gathering information because they felt pressured to produce quality postings
- trusted their discussion forum group members to be conscientious because the grading of contributions would pressure everyone to submit good postings
- felt confident about expressing their opinions because the atmosphere in the forums was friendly and non-threatening
- thought that relationships in the discussion forums were friendly because the atmosphere in the forums was collegial
- felt they learned more because accessing discussions online gave them greater flexibility to manage their time
- felt they remembered more because online discussions encouraged deeper and longer reflection about the topics
- felt that peer collaboration was practical
- preferred the online discussion format because it seemed a more efficient way to work

- felt more trusting of their group members because of the high quality of contributions that were made
- felt more confident about expressing their opinions because relationships within the group had improved
- thought relationships within the group had improved because group members had gotten to know each other better

In contrast, students who favoured the traditional face-to-face tutorial discussions said that they had:

- submitted fewer contributions to the online discussion because using discussion forums interrupted the flow of their ideas
- spent less time gathering information because they felt that they were not accountable to the team
- felt less trusting of their group members because they believed them to be unreliable
- felt insecure because the written record of their postings made them accountable for what they had contributed
- felt their relationships were impersonal because the online environment was not conducive to initiating or supporting social interaction
- felt they learned more from the traditional face-to-face tutorials because real-time interaction was easier to follow
- felt they remembered more from face-to-face tutorials because it was a more efficient format from which to gain information for later recall
- felt that peer collaboration was ineffective
- preferred the traditional face-to-face discussion format because it seemed to be a more efficient way to work
- felt less trusting of their group members because the number of postings had decreased as the semester progressed
- felt less confident in expressing their opinions because of insensitive replies from other group members
- thought that relationships within the discussion forum group had deteriorated due to the lack of personal interaction

Since these open-ended questions were a follow-up to many of the MCQs in Survey I and II, some responses can shed further light on the findings from the factor analysis of these MCQs. While students had not been asked to comment about why they had had difficulty composing their postings, they were asked to give reasons about why they felt insecure about expressing their opinions, and why they did not trust their group members; two significant factors that were highlighted in the factor analysis. In response, students said that they felt uncomfortable posting their opinions because having a written record of their contributions made them accountable for what they had posted, and they did not trust their group members because they believed them to be unreliable and not committed to helping their fellow group members.

In order to gain some insight as to why some students had done particularly well or particularly poorly in the peer ratings, 8 students with the highest peer ratings (top rated) and 9 students with the lowest peer ratings (bottom rated) were interviewed. While most of the feedback from the interviewees confirmed and reinforced what had already been established in the surveys, one interesting finding indicated that top rated students preferred working in the discussion forum format. Specifically, the bottom rated students were almost evenly split in their discussion format preference, while the top rated students preferred the discussion forum over the face-to-face format by a margin of 3 to 1. Although the sample size for these interviews was very small (N=17), it is nonetheless interesting to note this strong support by the top ranking students.

## **8.5 Post Hoc Findings**

The DFA in which cognitive learning styles groups were set up as dependent variables (DVs) did not reveal any meaningful predictive independent variables (IVs) for Active learners, Sensing learners, Verbal learners or Global learners. However, significant discriminates were found for Reflective learners, Intuitive learners, Visual learners and Sequential learners, as well as for a number of student demographic groups.

Reflective learners prefer working alone (Felder & Silverman, 1988), so it is not surprising to find that they tended not to trust their online group members. Another DFA showed that Intuitive learners were more likely to say that the discussion forums were impersonal, and while the literature does help explain this finding, it might just indicate that Intuitive learners are more inclined to express their perspective about the discussion forums from the general overview of their group interactions. If so, this

would once again suggest a link between the Sensing-Intuitive and the Sequential-Global learning style dimension of the ILS, since Global learners, like Pask's holists (Ford, 2001; Tickle, 2001), have a tendency to see general patterns and interpret information from a broad perspective.

The DFA that examined Visual learners found that they tended to trust their group members to be conscientious, yet the literature and the evidence from this study do not provide any basis from which to explain this finding. However, the DFA examining Sequential learners revealed some noteworthy findings: Sequential learners were more inclined to say that they had difficulty understanding what was happening in the discussion forums and that they learned more about a tutorial topic from attending the face-to-face tutorial discussion sessions. These findings highlight the difficulty that Sequential learners, linear thinkers who learn best in a step-by-step manner (Saddler-Smith & Smith, 2004; Pask & Scott 1972; Felder & Silverman, 1988), have in making sense of information acquired through asynchronous collaboration (Dünser & Jirasko, 2005), and why these students do not think online discussions are conducive to learning.

Traditional classroom teaching techniques are designed for Sequential learners in which teachers proceed in a logical progression (Felder & Silverman, 1988). In the classroom, they first present new information or concepts by linking them to already established knowledge, they then provide practice and testing so the students can verify the soundness of their newly assimilated information and knowledge, and then repeat the process with links to new material. Hence, it is not surprising that Sequential learners preferred the traditional face-to-face tutorial discussion format and felt disadvantaged when required to use the discussion forums as a replacement for the face-to-face format.

Another DFA that examined student demographic groups as DVs revealed that students whose primary language was not English did not perceive their relationships with their online discussion group members as being impersonal. While this may indicate that these students did not understand the meaning of the word "impersonal", it is also plausible that they had different expectations relating to friendliness in discussion forums.

An important DFA finding showed that students who said they had not enjoyed the traditional face-to-face tutorial discussions felt they had contributed more opinions in



the online tutorial discussions. Thus, the discussion forum activity seems to be well suited to students who feel uncomfortable with the face-to-face discussion format.

Finally, some of the DFA calculations corroborated, while others complemented previous findings. Students who said they had enjoyed participating in online discussions forums in the past were more inclined to say that their relationships with the other discussion forum group members were more impersonal by the end of the semester. This supports the findings discussed in section 8.2 in which a pre-misconception by the students concerning the use of discussion forums was noted. Another DFA examined student motivations for taking the course and found that those students who were motivated to achieve a high grade also said they believed the online discussion forums were more conducive to learning. This complements another finding discussed in section 8.2 in which these same students were identified as having submitted more postings than other students.

## **8.6 Conclusions**

As discussed in section 1.1, there are many reasons why students in residential universities are resistant to embracing CMC-mediated activities as an integral part of their coursework, and this attitude underscores the importance of understanding how these students are affected by the implementation of the new teaching and learning strategies associated with a 'blended learning' approach. Since a number of experiments have shown that educational activities are more effective when they are designed to harmonize with the students' preferred learning strategies (Pask, 1976), Evans and Saddler-Smith (2006) recommend that a "better understanding of thinking styles and learning strategies would enhance the planning and design of learning in educational and occupational settings". Hence, the quest for matching teaching strategies with learning styles (Felder & Henriques, 1995; Graff, 2003<sup>a</sup>, 2003<sup>b</sup>; Zapalska & Brozik, 2006; Zhenhui, 2001), with Kolb (1984) even claiming that if students were to experience a learning environment at variance with their particular learning style, they would likely reject it.

Accordingly, in this study it was suggested that due to a match/mismatch between cognitive learning style traits and the requirements for effectively perceiving, receiving, processing and understanding information communicated in discussion forums, some students would gain through interacting in these discussion forums while others would

struggle to make sense of the information presented. Hence, it was proposed that the discussion forum format would be an appropriate match for both Active learners, because they prefer working in groups and tend to retain and understand information best by discussing it, applying it or explaining it to others, and for Intuitive learners, because they prefer innovation, dislike repetition and are more comfortable with new concepts (Felder & Silverman, 1988). The discussion forum activity was expected to be a mismatch for Sequential learners because these learners are linear thinkers who have difficulty following and remembering material presented in no apparent order or with gaps (Pask & Scott, 1972; Felder & Silverman, 1988).

Because of the inherent resistance to change from both students and faculty (Finley & Hartman, 2004; Felder & Brent, 1996; Hunt, Thomas & Eagle, 2002; Jaffee, 1998; Woods, 1994), the study also expected to find that over time and regardless of learning style, the level of insecurity the students felt due to the radical changes in their coursework and assessment would not diminish. Also, students who were unsympathetic towards participating in collaborative group work, or who resented using CMC to express themselves, were not expected to make valued contributions to the online discussion, and hence would be poorly rated by their group leaders.

Did the findings from the study support these hypotheses?

- **Hypothesis:** Active learners achieve significantly higher peer ratings.
  - Hypothesis **Rejected**
  - DFA calculations indicated that students who were Active learners were not very active in discussion forums.
  - However, with only 6 Active learners in the group of 147 students, a Type I statistical error is possible (Whalberg, 1984; Hopkins, 2002).
- **Hypothesis:** Intuitive learners prefer the discussion forum format rather than the traditional face-to-face tutorial discussions.
  - Hypothesis **Rejected**
  - No Relationship was found.
- **Hypothesis:** Sequential learners find it difficult to work in the discussion forum format.
  - Hypothesis **Accepted**

- DFA calculations indicated that Sequential learners were more inclined to say they had a difficult time understanding what was happening in their discussion forum.
- **Hypothesis:** The initial resistance to replacing the traditional face-to-face tutorial discussion format with a peer rated small-group CMC-mediated collaborative activity does not diminish after its implementation.
  - Hypothesis **Accepted**
  - Paired samples correlations, t-tests and effect size calculations showed a significant increase in the belief that discussion forums were impersonal and that the traditional face-to-face discussion format was more conducive to learning and to a large degree, better for stimulating the recall of information.
- **Hypothesis:** Positive attitudes towards participating in the online discussion forum format generate high peer ratings.
  - Hypothesis **Judgement Withheld**
  - Findings from the end-of-semester interviews indicated that 75% of the top peer rated students had positive attitudes about working in the discussion forum format, however the DFA calculations showed that students who said they had enjoyed using online discussion forums prior to the study received lower peer ratings than those who said they had disliked using the discussion forums.

In the next and final chapter, the importance of this study within the greater field of research into 'blended' learning and cognitive learning styles is examined, and given the setting and the context of the study, the extent to which its findings are generalisable is discussed. Then, in light of the major research findings and their implications, the author makes recommendations to practitioners, students and instructional designers, and presents contemporary CMC tools and environments as candidates for further research into cognitive learning styles and CMC facilitated collaborative group work.

## **Chapter 9**

### **CONTRIBUTION TO KNOWLEDGE AND RECOMMENDATIONS**

#### **9.1 Overview**

In this chapter, the rationale for undertaking this study is revisited, and its relationship to the wider field of research into 'blended' learning is discussed. As such, the study's contribution to the field of 'blended' learning design and cognitive learning styles research is examined. Also, because the study involved a single group design and the research subjects were from a sample of convenience, the reliability and generalisability of the findings are discussed. Lastly, the author discusses the implications of the major findings, makes recommendations for instructional designers, teachers and students, and proposes some directions for further research.

#### **9.2 The Study's Contribution to Knowledge**

As universities world-wide continue to invest in their ICT infrastructure, an increasing number of faculty are transforming the ways in which their students learn by opting to include CMC/ICT as a vital component of the learning environment (Graham, 2006; West & Graham, 2005, Garrison & Vaughan, 2007). Faculty are also encouraged to be sensitive towards their students' learning preferences and to provide them with learning experiences that are congruent with their learning styles (Graff, 2003<sup>a</sup>, 2003<sup>b</sup>; Jaques & Salmon, 2007; Zapalska & Brozik, 2006). Therefore, it is essential to explore the relationship between learning styles and students' aptitudes and attitudes towards particular 'blended' learning designs, such as the one outlined in this study, in which the traditional face-to-face post-lecture tutorial discussion was replaced with a CMC-mediated, peer-moderated, collaborative learning activity.

##### **9.2.1 Blended Learning**

In the five years since this study was undertaken, the convergence between traditional face-to-face and online learning experiences in higher education has increased dramatically. Since blended learning has grown to span the four levels of operational structures in higher education; the activity level, the course level, the program level and the institutional level (Graham, 2005), it is important to present the current research in the context of these structures. While this study involved course level blending in which

a combination of distinct face-to-face and CMC activities were implemented, the research itself focused specifically on an activity level blending in which the in-class tutorial discussion activity was replaced with an online small-group discussion forum activity.

Comparing in-class discussions with asynchronous online discussions, Graham (2006) emphasized that a discussion forum environment provides students with more flexible access to the discussions, removes time and space constraints, and facilitates full participation and more thoughtful reflections. Hence, online discussion forums provide students with a more engaging learning experience (Garrison, 2007; Jaques & Salmon, 2007) that is deemed to be in accordance with the constructivist approach to learning in higher education (Garrison, 2006).

*"At the heart of a meaningful educational experience are two integrated processes: reflection and discourse. These are the two inseparable elements of inquiry in higher education. In an online learning experience the advantage is given to reflection in a way that is not possible in the fast and free flowing face-to-face environment. The face-to-face classroom experience requires verbal agility, spontaneity, and confidence to express oneself in a group setting. Reflection and even dialogue are greatly limited in most campus based classrooms due to student numbers and dated pedagogical methods. There is evidence to suggest that online learning may in fact have an advantage in supporting collaboration and creating a sense of community. An online learning environment reflects a "group-centered" interaction pattern versus an "authority-centered pattern" of a face-to-face environment. Moreover, there is a tendency to build on the comments of others in the online environment (higher flow of communication), compared to the "turn-taking" face-to-face environment." (Garrison, 2006:25).*

One important issue associated with using discussion forums in a 'blended' learning design concerns the manner in which a moderator/instructor supports the progress of the discussion groups towards meeting the intended goals of the activity (Garrison, 2006, 2007; Garrison & Anderson, 2003; Garrison & Cleveland-Innes, 2005; Garrison & Vaughan, 2007; Jaques & Salmon, 2007; Salmon, 2000, 2002). In her five stage model of teaching and learning online, Salmon (2004) describes the role of the e-moderator as a guide who creates an atmosphere in which the learner's skill and comfort level gradually increase to enable the independence and self-determination necessary for meaningful learning to occur. She proposes that the e-moderator provide learners with interactive tasks throughout the process; beginning with an induction, then followed by tasks promoting online socialisation, information exchange, knowledge construction and ultimately self-sufficiency. Because the e-moderator can intervene directly or remain

unobtrusive when monitoring student interactions, it is the degree to which this overseeing presence is evident and influential on group members that has generated concern (Condie & Livingston, 2007; Finegold, & Cooke, 2006; Garrison, 2006, 2007; Garrison & Vaughan, 2007; Gulati, 2004).

On the one hand, Garrison (2007) believes that in online learning there is a risk of providing too little direct teaching presence. Noting that interaction and discourse are indispensable requisites of higher order learning, he emphasises that this does not occur without design, facilitation and direction. To support this view he quotes Schrire (2004) who found that the active presence of an instructor in online discussions helped the groups attain more advanced stages of inquiry than in discussions led by students. However, Garrison admits that “while students expect a strong teaching presence, too much direct intervention will most assuredly reduce discourse and collaboration” (Garrison, 2006:32).

On the other hand, a number of researchers believe that any overt teaching presence discourages the targeted self-reliance of students and impinges on the co-construction of knowledge among peers (Condie & Livingston, 2007; Finegold, & Cooke, 2006; Gulati, 2004). They believe it is essential for instructors to adopt a “hands-off” approach towards directing and managing interaction in online groups. Even Garrison seems to partially support this non-intervention point of view, as he and Vaughan point out that a teacher should not “micro-manage” the discussion forum, but rather encourage students to address and resolve conflicts on their own (Garrison & Vaughan, 2007).

The findings of this study support this latter perspective. The course instructor wanted the students to express opinions and explore ideas that were brought forward in their postings, without falling back on his “expert” advice. Hence, throughout the semester the instructor did not make any postings on the discussion forums, and as discussed in sections 4.3.5 and 4.3.6, the group leaders readily took charge of managing their groups, making requests and suggestions, asking for opinions and providing words of encouragement and support towards their group members. This hands-off approach is also found in Doolan’s (2007) design of a CMC collaborative student learning activity, without tutor input or intervention, in which she used a Wiki as the online environment for facilitating the student collaboration.

In the present study, the course instructor accessed and reviewed a large number of postings from all of the discussion forum groups, and by the end of semester he had noted that from the content of these postings, the students showed a far greater depth of involvement in the topics than had previously been generated during the traditional face-to-face tutorials. As well, the students had provided more article references and relevant web links in these postings than had been shared in face-to-face sessions. He therefore concluded that the activity had achieved all of its desired objectives: it had (a) provided an environment in which students could easily exchange facts and perspectives on the issues related to the tutorial topics, (b) generated near full student participation, (c) promoted learner interaction and (d) encouraged thoughtful reflection throughout the course. In summary, this study showed that undergraduate students (randomly-selected and assigned to small groups) could collaborate effectively and provide each other with mutual support in peer-moderated discussion forums without the direct facilitation of an instructor.

#### 9.2.2 Cognitive Learning Styles

This study examined four dimensions of learning from the Felder and Silverman (1988) model (Active/Reflective, Sensing/Intuitive, Visual/Verbal and Sequential/Global) and explored the influence that moderate to strong learning style preferences could have on student attitudes and aptitudes towards using small-group discussion forums as an environment for exchanging information and ideas on a given tutorial topic. It also examined the validity of the Felder and Soloman (1991) Index of Learning Styles (ILS) questionnaire.

One important finding from this study revealed that Sequential learners seem to favour the traditional face-to-face tutorial discussion format over online discussions and feel disadvantaged when required to use discussion forums for understanding and communicating ideas. This is an important contribution to the current body of knowledge about this learning style because previous research has not only suggested that Sequential learners would not be disadvantaged, but that the variety of asynchronous interactions provided through discussion forums would in fact help them “see the development of the argument” (Sabry & Baldwin, 2003). In addition, Kovacic’s (2004) findings that Sequential learners were significantly more active in discussion forums than Global learners, also implied that they would be proficient at, and amenable to, using these discussion forums.

The results of this study mirror the findings from Dünser and Jirasko (2005) who researched the influence of learning styles on performance in a hypertext environment. They found that Sequential learners were dependent on step-wise linear structures in order to build up their understanding of a subject, and that without such structural aids, they could “learn the facts, but seem to have difficulty in understanding the information”. Since, much like working in a hypertext environment, working in a discussion forum environment does not provide Sequential learners with any logical sequence from which to organise facts, thoughts or opinions presented in the postings, it is therefore understandable that in discussion forums these students would have difficulty making sense of the disjointed information posted.

Another important finding of this study revealed that contrary to research suggesting that Active learners tend to favour interaction with people and therefore enjoy sharing their ideas in discussion forums (Felder & Silverman, 1988; Schaller, Borun, Allison-Bunnell & Chambers, 2007; Jeong & Lee, 2007), the findings from this study strongly suggest the opposite. As presented in section 7.7.6, DFA calculations showed that Active learners actually made fewer postings than other students. Notably, the effect size was large ( $d=1.09$ ) and the classification statistics showed that 96% of the original grouped cases were correctly classified with the discriminant function. However, because only 4% of this research sample were Active learners, further research into this issue is advised.

Lastly, this study supports previous research that shows the Felder and Soloman ILS questionnaire as having a satisfactory reliability and strong construct validity. While some researchers have expressed reservations with regards to the robustness of the ILS (Van Zwanenberg, Wilkinson & Anderson, 2000; Viola, Graf, Kinshuk & Leo, 2006), the test-retest trials of this study showed similar results to other studies that claim the ILS is robust (Felder & Spurlin, 2005; Litzinger, Lee, Wise & Felder, 2005). This study also supports the notion that there exists a ‘moderate’ degree of association between the Sensing-Intuitive and the Sequential-Global scales of the ILS, and the author agrees with Felder and Spurlin (2005) in that the implications of this association, while problematic for the internal consistency of the ILS scales, does not impinge on providing students with valid guidelines for managing their learning experience.



### 9.3 The Generalisability of the Research Findings

As explained in section 3.4, the research design was a field study in which subjects from a sample of convenience were observed in a natural setting as they proceeded through a graded out-of-classroom activity over the course of one semester. Although no students could be assigned to a control group, the data from various sources such as; the discussion forum usage statistics and transcripts, the peer ratings from weekly contributions to the discussion and the attitude survey questionnaires, nonetheless provided a broad understanding of the relationships involved in the implementation of a small group online tutorial assignment activity.

While some of the research findings in this study, such as the low number of unfriendly comments in the postings and the lack of gender differentiation in the findings, may have been influenced by entrenched attitudes particular to Asian cultures (Kayany, 1998) and as such would not be widely generalisable, the findings associated specifically with ILS results are not subject to this cultural bias (Dunn, 1997; Mills, & Parker, 1998; Zualkernan, Allert & Qadah, 2005). Zualkernan et al (2005) looked at the learning styles of Middle-Eastern (n=68) and American (n=71) undergraduate computer engineering students and concluded that; “students from diverse cultural backgrounds, countries and schooling systems with fundamentally different pedagogical bases have remarkably similar learning profiles based on Solomon-Felder ILS” (page 7). Hence, the findings from this study, indicating that Sequential learners feel disadvantaged when using discussion forums, and the tentative conclusion that Active learners avoid using discussion forums for communicating information and ideas, are significant and generalisable within the global context of higher education.

Also, as discussed in section 3.7.1, the research sample from this study had substantially fewer Active learners and a much higher number of Reflective learners than has been reported in other studies. To explain this discrepancy, the author pointed to the fact that most of the other studies involved undergraduate engineering students, while this research was conducted with undergraduate arts and social science students, and that the Reflective learning style may also be more prevalent among Asian students. However, while this research sample was very different in terms of its field of study as well as its cultural setting, its distribution of learning styles may well reflect Kolb’s (1984) suggestion that there are more Convergers (Active learners) among engineering students

and more Divergers (Reflective learners) among psychology students. Consequently, the major research findings from this study are generalisable to the overall university undergraduate population.

#### **9.4 Recommendation for Practitioners, Students and Designers,**

Responsible and responsive communication, a key enabling element of shared learning, is subject to the feelings of confidence and trust among learners (Jaques & Salmon, 2007), and this is reflected in the findings of this research. The analysis of the data from the survey questionnaires indicates that students who resent working in discussion forums feel isolated and distrustful, or show indifference towards their team mates. Therefore, initiating and promoting genial interpersonal relationships within online workgroups is very important.

As suggested by Jaques and Salmon (2007), exposing learners to the similarities and differences of face-to-face and online communication would be helpful in easing the transition to working in an unfamiliar online setting. They propose that prior to accessing the first online discussion, teachers run in-class simulations in which groups of students, who will be working together in the discussion forums, write and respond in silence to messages that they stick on the wall. Following this exercise, within-group discussions and observations shared between the groups would help strengthen personal relationships and alleviate some of the awkwardness and confusion associated with communicating online (Jaques & Salmon, 2007). While it may be difficult to run small-group activities when dealing with large-size university classes, it is nonetheless important to incorporate some face-to-face activities with the aim of initiating and strengthening relationships and familiarizing learners with issues related to communicating in an asynchronous mode.

The author recommends that both in-class and post-class face-to-face group meetings be scheduled within the first few weeks of the semester, and that the group leaders submit the minutes of these meetings along with their tutorial assignment papers. Because some group members may feel uncomfortable working online, and need more time adjusting to the discussion forum environment in order to contribute with confidence, the team leaders should also have the choice of setting up additional face-to-face meetings, or of working partially or exclusively online.

As Graham (2006) explains, it is apparent that learners will be the ones making the decisions about the extent to which the 'blending' suits their needs, and inevitably it will be up to the institutions and course instructors to make these options available to them. Having this flexibility of 'blending' would enable students to negotiate the degree to which discussion forums are used, while still maintaining the objectives of discussing the tutorial topic as a team, and having the group members provide the leader with a broader scope of information and perspectives. A mix of face-to-face meetings with online follow-ups could in fact allow for a more gradual move to an online environment.

Research has also shown that when CMC activities are well structured, more effective student-to-student interactivity takes place (Wozniak & Silveira, 2004, Salmon, 2000, 2002, Jaques & Salmon, 2007). Hence a structured approach that includes an initial student orientation to the online learning environment, as well as learning activities designed to show them how to use asynchronous discussions efficiently, is necessary (Salmon, 2000, 2002). Jaques and Salmon (2007) also propose that small tutorless discussion forum groups would benefit from a design approach similar to the syndicate learning method (Collier, 1983). This is a method for managing independent learning in groups in which students collaborating on a joint assignment through peer interaction are free to debate perspectives and exercise their own judgements, yet still benefit from a syndicate framework within which to report their findings and receive feedback.

Many researchers have also promoted the awareness of individual learning preferences as being beneficial to effectively perceive, receive, process and understand information (Boström, & Lassen, 2006; Hawk & Shah, 2007; Kolb, 1976, 1984; Melis & Monthienvichienchai, 2004; Mumford, 1987; Rayner, 2007). Even Coffield et al (2004a), who are highly critical of learning styles, believe that:

*"A knowledge of learning styles can be used to increase the self awareness of students and tutors about their strengths and weaknesses as learners. In other words, all the advantages for metacognition (ie being aware of one's own thought and learning processes) can be gained by encouraging all learners to be knowledgeable about their own learning and that of others"*

(Coffield et al

2004a:37)

Ultimately, as Hawk and Shah (2007) point out, the use of learning style diagnostics would allow students and faculty to become aware of, and carefully consider, the

circumstances and activities that would be most conducive to effective and deeply meaningful learning experiences. Since this study found that Sequential learners had the greatest difficulty working in discussion forums, and that Active learners seemed put off by the asynchronous nature of the forums, helping these particular learners become aware of the advantages and disadvantages associated with their learning preferences is important.

In summary, the author recommends that teachers who will be implementing a blended learning delivery, plan and carry out from the beginning, in-class activities designed to initiate socialization and facilitate communication within discussion forum groups, as well as allowing students the flexibility of a more gradual move towards interacting in an online environment. Teachers also need to be familiar with the implications of learning styles in order to instruct students on the various ways in which to approach learning activities, given the drawbacks associated with any particular learning style preference. The author recommends that students complete a learning styles inventory such as the Felder and Soloman ILS, identify their individual cognitive learning style profiles and become familiar with the advantages and disadvantages associated with their particular learning preferences. Lastly, the author believes that students should be involved in the design of their learning experiences, and proposes that rather than just being prescriptive in their approach, instructional designers must also consider the context within which a blended learning design is to take place, and consult with students, as well as their teachers, before proposing a flexible approach from which to achieve the desired learning goals.

## **9.5 Further Research**

Since an ever-increasing number of teachers and students from residential universities are being introduced to a new blending of ICT and face-to-face components in their courses (Garrison & Vaughan, 2007), the implications of this study on the design of blended learning strategies for higher education, the changes brought about during the implementation of such a design and the impact on the individuals affected by the ensuing changes, are very important. Continued research is needed in order to understand how traditional teaching and learning strategies in residential tertiary educational institutions can be supported, complemented, enhanced or even replaced by the appropriate use of ICT-mediated learning activities.

While discussion forums continue to be a basic feature of the learning management systems available on the market today, new CMC tools and environments have emerged since this study was undertaken. Wikis, a Web 2.0 technology, offer students the opportunity to work independently in a CMC environment, communicating and sharing information within and across groups (Doolan, 2007); Web Logs, a form of personalized online journal, can also be used to support self-reflection and peer review of course assignments; and synchronous communication applications such as “Eliminate Live!” can be used to support collaboration outside the classroom (Garrison & Vaughan, 2007).

Most recently, social network sites (SNS) such as MySpace and Facebook have become a global phenomenon (Boyd & Ellison, 2007). Typically they provide various ways for users to interact, such as through chat, messaging, email, photo and video sharing, voice chat, file sharing, blogging and discussion groups. However, Mazer, Murphy and Simonds, (2007) caution teachers about creating a Facebook profile in order to provide their students with a more personal image, as this can have a negative effect and cause their credibility to suffer. Their research showed that 37% of students (N=133) thought a teacher’s presence in Facebook was inappropriate.

While these new CMC tools and environments have ushered in an era of online personalisation and user content development in shared communities, the findings of this research compel the author to ask whether all learners would be well served if required to participate in online collaborative learning activities in such settings. Further research is needed in order to establish whether Sequential learners and Active learners would still feel that they were being disadvantaged, isolated or wasting their time.

In conclusion, due to the ever expanding role of ubiquitous computing and the use of ICT in everyday life, academic leaders in universities world-wide will undoubtedly seek to align their traditional educational practices with the new CMC affordances in order to complement and enhance the classroom experience. This research has provided new perspectives from which to view the blending of these learning environments, and is but one small step in the ongoing quest to understand how we can design personalized yet shared learning experiences with a view to optimising an individual’s learning potential.

## APPENDICES

### Appendix A

#### Research subject consent form, information and ILS questionnaire

#### Participant Consent Form

#### Research Project

#### Cognitive Learning Preferences and Peer Collaboration in CMC

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Dear Student,

Other than in the context of distance education, little research has been directed at examining the elements of group dynamics in online discussion forums when they are used to facilitate small group collaborative learning activities. Hence, I request your support and participation in a study aimed at investigating the relationship between individual learning styles and small group communication when using discussion forums to collaborate on tutorial topic assignments.

Participation in this study is on a voluntary basis. Students involved in the study will go through the Health Psychology course in the same fashion as students who are not taking part. The only difference is that those involved will complete the attached questionnaire, and during the semester, some of the students may be asked to meet with the investigator, Mr. G. Doiron, for a short face-to-face interview. Note that the course instructor, Professor G. Bishop, is not associated with this study and will not have access to any of the data gathered during the study. To further secure confidentiality, your name will not appear with any of the data, codes will be used.

At the end of the semester each participant will receive their Index of Learning Styles (ILS) profile and a summary of the data and preliminary findings. You will be advised through email when a more complete report is available for viewing on the NUS Centre for Development of Teaching and Learning (CDTL) website.

Please complete the form below and return to Mr. Doiron, the principal investigator in this study. Mr. Doiron, Principal Educational Technologist, CDTL can also be contacted at [doiron@nus.edu.sg](mailto:doiron@nus.edu.sg) or Tel: 6874-2529.

**Your Name:** \_\_\_\_\_ **Student ID:** \_\_\_\_\_ **Group #** \_\_\_\_\_

I have listened to Mr. Doiron's presentation explaining the study.

I agree to participate in the study.

(Check one)      Yes ☐      No ☐

**I understand that I am free to withdraw from the study at any time, without having to give a reason for withdrawing and without affecting my grade or standing in the course.**

If you checked the Yes box, please sign your name below.

**Signature:** \_\_\_\_\_ **Date:** \_\_\_\_\_

## Student Information

Gender:      ☐ Male                      ☐ Female                      Age: \_\_\_\_\_

Principal language of communication:  
☐ English      ☐ Mandarin      ☐ Malay      ☐ Tamil      other \_\_\_\_\_

Other Major language of communication:  
☐ English      ☐ Mandarin      ☐ Malay      ☐ Tamil      other \_\_\_\_\_

### Experience using information and communication technologies (ICT)

I have been using ICT (email, internet chat, discussion forums, etc.) for...  
☐ < 1 yr      ☐ 1 - 3 yrs      ☐ 3 - 5 yrs      ☐ 5 - 7 yrs      ☐ > 7 yrs

How often do you send email?  
☐ Never      ☐ < 1 per/wk.      ☐ 2 - 6 per/wk.      ☐ 1 - 3 per/day      ☐ > 3 per day

How often do you use Internet Chat?  
☐ Never      ☐ < 1 per/wk.      ☐ 2 - 6 per/wk.      ☐ 1 - 3 per/day      ☐ > 3 per day

How often do you post a message in a **Discussion Forums**?  
☐ Never      ☐ < 1 per/wk.      ☐ 2 - 6 per/wk.      ☐ 1 - 3 per/day      ☐ > 3 per day

### Experience using face-to-face discussion groups for collaborating on tutorial assignments

Please rate your satisfaction on using face-to-face discussion groups for tutorial assignments?  
☐ N/A (no prior experience)  
☐ Strongly disliked      ☐ Disliked      ☐ Indifferent      ☐ Enjoyed      ☐ Very much enjoyed

### Experience using IVLE discussion groups for collaborating on tutorial assignments

Please rate your satisfaction on using IVLE discussion groups for tutorial assignments?  
☐ N/A (no prior experience)  
☐ Strongly disliked      ☐ Disliked      ☐ Indifferent      ☐ Enjoyed      ☐ Very much enjoyed

### Your personal order of preference

I have enrolled in the PL3242 Health Psychology module because...  
(Please rank order the items you find appropriate according to their importance)

- \_\_\_ I'm interested in the topics covered.
- \_\_\_ there are no face-to-face tutorial sessions.
- \_\_\_ I believe I can achieve a high grade.
- \_\_\_ I believe the work load is light.
- \_\_\_ I can contribute to tutorial sessions and submit assignments from home using IVLE

**Appendix B**

**Survey I**

**Section : Ease of use of the technology**

1. Accessing the IVLE discussion forum for discussing the tutorial topic is complicated.
- |                       |                       |                       |                       |                       |
|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| Strongly<br>Disagree  | Disagree              | Neutral               | Agree                 | Strongly<br>Agree     |
| <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
2. No problems were encountered in accessing the IVLE discussion forum.
- |                       |                       |
|-----------------------|-----------------------|
| True                  | False                 |
| <input type="radio"/> | <input type="radio"/> |
3. If problems were encountered while accessing the IVLE discussion forum, please describe the problem below.
- 

4. Using the IVLE discussion forum to post my message is easy.
- |                       |                       |                       |                       |                       |
|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| Strongly<br>Disagree  | Disagree              | Neutral               | Agree                 | Strongly<br>Agree     |
| <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

**Section : Quality of the online discussions**

5. In the IVLE discussion forum, I can understand clearly what the other discussion group members have contributed to the tutorial topic.
- |                       |                       |                       |                       |                       |
|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| Strongly<br>Disagree  | Disagree              | Neutral               | Agree                 | Strongly<br>Agree     |
| <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
6. I have difficulty expressing myself clearly when posting a message on the IVLE discussion forum.
- |                       |                       |                       |                       |                       |
|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| Strongly<br>Disagree  | Disagree              | Neutral               | Agree                 | Strongly<br>Agree     |
| <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

**Section : Comparing online versus face-to-face discussions**

7. Compared to face-to-face discussions, when using the IVLE discussion forum I have contributed more opinions on the tutorial topic.
- |                       |                       |                       |                       |                       |
|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| Strongly<br>Disagree  | Disagree              | Neutral               | Agree                 | Strongly<br>Agree     |
| <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
8. Why have you contributed more or fewer opinions?
- 

9. Compared to face-to-face discussions, when using the IVLE discussion forum I have spent more time gathering information on the tutorial topic.
- |                       |                       |                       |                       |                       |
|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| Strongly<br>Disagree  | Disagree              | Neutral               | Agree                 | Strongly<br>Agree     |
| <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
10. Why have you spent more time or less time gathering information?
- 

**Section : Perceptions about your online relationships**

11. When using the IVLE discussion forum to work on our tutorial assignment, I feel that I can trust the other group members to do their share of the work.
- |                       |                       |                       |                       |                       |
|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| Strongly<br>Disagree  | Disagree              | Neutral               | Agree                 | Strongly<br>Agree     |
| <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |



12. If possible, explain why you feel that you can trust the other group members.

13. When using the IVLE discussion forum to work on our tutorial assignment, I feel insecure about expressing my opinion on the tutorial topic.

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

14. If possible, explain why you feel insecure or confident about expressing your opinion.

15. When using the IVLE discussion forum to work on our tutorial assignment, I feel my relationship with the other group members is very "business like" and impersonal.

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

16. If possible, explain how you feel about your relationship with the other group members.

**Section : Perceptions about your learning**

17. I believe that I learn more about a tutorial topic from participating in the IVLE discussion forum rather than in the face-to-face discussion format.

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

18. Why do you believe that you learn more from participating in the IVLE discussion forum or in the face-to-face discussion format?

19. I believe that I remember more about a tutorial topic from participating in the IVLE discussion forum rather than in the face-to-face discussion format.

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

20. Why do you believe that you remember more from participating in the IVLE discussion forum or in the face-to-face discussion format?

21. I believe that playing the role of a member of a team of "consultants" assigned to give advice on the topic of the tutorial is a good strategy for learning.

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

22. Why do you believe that playing the role of a member of a team of "consultants" is a good or bad strategy for learning?

## Appendix C

### Survey II

#### Section : Technical reliability and usability

1. Only minor problems were encountered in accessing the IVLE discussion forums.

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

2. As the group leader, I was requested to rate the other group members. Using the web site for this purpose was easy.

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	N/A
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

#### Section : Quality of the online discussions

3. In the IVLE discussion forum, I can understand clearly what the other discussion group members have contributed to the tutorial topic.

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

4. I have difficulty expressing myself clearly when posting a message on the IVLE discussion forum.

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

5. Generally, the messages in the IVLE discussion forum have been relevant to the topic being discussed.

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

#### Section : Comparing online versus face-to-face discussions

6. For group collaboration on writing a paper for a tutorial assignment, I prefer:

a face-to-face discussion	the IVLE discussion forums format	either one is fine
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

7. If you do prefer one format over the other, list your reason(s).

#### Section : Perceptions about your online relationships

8. When using the IVLE discussion forum to work on our tutorial assignment, I feel that I can trust the other group members to do their share of the work.

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

9. Has your trust in your group members increased, decreased or remained the same since the start of the semester?

Increased	Decreased	stayed the same
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

10. If your trust in your group members has changed, list the reason(s).

11. When using the IVLE discussion forum to work on our tutorial assignment, I feel insecure about expressing my opinion on the tutorial topic.

- |                       |                       |                       |                       |                       |
|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| Strongly<br>Disagree  | Disagree              | Neutral               | Agree                 | Strongly<br>Agree     |
| <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
12. Has your confidence in expressing your opinion increased, decreased or remained the same since the start of the semester?
- |                       |                       |                       |
|-----------------------|-----------------------|-----------------------|
| Increased             | Decreased             | Stayed the same       |
| <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

13. If your confidence has changed, list the reason(s).

14. When using the IVLE discussion forum to work on our tutorial assignment, I feel my relationship with the other group members is very "business like" and impersonal.

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

15. Has your relationship with the other group members become more impersonal, less impersonal or unchanged since the start of the semester?

More impersonal	Less impersonal	Unchanged
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

16. If you feel that your relationship with the other group members has changed, list the reason(s).

#### Section : Perceptions about your learning

17. I believe that I learn more about a tutorial topic from attending a face-to-face tutorial discussion than from participating in the IVLE tutorial group discussion forum format.

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

18. I believe that I remember more about a tutorial topic from attending a face-to-face tutorial discussion than from participating in the IVLE tutorial group discussion forum format.

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

19. From my experience at participating in the IVLE discussion forum groups, I believe that I have learned more through collaborating within a group, than if I had worked alone.

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

20. If during the semester, you wrote a critique of a tutorial topic paper, did you find this to be a good learning experience, not useful, or did it leave you indifferent?

A good learning experience	Not useful	Indifferent	N/A
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

## Appendix D

### Survey I – Open Answers

Technical problems:

There have been some problems related to opening some of the posting, but after sending an e-mail to Bishop, the problem was taken care of really fast.
At first when i was done with the first week of discussion forum, i was unaware of a new one for the following week way below [I've to scroll down]. I didn't realise it was separate until i scolloed down one day and suddenly realised it has started long ago. I thought the second's week discussion forum was in the same link as the first one.
when there is virtual discussion, it's really hard to get everyone to participate and that the flow of interaction was not really smooth, because when the members go out of point, it'll take a day for the leader to point it out and another day for the members to check the replies and stuff...not very efficient i think.
There would be an error note when I try to respond to a posting from home but not on campus.
for example, you could be typing out your discussion but you suddenly feel like referring back to someone else's discussion. once you click on other's discussion, what you have typed disappeared and is totally unretrievable.
It always take a while to kickstart the discussion, so the first 2 days are usually wasted. Even if the leader have posted questions or comments, it will take a while for the group members to start participating
everytime i want to do my posting i will cut and paste into my microsoft words first. B'coz sometimes i may fail to post my message, in the end i hv to retype it again.
there was no problem in accessing the forum. except the fact that initially it wasnt made clear when the forum would be opened and closed.
I had problems posting new messages or replying to the postings in the discussion forum from home. I used NUS Dial-up, but it could be because of my laptop. I never tried posting messages from home before & my laptop seems to be working otherwise, so I'm not too sure what the problem may be.
there doesn't seem to be a pattern in the discussions and thus it is hard to follow or know where the discussion is heading. every member is posting their own thoughts and there isn't a flow of communication. therefore it is hard or almost impossible to see a link between each posts.
the screen/page would hang when i'm typing more than half done...happened twice in one attempt to write...so i have to retype everything again...which i tend to leave out some trend of thots and could be very frustrating.
Difficulties in figuring how to reply, also it is not easy to see who said something the last time. People are talking about everything at the same time.
forum is sometimes blocked
computer crashes, restart, access ivle, cycle srarts again...and several times...very frustrating and stressful, increased heart rate and breathing problems
Netscape doesn't support any option for varieties of icons available in IE? And i can't even change my font or wordings so as to emphasis certain points. Besides, my paragraphing was erased upon submission when i use netscape.
The only problem is that not everyone has broadband which makes logging on a chore sometimes, but other then that, no real problems
I do not know how to get to the initial interface which states the questions after assessing to my teammates contributions. IT would be good to provide a link to refer back to the questions.
There are very few interactions involved. Students would like to enter one piece of short essay but would never appear on the IVLE discussion again.
sometimes when the traffic gets heavy...itz quite slow.but generally itz ok
Hard to find which post we have read, also people will follow up the post read days ago again and we have to go thru the original post again, completely wasting my time!
there was once when a whole chunk of my post disappeared for no apparent reason.. made me re-type everything

## Why have you contributed more or fewer opinions?

for a discussion forum, one has to contribute at least something but for face to face discussion, one can just sit there and listen to the tutor or discussion.
can contribute at my own leisure have more flexible times to prepare
In the case of face-to-face discussions, i am afraid that i would stutter while contributing. Moreover, i am afraid that i am unable to express myself clearly. I think posting opinions online has enable me to check what i have said.
I can put on my opinions at any time
Easier to say all of my thoughts without anyone interrupting. Even if you give stupid comments, you don't feel silly becuz u tend to add in like, "i'mnot sure", or "i also dunno what i'm talking about, haha", that kind of comments that alleviates the awkwardness..
Because postings are evaluated, hence I will have a tendency to post more.
More because there is more time to look for research and think through ideas given by others.
i tend to keep my mouth shut or to talk less when having face-to-face discussions.having online discussions allows me to be more relaxed and can contribute better.
The forum allows for us to have our say as we don't have to take into account time limits, unlike tutorials. We're also able to cite external study resources to aid in the discussions.
we are free to process whatever we wanna say and post it online at our own time and do our own research and organise our thoughts properly. it somehow forces us to do our readins as well.
i can contribute at my own leisure and whenever ideas come to me.
i have the time to read up on the topic in my free time..
Mainly because i know i will be rated on my contributions..=P
I have a slight phobis in bringing up ideas in front of strangers so IVLE discussions can spare me from such agony..
hmm..i will feel anxious whenever i need to speak in front of others.ivle gives mi a chance to express myself and communicate wf others.
More time to think of answers, less concern about speaking out
There is no restriction of the chance and length of opinions. You can have any thoughts at any time of the day and post it on the forum.
time factor is very important in the amount of opinion.
cause it's compulsory
<b>MORE TIME TO COMPOSE MY THOUGHTS TO BE PRESENTED</b>
using the IVLE discussion forums have allowed me more time to think through the discussion topic at hand, and hence enables me to discussion in a more organized and coherent manner. also, we can now access the forum at any time we deem convenient to us. with this feature, we have ample time to do our readings related to the topic and thus be better-equipped to discuss more effectively the topic.
More time to read and understand responses, and easier access to learning material.
Participation marks are given.
More opinions because more time to think about issues and can refer to more information at hand.
Cos I have more time to do research, and to think through something before I type it out.
There is more time to think over what I have to say, hence I am able to express my opinions
i have a longer period of time for me to think through the issue
there is more time to think and answer. there is more freedom in what we express and there is not much apprehensiom in what we want to say.
Convenient
There is more time to formulate your thoughts and opinions and I feel that I am a better writer than a speaker.
I am not so inclined to speak up during face-to-face discussions.
contributed more coz we all have to contribute at least something over forum as points are awarded. but in face to face discussions, not everyone gets to speak. or u can choose not to express ur views, if u have any that is. also in classroom face to face discussion, some member bound to not have read beforehand hence not contributing. however in compulsory forum discussion, we have to read in advance so as to be able to contribute.
have more time to think
I have the luxury of time to access resource materials pertaining to questions that arise.
It's easier to give opinions (esp extreme ones)
has no fear of speaking up in class. has a longer time to reflect on the views of other people and to consolidate my own thoughts.

im better expressing myself in pen and paper style. Also, the feasibility of doing the online contributions with no time constraints allows me to do the readings at my own pace before i post any related comments
I have more time to think about what someone said, so that i am able to process then and also do some research on topics posted.
During face to face discussions, i will be afraid to voice out my opinion but during IVLE discussion, no one can see me so i would not be so self conscious.
because i don't like to speak up in class
More references at hand to refer to.
The ease of not being pressured to do so and at one's leisure.
I have more opinions because I would prepare more sufficiently before i go on forum for my points than face-to-face discussions.
more time to think and put thoughts into words
because I have time to think things through
more time to think of response to others points
easier to speak out, does not have to worry about embarrassment
-flexibility, I can read up on the topic and contribute my opinions when I'm free. Face to face discussions lack this kind of flexibility.
i have more time to organise my thoughts before they get translated into words.
More, because: 1) everyone can contribute simultaneously without waiting for others to finish 2) longer time window for contributing 3) being able to read and consider what others have said at my own pace is more conducive to contributing 4) the discussion is GRADED !!
I have contributed more opinions because posting IVLE messages allow me more time and leeway to think about the issues raised in the 'discussion' and to give more in-depth responses. In addition, everyone else seems to have more things to say too; thus, social and group norms probably factor in as well.
everyone gets their own time to express their opinions, unlike a group discussion where we have to take limited tutorial time to listen to people one by one. in the online discussion we can read everyone's opinion in our own time
opportunity to express all thoughts
I have the opportunity to do my own research before responding to others' postings and hence have more opinions to contribute :)
I have the flexibility to choose when i want to contribute.
more time to do research.
I tend to keep my opinions to myself when there are many people around.
Uninterrupted train of thought
not embarrassed
More research could be done before making a comment that had value
more time to think about the questions and topics
I do not have to face the type of face-to-face rejection of an idea. Moreover, when having face-to-face discussions, one idea is presented at a time & opinions will be targetted at that opinion. Unlike in discussion forums.
there is more time to read up on the topic. It becomes more flexible as i can post my contribution anytime of the week.
there is no fixed time that i am constrained to give my answers. i can have all my resources at hand, unlike in class
We have the opportunity to take our time to think about and do research on our responses to the opinions of others. More time to express our views.
I can sort through my thoughts at my leisure and word them out. I also do not have to compete with other members for time to speak, as is the case in tutorials.
I think it was because there was an element of anonymity that made me more daring.
I have time to organize my thoughts and to look up for more materials to substantiate my points.
I don't have to face the embarrassment of voicing out any "silly" opinions directly and I have more time to think and prepare what I want to say
YOu could look up references and substantial it in the forum. there is also more time to prepare (over a week), rather than a one-time off discussion.
More preparation time and I could think carefully before writing.
when itz face to face i may be a bit shy to contribute... also, im usually more prepared for on-line discussions since i will only contribute when i haf finished my readings
Less fear of being embarasseed, more time to type what I have to say

You do not have people trying to fight for more talk time, as what happens in a real life tutorial setting.
using the discussion forum ensures that everyone has a chance to "speak", perhaps, it is according to one's own time when doing the posting.
I have the time to go and search for more relevant resources
It takes so much longer time to write things compared to speaking- especially since english is not my first language.
I am more motivated to talk face to face and therefore I tend to contribute more in face to face tutorial.
less opinion...cause i'm rather lazy to type the all the thoughts i have...it's quite a hassle.
In face to face discussion, its more spontaneous and thus u need not worry too much abt being correct or wrong. But for ivle, there's seem to be a need to be more correct or more detailed... thus there is an urge to go search for more details. Since i have other commitments, i took up more time to search for materials and thus take longer to contribute than i would have preferred.
It becomes very time-consuming and effort-ful to go through the whole lists of opinions in the different threads to follow up with the discussion, before coming close to posting a single opinion. in constrast, a face-to-face discussion keeps everyone to the flow of the discussion in the same direction at the same time. personal preference.
1) I can only post messages when I am in school, which means I have to stay even longer in school, making it even more inconvenient. 2) I am more motivated to participate when I can see the person giving the suggestions. Reading pages of words hold very little/no appeal to me. 3) There are always delays between replies in online discussions and it can never generate the same kind of heated debate that you can get with face-to-face discussions. 4) I'm a visual & physical person. I need to see the people that I "talk" to.
because what you want to say is already posted... although you would like to elaborate, it feels redundant... when face to face it's easier to build on what others have said...
There is no immediate response so i'll only contribute something and have to go back to check again.
it is hard to know where the direction of the discussion is. many of times there doesn't seem to be a direction to where the discussion is heading. so therefore i would only post what seems relevant to my own thoughts about the topic and therefore i feel that i may not have helped the group leader by contributing as much information as he or she needs for the position paper.
The flow of discussion is not as continuous as in face-to-face discussions and thus sometimes one tends to produce less.
because it's not spontaneously getting feedback and proceed with the rest of the discussions and sometimes certain ideas have already mentioned by other group members
Most of my opinions are during tutorial lessons are in response to other opinions. Now on the forum, there is a higher chance that someone has already made the same point and you can't repeat.
The time lag between posts and replies is a bit too long and the flow of thought is thus interrupted.
No spontaneous idea discussions, so it gets very hard to get something going.
the flow of ideas, the exchange of information among members are much slower as compared to face to face discussions.
The same as in face to face discussions. It is probably better for the shy ones to use this method. It is not a bad method, I believe both methods have their pro and cons.
I have contributed less to the discussions than I normally would face to face because I think its a bit of a hassle to have to sit at a computer and type out all my thoughts. I think faster than I type, and I have you worry about typos and slang, when in person that would not be a problem. I also hate having to go back multiple times to read other people's responses all the way down the thread... its too time consuming.
Because my answers are written down, I feel that I have to give a more prepared answer. Hence, with time taken to do my readings and prepare a good answer, I usually only have time to post one or two messages. This is different from face-to-face discussion where I will just discuss what I think off the top of my head.
I find it easier to communicate directly. It is more real
Usually the first members to post their opinions covered most of the main points.
fewer because those who posted faster said almost whatever i want to say and stressful because may lose marks for not saying or repetition
Not able to carry out a conversation real time can hinder flow of relevant ideas. ideas in forums tend to come in blocks and one can keep typing without knowing if others understand the flow of thought.
I do not want to come up with points in which most of the members would come up with as those are points from the text and readings. I would rather do my own research and come up with more interesting ideas
It is easier to express my opinions in words.

No interactive in on-line forum. Every body is just puting their opinion and with out taking a look to others' posts.
because there is fewer interaction, we don't know whether others understand or not but there is no way to explain everything in details.
face-to-face sparks higher interaction level and passion regarding the concerned topic.
because it's online and i hate to use the computer. also, i prefer to talk directly to the group members so that if they have anything to clarify about the point raised, i can clear it on the spot and not have to wait til they read the posting first, then respond to their responses. it's troublesome and a bit time-wasting.
During face-to-face discussions, opinions set forth by my classmates can trigger certain thoughts I have, which I can immediately communicate across. I enjoy instant retaliation or elaboration of comments made, and would contribute more opinions because of the challenge to voice an opinion immediately. For IVLE discussion, certain opinions put forth through messages may not receive any comments from the rest of the members (as comments are voluntary), so there is no motivation to contribute opinions as these opinions would not spark discussion.
It really depends how busy I am with other things. When I had the position paper due, I could hardly find the time to read up on the next topic, therefore unable to contribute much
it is easier to vocalise as compared to consolidating your words, so it may end up spending more time trying to make your posting sensible and easy to follow.
Less because some ideas I have were brought up by other team-members that logged in earlier, and posting again would be redundant. More because everyone has a fair chance and not like face-to-face where the discussion may be skewed to one or a few people only. Plus sometimes speaking up face-to-face and upholding your stand can be intimidating when other members disagree. Hence I'm neutral.
Probably slightly more cos more flexibility to give opinions. Can online anytime i desire.
somehow many others have the same idea, so no need to repeat those ideas
If during a regular face-to-face discussion, there is a lull or inertia to start the discussion, I will often just start the ball rolling and so forth... so depending on how participative other members are, I sometime contribute more.
i have contributed more opinions as i am motivated to ensure tt my gp members clearly understand the points in topic.
Fewer, if i had found that it's quite impersonal, less direct interaction. More, it's because i had more time to search for the necessary infomation and think through the topic.
Having the dicussion forum it forces me to participate unlike in classroom discussion which i can remain quiet. However, sometimes the discussion seems to be going out of point thus fewer opinions might be generated.
I have contributed more due to peer appraisal
It really depends on my time management and workload for the week. However, contributing on IVLE is more preferable for opinions can be expressed more freely without fear of the crowd... some people may be naturally more shy in expressing opinions in class. In a forum, this fear factor is removed.

Why have you spent more time or less time gathering information?

since one has to contribute, one has to spend more time to read or find the relevant stuff for the discussion.
i haf more time since online discussions last for a week
more flexible time
I have spent more time so that i can contribute discussions of higher quality.
Spent more time coz I'll have ready access to the Web thus can search for journal articles concerning the topic there and then.
more time spent, because of reading up and research to post proper, organised information
no choice, everyone is putting up citations
Becuz you are presurized to cite and you must contribute, or rather you feel like contributing.
the quality of the postings are inportant. More time spent on gathering information imply that one can post postings of better quality.
more time because there is a sense of urgency to do the work within the week and also to put my comments before someone else with the same comments put it up. it is also because i hope to help the leader who must be having a hard time researching for ideas.
i spent more time probably because we do not interact like how we do during face-to-face discussions. there could be a lag in between members' postings. thus, i will tend to gather more information and post them at one time to state my views.



When posting on the forum, I must make an effort to make my ideas coherent while during face to face discussions, I can just say my ideas freely
To push the topic along. or to simply help in stating a point by using specific examples.
i would feel a need to post some substantial information to show that i have done my research and that i dun juz say or write or contribute what ever that i have already know.
with this online discussion, i need to find more information outside the readings that are given, so that i have more ideas about the topic.
i am more motivated to post interesting stuff..
As described in question 8. Also, we have more time to search up relevant materials
This is because someone will be rating us. Yes, it is superficial, but that's how i find it.
Because it would be also difficult to not have suffice info for a discussion to build upon.
b'coz we need to do posting every week haha. however, for those face to face discussion, sometimes i juz go there and note down the answer.
there is a span of seven days to discuss about it thus more time to gather information
to find some stuff to write. No free rider effect
More convenient to search for info on the web
the discussion forum will stay open for a week, and that implies i have approximately a week, or rather slightly less than a week to compile related information on the topic. given a face-to-face discussion, we may be thrown a topic offguard, and thus wouldnt be able to source for materials there and then.
To look up peripheral material because the discussion often goes beyond the normal scope.
i spent more time cos i didn't want to repeat others and sometimes i have to verify what others have said... if i didn't do more research, basically i would have nothing more to say except "i agree with him... i agree with her...."
Participation marks are given.
It's because i want a more informative contribution.
If I do not agree to what others said, I have to find evidence to support my opinions, resulting in spending more time.
i hope to help the group with more ideas but more importantly provide the leader with more info to write on..
because everybody else contributes a fair amount to the forum therefore there is peer pressure to keep up
I actually do more research with the online discussion as opposed to the typical discussions.
We're not gathering at the same time, a delay in the contribution of a member will cause the whole group to procrastinate. Especially tough for the leader to compile and summarize the information.
Because I will be rated on my contributions.
we need more time to gather info so as to provide substantial useful informative contribution. however if the discussion is about our viewpoints, no more or less time wld be needed.
seems more interesting
Face-to-face can result in me just keeping quiet when I do not have enough information to offer, but for IVLE, there is time for me to organize my thoughts before posting, and I can also support or query other member's postings.
I do not want to be seen as a member who contributes low quality ideas. This led me to do more research before answering questions. In contrast, face-to-face discussions compel me to come up with an answer or idea that usually has little support or evidence.
TO back up my arguments,
It is about the same though i'll do more search online for the particular topics.
Because i know i would be rated for my contributions so i would spend more time to gather more substantial information.
because by having to post something, i have no choice but to do the readings consistently, and hence i tend to gather more information as compared to cramming everything at the last minute before the exams
One has to pen down on his/her thoughts and idea first before submission of the post. Like the lecturer said, it is the quality and not the quantity that counts, so one has to do more research first.
In face-to-face discussions, one may not get the chance to speak and so some may not bother to gather information. An online discussion requires one to gather the necessary information.
need to find substantial evidence from research to argue my case, a luxury not available on traditional discussion groups
I would want to post few messages but with quality and not go on net so many times.

personally, it feels like i'm doing an assignment. Thus, each time before i enter the forum, i'd do some research on the topic given, to make sure that my points are properly substantiated.
I think that its important to have some literature background on the topic esp. when you are not talking face to face because it helps you make your points more clearly and succintly.
trying to find something different from whatever has already been contributed in the forum.
because it requires me to back up what i have say with references and journal articles.
There is time to do so and to follow up on threads of discussion over the week.
Timing is more flexibile
Because my answers are written down, I feel they have to be more presentable, and thus I give references and cite statistics to support my opinions. This necessitates doing all the readings required.
I cant dpend on others to contribute.. I have to contribute too.
I have spent more time because a more extensive reading is required to address the questions in the forum.
because i feel that it is needed to make an educated comment and expected
Because it is pretty obvious if your postings are lacking in evidence since your contributions are visible. Thus to avoid "embarrassment", I have to gather more information before making any remarks :P
Knowing what other have found out or have yet to find out faciliate my search for additonal info.
i may not have time to gather information prior to a face-to-face discussion, while IVLE is more flexible.
more because can talk to other people and answer at same time etc
because the leaders grade us
So as to post a opinion of interest and value.
because when i see a topic which interests me, i'll try to find some information on it.
Because the discussion is held over a week, it allows more time on individuals to collect information on their own schedule.
i feel obliged to.
Since we have to contribute to get our point for the week, we have to take more time to gather information so as to provide quality information
i want to contribute meaningfully to the discussion and since the discussion is a week long, naturally, i havemore time to do research
I may not have time to gather information before tutorials. With IVLE discussions, I can gather info and post at my leisure.
People are even more competitive and the list of reference force me to do more research and hence use more time.
Partly because my comments will be evaluated and partly because it is exciting to expand and share my knowledge with people.
Due to some norms in my group, where students like to post long piece of essays. While we know that it is the student leader who grades, length is absolutely an important factor for us though Lecturer emphasized that it was not. IT IS!
this is because when you are posting, you will feel that quality is important. you would not want to waste other peoples' or your time to post negligible comments. while in face to face discussions, usually it is like brainstorming, you just say whatever that comes to your mind be it good or bad.
Hope to contribute more, also with no defintie answer from teacher, need to be more self-reliant.
perhaps the mark allocation contributed to this
It's easier to read and research the information that others have come out with when using the IVLE discussion forum as compared to face-to-face discussions.
As the message is laid out in black and white, there is a need to have substantiable content in what was being put forth. Also, arguments or opinions would have to be supported with literature, and as such, more time would be spent reading up and gathering information to sound convincing to the rest of the group members.
Basically the way and amount that I gather and use the information is same for both methods just that the mode of communicating the information that I gathered with my classmate is diferrent now.
less time, cause others are doing the research and contributing what i wanna say...
I think because of the fact that I don't see the other members, I don't feel as accountable for providing extra information. Furthermore, I find online discussions even more tiring and stressful than face-to-face discussions because it runs throughout the whole semester & you need to keep checking back to see what others have posted & try to reply. Whereas for traditional tutorials, you spend a certain amount of time doing your readings/exercises, go for the discussion, & after Disagree hours, you're

done & you can concentrate on other modules/assignments/papers.
Web resources are easier to access
My time spent on gathering information is about the same for both discussion. I just go and read up relevant information.
everyone's opinions are already there, it is easier to link my thoughts to what they are saying, and expand on some of their ideas, thus needing less time for research.
During classroom discussion, one has to speak and be sure of the topic being discussed but for online discussion, many a times there can be cutting and pasting from websites.
I spent less time because I have less obligations to the group
since it's online, it means technically that the teacher supervision is not as strict as face to face tutorial. also, i prefer people to machines and i do better when i know i have a live audience around me. tutorials also have specific times that serve as the due date for assignment. with the online system, it frees our time and we have a choice not to research the topics, which is detrimental.
i usually write what i feel and respond to the others.
basically it was about the same..
i do not spend a lot of time gathering information from the books ask other group members would already have done so. hence, i try going to various websites instead to contribute additional information
yes and no....sometimes IVLE discussion causes me to just depend on other's idea and from there expand and give my own opinion. it also depends on the load of readings for each discussion topic, whether i can cope and catch up with that and thus able to provide more information on the discussed topics
Still have to do research before going for tutorials, so amount of work done is about the same.
I have spent the same amount on time gathering information as I would have in face to face forum. Maybe it is possible to use less time, because no topic or problem will be a surprise. If you dont know anything, it is easier in this forum not to say anything.
Well, I thought the one incharge that week should gather more info
Not much difference
I feel that I've not spent more or less time gathering information compared to face-to-face discussions. To put it simply, either way, information gathering is still done at your own time.
general knowledge can be used in discussion but support for some claims still necessary
The same amount of time is spent gathering information. It is the time spent typing in my contributions that has increased because of my slow typing speed.
It is basically the same for me, perhaps the only difference is the increase in flexibility with regards to research being done.

Explain why you feel that you can or cannot trust the other group members.

everyone is going to be the leader hence they know the difficulty others may encounter and do their share of work
I think everyone is motivated to learn from each other or at least earn more points for tutorial.
Because their contributions are "visually" noticeable.
you get to see what other members have contributed and how much have they contributed.
Because what one say is more or less recorded
because it would be graded??
All our contributions are being graded and noted by the group leader.
there are responsible for their own part of work
marks are awarded for their participation
to be very practical, the ratings of each member's contributions to the forum should well motivate the members to participate in the discussions. moreover, each of us will have a turn at being the leader of the discussion, and have to submit a position paper on the topic. i am sure we all could empathise with the leader, and not put him or her at a spot.
Everyone is graded.
I believe everyone feels that only when each member do their part, only then can everyone benefit eventually.
They are all responsible and they want to do well.
peer rating
Beacuse they will want to be rated highly for their contributions and also when they are the leaders for a particular week, we will contribute too.
All their online discussions are graded.

as contributions are graded, everyone would be doing their job. in face-to-face discussions, people tend to be shy or reserved and not contributig. over the net, one is free to express. so can trust each one to contribute due to the nature of point system. if no points are rewarded, high chances little people will post.
there are no reason to distrust them since we are doing the same things
Initially I was also worried but after the 1st forum and now into the 3rd, it is getting more comfortable to post and share ideas. Plus most will post and contribute their ideas as their effort will be graded.
It is clear on the forum who posted what kind of information. This is itself a strong determinig factor fror those who are concerned about their image projection.
from what had been contributed so far.. of cause, theres still alittle doubt in a few members
Our work would be graded so they would produce their share of the work.
At least the group leaders have to do their share. Also, somebody has to say something, and I believe if there is totally quiet, everybody would feel some kind of responsibility to make this going.
Because it is counted towards our CA
because we all know that however much we contribute will be taken into account in our final grade.
because everything is in the open, you can see the amount being contributed by everybody-no shirking of repsonsibility possible
Mainly, it's graded and we're talking about Singaporean students (kiasu, or defensive pessimist).
There's no reason not to trust them.
everyone wants to get marks for their contribution.
All are motivated to earn a decent grade
I trust other members because I can see everyone participating in the discussions, and are very enthusiastic. I think it helps too that there are incentives involved, e.g., tying quality of IVLE postings to continual assessment.
i feel that those taking this course should be interested in the module and thus will do their fair share of work.
it's graded..and most people will try to help the group leader for the week.
because they too know the leaders will grade them
Everybody has a responsibility to contribute their share of the data because they are graded on it. Thus, the responsibility is flatly laid on their shoulder.
Every one has to make some bit of contributions to the discussion as its sort of forms the participation grades counted to the CAs.
They make rather good contributions
I believe that they enjoy the discussion as well and would not want to be negatively evaluated for not contributing to the discussions.
It is because their comments will be rated. I guess once the extrinsic reward is removed, substantially few people will log onto the discussion forum.
cos everyone is graded by their share of work
Because we would be graded on our contributions. This reduces social loafing.
I would like others to trust me too and the dicussion counts towards the participation marks, so everyone should contribute.
Everyone knows that whether or not they contribute will be recorded in black and white, so most people who don't want to look bad will contribute.
Because everyone in the group can see each posting made, there is social pressure for each member to perform adequately (i.e. post messages with substance). Due to this responsibility to fulfil, all group members will do their share of the work.
There are some group members that i've realised i'm seeing less and less of their names in the forum.. think they can't be bothered.. After all, if you dun access the forum, you won;t know what's going on and if you dun have time to do ur research, you write rubbish..
I feel that I can't trust because i know that when there is an overload of homework, most will try to take the easiest way out and do the minimal.
I'm not sure when will they contribute their ideas.
There is no telling if any person is going to contribute to the discussion at all until the very last day.
i can't. it's hard because we do not get to interact with the others much and we do not really know each other personally.
they dont involve themselves as much as they would if the discussion was face-to-face
From the previous discussions, it is obvious that some of them are just making the bare minimal effort (as in they just have a single posting or few non-qualitative postings).

some may forget or miss deadline
online discussions, in a way, provide a form of anonymity. there's a higher tendency to contribute less when anonymity is involved.
because they would want to understand the topic better as well.
I feel that other people have their own commitments, and thus might not have time to read up materials. As such, though i trust that they will make an effort to read up and contribute, i also recognised that sometimes they simply do not have the time
what "share of the work" do they need to do?
Cos we have to work together.
in the case of this module, coz everyone is required to write a report on the topic assigned, while expecting others to contribute to one own's topic, group members would be more willing and more considerate to help search info for each others' reports
Really depends, everyone has their own commitments and other work to do. Trust does not equate to the end results that matter more.
Generally, I feel they will be honorable and do at least St/disagree or Disagree postings. However, it is impossible to force them to be enthusiastic about it.
I think this method forces and allows everybody to contribute something at the very least, but whether it spurs people on to contributing their very best is another matter altogether.
when you don't know who are the members, you can keep track of them to make sure they do their work....you can only type frustrating msgs in the forum to hopefully get their attention on the matter.
i cant trust them because, well, so far, it's been only the same two people that have been contributing! Computers give students a lot of room to slack.

Explain why you feel insecure or confident about expressing your opinion.

i may feel that my opinion may have gone out of point.
i have no idea if anyone will respond to me or not
if I can come up with comments that sound stupid. most people will take note of it as they will read it.
Due to past experiences, opinions posted were taken as a personal attack. People can disregard your opinions and 'shoot' back, because there's not a need to face the person.
Especially when there is just discussion among members, we have a tendency to go in different directions. Compared to face-to-face discussions, where the tutors are around to guide us, I often fear that what I say may not be relevant/useful to the discussion itself & because of that, I have to spend more time posting messages.
it like the posting is there and people can read it and come back to read it again... so i would ponder for a very long time and edit my posting repeatedly before psoting in case i wrote something stupid or repeat what others said...
A little insecure because I have not yet discuss with anyone before making my opinions public and my opinions may be wrong.
Not sure if the others understand my point exactly.
It is hard to get much across with written words compared to spoken.
because i do not know whether the others understand what i'm saying in my posting. :)
insecure because if the pointers are very deep memebbers may not understand and that can also affect leader ratings
Not confident that what is posted is accurate
Discussion forum is like a documented discussion. If any error were to be made, it can be remembered permanently. In classroom discussion, misconceptions can be corrected by tutors.
Since there is no instant feedback, when others read the entire block and end up not fully understanding the author's actual thoughts, the criticism can be a lot stronger and longer.
I think it's because in the forum, everything u read is kind of down in black and white, i'm not sure when my words will come back to haunt me.
Because in a face to face discussion, if i am saying something on, there could be someone to correct m so that i can see that my point is wrong. But in an IVLE discussion, i could be rambling on and on about the wrong point.
Because, unlike spoken words which could possibly be forgotten after said, everyone can see the stupid comments that I make simply by referring back to my post. Hence, I feel very insecure as to what judgements people might make of me and my posts.

There is some insecurity due to the inability to receive direct response from the rest of the group members. Body language cannot be observed, and yet in my opinion, body language sometimes provides information as to whether your opinion is supported or not. Direct feedback is important to me and this lack of instantaneous feedback makes me less confident of expressing myself. I tend to be more careful with my expression as such.
I don't think that there is anything confidential that we share on line. The discussion is just an exchange of ideas with regards to this module.
there's actually no difference whether it's virtual or face-to-face discussion...i know what i'm talking about so in either cases, i am confident of my points.
i do not experience insecure. there is nothing wrong with posting right or wrong opinions.
Th forum allows for all members to air their personal opinions with little or no chance of feeling opposed on a personal level.
i feel confident because everyone is here to learn and the only way is to voice one's opinions for discussion.
Since i make sure that i have relevant materials before i post my opinion, i have more confidence in my opinion
cant really express how but virtual discussions can spare me from direct criticism...
i don need to care about my grammatical error while i m using the ivle discussion forum. In contrast, in face to face situation, i feel stressful and anxious whenever i need to communicate wf other in english.
opinions by definition are subjective. no qualms therefore. unless if they are strong/ personal enough for other members to feel sensitive towards.
It is not an issue.
because everyone is entitled to his or her opinion.
I'm have confident because i've done research.
Maybe because it's a more impersonal medium--there's no face-to-face contact so I'll feel less conspicuous.
i still feel theres no right n wrong answer, everything is debatable, our opinions
i feel more confident expressing my opinion because there isn't any time limit that i should adhere to, as in face-to-face discussion groups. there is less peer pressure i feel when i can just give ideas online.
because people rarely comment in response to the postings except to the questions which the leaders post
there is no problem for me to express my opinion in whatever way:)
I should be confident as I only post substantial comments or opinions, not just to make up the numbers.
It is because I feel more confident expressing myself in words than in speech.
as there is no face to face contact, we wld not see other group members' facial expression hence their expressed feelings towards our comments...thus we can be more relaxed and free to speak. also we can slowly form our arguments and viewpoints or counter-agruments, being able to correct again n again bAgree posting...thus the opinion wld be more detailed and truthful.
I feel there is always both sides to an opinion, and when people question certain ideas, it is to generate more discussion. Also, partially there is a small level of anonymity as most members just met for the St/disagreest time at the breifing session that time.
I have the time and freedom to edit and look over whatever information I am going to send across to my members. This certainly led to increased confidence compared to speech that has to be generated on the spot.
I feel more confident. Perhaps there'd be some members who dont read up and thus may not necessary able to defend my stand.
No face to the person (heh)
the advantage here is that one is not identified by his or her face. should feel less restricted
even if i say something that others disagree to, i have time to think carefully about my opinion again before retaliating.
confident...because I can prepare myself better
I never have problems with what I want to say. I dont have that problem in person or on the computer, especially when it comes to academically related topics. Everyones opinion is a valuable perspective in my opinion, so I am not afraid to say what I think.
Whatever I say, I believe they do not know who I am, so I can freely say my piece
I do not feel insecure, but do sometimes wonder if I am giving relevant information.
I feel quite confident once I am well prepared.

Like I said earlier, because the postings can be done at my own time, I am given much more leeway to think and ponder more deeply about the issues raised. This gives me confidence that my responses and opinions are valid since I have duly considered more perspectives.
I don't feel insecure nor confident because in the course of disagreeing and having opposing views, we can then maximise our learning processes :)
I don't really feel insecure since i believe in having my opinions commented on by others.
Confident, because i'm always comfortable to seek to people. But i held back a little nevertheless because i could not see the people that i am talking to.
i've done some research on the topic before posting.
I can always go back and correct my opinions and comments
It is easier and less pressuring to express opinions without face to face contact as a 'wrong' opinion will not be attacked immediately.
As long as one does not say things that are totally irrelevant, one can be assured that there is no right or wrong answers. There is always something to learn from one another and I am confident that my views will add to the pool of knowledge.
No fear of being embarrassed and everyone has the right to say what he or she feels is relevant.
if my opinion is not really correct or on track, the others will inform me.
I am rather afraid that people might not understand what I have said.
I'm not sure if my contributin is actually helping.
It is a open online discussion forum, everyone is a different individual with their own opinions, being confident or insecure depends on the individuals concerned in a group interaction setting.
not sure if i'm on the right track
like i said, face to face lets us clear our misunderstandings with the tutor straight away, without having to wait a few days before a reply is given to the forum posting. By the time i get an online reply, i might already have forgotten exactly what it is that i was unclear about.
As mentioned above, its less awkward, even if after someone rebut your point, you can still continue your "fight".. In a normal tutorial grp, when others rebut, you feel uneasy and unsure already, let alone to continue your stand while everyone in class waits in silence, for you to comment or when someone else continued to speak, you miss ur chance n that's it, ppl think u r stupid or rather you think ppl think you are stupid..
I feel confident because I have done enough reading about the topic.
there are no reason to distrust them since we are doing the same things
I never feel insecure about expressing my opinion.
Everyone is entitled to an opinion; there's no reason why one opinion should be better or worse than another and no reason why one should feel insecure about expressing them
It is a place for opinions sharing only, there is no need for me to feel insecure so far.
I think it is up to the personality of the person involved, rather than the situation and context, as to whether one would be insecure of confident in expressing an opinion. However, having such a virtual arrangement will definitely allow shy people to speak up more often.

Explain how you feel about your relationship with the other group members.

Some are friends I know personally while there is people I don't even know how they look like cause they never turn up for the briefing on that day.
no interaction besides forum
I feel that we are like online pals only. I cannot feel that my group members are in fact "alive".
that's what the forum's for...everyone's meeting and posting msgs at the forum just to get the credits, no commitment to meet and personal changed to suit to group...just going with the flow of the discussion..it's so impersonal..but less disagreements...
Impersonal
Business like because it seems that if given the choice, people would not contribute (since this would free up more time). Feel that people contribute because we need to contribute.
We have almost no idea how each other look like (that brief meeting makes it hard to) and because there is no body language, we are unable to tell anything about the next party.
hmm..i think everyone juz post their answer them. don really communicate much.
Not talking face to face will definitely reduce the possible interactions that one may have in social situations. After the module is over, you probably will not know the person better.

entire lack of (real) interaction. only reads the comments and posts which may not in any case represent each personality well. cannot even recognise "tutorial mates" in class (lectures) or outside. if socialisation is not important in our learning process then we could well receive our education through information technology in our homes.
more impersonal compared to face to face as body language cannot be as accurately gauged
there's a lack of personal touch, and we wouldn't even know how each other look like, apart from the very brief first meeting.
Up to a certain extent, members do inject a certain amount of informality, but if you don't even get to see each other (with exception to the first time when you get to see your group members), how can the relationship possibly be personal?
The way the discussion is carried out remains casual and friendly even though we do not communicate face-to-face.
It's ok but it can be better if we can discuss back and forth more rather than just disseminate information that we read about.
not bad
just work relationship
It's cordial and we learn from each other.
I feel that we are just interacting for purely academic purposes, hence there is no real development of relationship with the other group members.
there is no relationship. we don't know who the names belong to. all we see are threads of opinions and we're only responding to that. not having anyone in mind.
quite sincere and comfortable, especially when i get the feedback from them
There is not much of a relationship actually. It's like we are strangers contributing to the discussion. Feelings cannot be conveyed online. I prefer face-to-face discussion where everyone can get to know one another better and this may help towards contributing to the discussion.
Maybe it's just me, but I can somehow see personalization of writing styles that might reflect quite well on the writer himself/herself. If there's personalization, this discussion cannot be said to be impersonal.
The way we express ourselves is very informal.
Don't really know them, so no comments.
Other than the names, we do not really know them personally, face to face. Sometimes it is difficult to place a face to the name, so i feel that it is quite impersonal
There is not much interaction between group members, we seem to only post our information for the sake of posting and that's it.
There is not much of a bond among us and we are engaging in discussions just for the sake of it. We do not know one another and it can be strange discussing things without knowing exactly who we are discussing with.
with this IVLE discussion forum, everyone is trying to post because marks are involved.
You don't get to see who you're writing to, it's just the name. you may not even know that your group member may be the one sitting beside you during lecture
I don't get to see their faces
We never talk about personal affairs.
Actually, it is in fact easier to be honest and open on IVLE. It is something about not seeing anybody's face...
we are more focused on answering questions...don't know each other...can't see expressions
I don't like not having a face to put with a name. I am still not familiar with differentiating these people, and I think it hinders the comfort level a bit when the human contact is removed. I feel like I'm more having a conversation with my computer than other human beings sometimes.
we don't really get to know each other well...
Purely tutorial mates
i can't even remember what they look like, nor had any conversations with them before. feels like we're a group of students just posting messages one after another, we don't get to interact other than about the topic of discussion.
I feel quite informal and at ease.
I don't really get to know them as individuals, only by the name. I don't think I can place the name to a face. But that is not to say our discussion is cold, it can be quite informal and engaging.
more like a making use of each other relationship.
I feel that amongst my group members, relationships are pretty informal, because we still tend to 'write' informally, with emoticons, abbreviations, colour text, etc. And we constantly acknowledge one another's viewpoints, which I feel is a very positive way of communicating.



it is impersonal because you don't really meet them face to face. however, the atmosphere in there isn't that cold either because the group members make an effort to be warm and friendly in their posts.
i feel although both they and I act very formal IN ORDER TO present ourselves as knowledgeable
It's impersonal because we don't get together for discussion physically, perhaps lacking a 'real' feeling.
don't know how they feel because cannot hear their voice. and emoticons may be deceptive either.
Lack of discussion
Go in, read, contribute. Not much of interactions. No smiles. Impersonal.
With only one meeting opportunity, i feel that there is no interaction between group members. Everyone is just contributing to the discussion in order to secure themselves of the grade they need.
no personal interaction.
The relationship is forged by the common goal of fulfilling our roles as group leader and members. There are less opportunities to understand the people on a personal basis after the initial meeting.
I feel less capable of posting good opinions as compared to others and this can act as a self-fulfilling prophecy when phrasing my post.
Many members did not turn up for the first session and so I do not have a face to their names. Most people try not to deviate from the topic and hence discussion is limited to the issues at hand, hence "business like".
Many seem to be posting individual comments. I feel that attempts should be made to ask questions and to reply to these questions. This facilitates interaction and makes learning more fun.
I don't know them. Even when the time we were sitting in the lecture room, we did not dare to speak to each other.
i don't get to see my group members expressions...to me, expressions and tone tell a lot
i cannot look at their faces, so just talking to machines, even those emotional symbols are just like having fun with myself rather than other peers.
more of a feel of communicating with the computer than with fellow classmates
We go into the forum because there is an obligation to, and there is no real interaction.
distant. it's not at all like a group. i would think that it's more of an individual thing instead. no togetherness feel.
Very formal and business like relationship. It is akin to working in a professional setting; just say whatever you want to say, albeit only things which are related to the topic.
There is no face to face communication, and no small talk (or jokes) can be made to enhance the interpersonal relationship with the rest of the group members. As such, the relationship seems very "business-like", that we are all working co-operatively in order to complete the tasks assigned, but would not otherwise really "know" each other as classmates at all.
is ok as we have met one another before and being psych majors, are roughly acquainted with one another prior to this
There are emoticons to make the atmosphere lively and less formal..=P
When i am chatting through the discussion forum, it feels like a chat room where there is no formality and everyone is very relaxed and sharing their opinion but when i see them in class, i don't feel as though i really know them. kind of awkward.
Everyone's purpose is to get the work done.. including myself.
easy going, relaxing...not that stressful.
face to face tends to be more friendly and informal, more relaxed and pleasant environment
there is not much interaction between our group members. ppl just post their own opinions and that's it. so it's very formal.
When posting the main ideas and arguments it can be a little businesslike. However the language used is not very official, and often we sign off with greetings and smiley faces after postings.
Well yes. Rather impersonal.
superficial? haha... impersonal.
Since it isn't face-to-face, certain emotive messages cannot be put across or received between members. As such, the postings and communication between members tend to stick to the topic at hand in a rather business-like manner.
Even though I've met some of my forum-mates, on the forum they're just names. All postings so far have been pertinent to the topic, with little interpersonal interaction.
i guess we discuss because we have to, not because we want to, so this relationship is a pretty pragmatic one. But i also have this feeling of interdependence, because we need to help each other to do our position papers. And i do believe that help begets help, that means trust.
There is very little mingling. No personal communication. Everything is work-based.

Although all of us are "talking" through the pc, i feel that the first session of letting us meet up with one another helps and i feel that i can at least picture the face of the person that i am talking with, so it is more personal.
I feel we are quite close online, since we "meet up" every week to discuss.
Very impersonal. I can't give a face to the names, i.e. don't know who is who.
When you don't know the faces of (or sex, since I am not familiar with Chinese names), you don't get a personal relationship to any of the group members.
i feel that we can be responsible for our work but at the same time, we can actually interact with other members if we want to.
we would of course want to show that we have been doing research and that it therefore proves our point. no pt tryint to be nice and anyway most of us prob duno the rest, so no pressure at all.
Over the screen, unable to see facial expressions. Therefore, it is a little cold.
it like you can't see their face and sometimes you don't remember who they are... its like talking to air... and you can get immediate feedback from their expressions... tone of voice etc...
there's no interpersonal interaction.
Impersonal
I guess everyone participates because there'r marks for it. Probably not so really spontaneous.
i've only met my group members once, so i barely know them. being in a faculty where one's classmates change every semester, i would prefer to interact with my group members face to face.
just feel having a long distance between my members, no coordination.
without seeing them face to face, I can't even relate the names to the faces...
unless i know them before the discussion, i can't put a face to the name.

Why do you believe that you learn more from participating in the IVLE discussion forum or in the face-to-face discussion format?

i may learn other stuff in a face to face discussion as the tutor may guide us
More ppl contributes and you hear more comments and some are really good and insightful..
it is because i have to do really extensive research, though it is really tedious, i feel that doing the work helps me learn more and discussing ideas with others make me see more perspectives to the issue. it encourages critical thinking.
Because everyone makes an effort to cite external sources, we get specific examples of studies and the like.
because people contribute more on IVLE discussions so we can discuss and exchange views and learn more from each other....
Because everybody has more likely prepared for their material as compared to face to face discussions.
b'coz i hv to do research almost every week.
The scope of discussions often goes beyond the lecture scope.
In ivle forum there's more research done.
given the opportunity to do research online and not just reading from materials recommended has indeed help widen the scope of my understanding of certain aspects in the various topics.
coz we can't just keep quiet and not contribute at all (participation rating). we need to read ahead or at least catch up with the reading so that we are able to carry out the discussion
Everyone participates and there is better flow and generation of ideas.
Because the discussion is carried out over a span of one week, there is more time for discussion. Typically, the discussion is carried out in a very systematic and organized way, which helps me learn better. And people usually spend more time and effort preparing for the online discussions.
more topics for discussion
More homework and research is done before posting and since the full name is used, you have an identity in the forum. What you say is what people think of you. In a face-to-face class, there will always be those enthusiastic students presenting, and there is less pressure to prepare tutorials.
It is very difficult to jot down notes, keep vital and wonderful suggestions in your mind, listen to ongoing discussion among members and still be able to respond as a contributing member all at the same time.
I can take my time to think through the issues. In "normal" tutorials, there is not much time for me to delve into my thoughts.
Because i learn more through the gathering of information and also learn when i look at other group members' posting.

There are people who do not contribute ideas face to face but are better at conversing in words
Information is a little more coherent in the IVLE discussion forum. Perhaps this has to do with the difference between how people write vs how they speak to convey the same message. Namely, I suspect that people are a little more formal and careful with grammar and clarity when writing than when speaking.
I have more time to read up and digest the information posted in the forum. I can concentrate better (since I can access the forum when I feel like it) and thus learn better.
People seem to be more well prepared.
Because we have more time to find out information and contribute to the discussion.
Since participation in the forum is integral to the course, I find myself participating more than in face to face discussion sessions, which are often too short to get properly into a topic.
I think I learn more from participating in the IVLE discussion forum because everyone has so many fresh and interesting perspectives on the issues at hand. Indeed, making discussions 'online' seems to encourage people to speak up. As people speak up more, the more perspectives one gets, and the more you'll learn!
the duration of discussion in IVLE is longer,so more information can be brought up and I might be too tired during the face-to-face discussion
well-documented black and white
because people put in more effort
everyone can present their sources to one another and we can assess these sources.
As mentioned, the comments posted are more substantial. Very often, in face-to-face discussion, many do not elaborate on their points. Further, some have not read up on the relevant chapters and have limited points to raise.
Due to more preparation time by myself.
all will give their comments and i am able to read all of them.. sometimes in tutorials ppl speak too fast and i won't be able to catch
We had more time to search for resources and its nt rushed within an hour like normal tutorials
In a face-to-face discussion, I'm able to clear and clarify any doubts there and then, and am able to ask questions directly and immediately to the tutor/ lecturer.
I don't. On IVLE, you only have to focus on the things YOU want.
Face to face discussion encourages speedy spontaneous exchange of information. wheres participation in the IVLE will be a hurdle for those who cannot type fast enough. It would really waste them alot of time.
i'm a person who can learn better through audio than visual...it just makes my head spin from readin the long msgs that the members have posted..
It all depends on the productivity of the tutorial. Since there is no tutorial, there is nothing we can compare this too. I however have expeired extremely productive tutorials too.
In face-to-face discussions, there'll be input from many more students ultimately. So this gives you greater depth & breadth. At the same time, you are exposed to a greater range of perspectives and opinions. Especially when you are in the same discussion group for the duration of the semester, the discussions may become stale because you are not exposed to other opinions & views. (Usually in face-to-face discussions, you get to disucss with different people each session.) Also, face-to-face discussions, due to the limited time, tend to work through the relevant issues directly.
in the face to face discussion, at least when you mention your points to the class, other members or even the tutor can point out any mistakes we might have made and we learnt that immediately. This is not the case online because when I replied to a question, I don't get an opinion whether my answer is right or not.
In face-to-face discussions, I don't just learn head knowledge but also communition and interaction skills.
i learn less in the IVLE discussion because i rarely visit the postings of others, but in the face-to-face discussion format, i have to listen and engage in what others say
I am more inclined to just post my own opinions and comments than to read others' postings.
In the face-to-face discussion format, ideas and thoughts are conveyed more accurately and easily. Group members can brainstorm together, throw out ideas during discussion time where everyone is gathered together. I believe this helps us to learn more and better because it is personal and also our visual and auditory senses are better stimulated.
Learn less due to lack of information exchange.
the flow and exchange of ideas takes much longer time. very often it is disrupted.
lack of instructor's guidance / viewpoints

a face to face discussion is more personal and flexible. IT's probably more interactive too as applicable examples and personal experiences can be shared.
there is no teacher input in the online forum, perhaps a professional might be able to give us insights about the topic at hand, such as suggesting a whole new light in which we can look at the question.
Large chunks of information posted, it can be quite tedious to read through it. There is in fact no discussion but a collection of posted.
Seemingly, U are being graded to take part in this and everyone will try to read up more to get more points. It's a practical world out there but at least this method is effective. U are bound to learn more.
Face-to-face discussions generates more responses and and it can be a two-way discussion unlike online discussion where one discuss whatever he/she wants freely.
Discussing points seem more tiring as one has to wait for the person to come online, and answer whatever qn one may pose, whereas in face to face discussions, discussion is instantaneous
The face to face discussion format tend to be more structured and yet it tackles more issues at the same time. The face to face discussion format allows queries to be addressed immediately.
in the face to face format, ideas are less scripted than in the forum.
I believe that a face to face thing works out better as stronger ties are created and such people put in more effort
I am not sure whether we have covered the topic sufficiently in scope or depth in IVLE discussions.
I just search for the info, and post it. No interaction to help me to have a better understanding of the topic and lost of the direction
there is often no detail investigation in certain topics as people may think others will do that but everyone has this thought, then actually nothing fruitful is gathered.
some online posts are so long, and disorganized. no proper spacing, paragraphs etc. simply looking at them makes me dizzy already, let alone reading them
face to face clears up misconceptions straight away, and makes us feel more free to ask questions.
I don't think there is a difference in the amount that I learn either from IVLE forums or face-to-face discussions.
It is definitely more spontaneous in a face to face discussion. It is like comparing having a discussion through smses with just simply calling the person up to speak to him directly. The former is more tedious and less stimulating.
i prefer to learn by listening instead of reading.
perhaps the intervention of the teacher occasionally would raise the level of discussion ?
I think the tutor would be able to join us in the discussion face-to-face, and impart more knowledge or share more experiments with us.
as the online discussion is made without the lecturer's confirmation. and somehow we would still have to read up on it ourselves and there is this element of qn mark?? as there is no exact or CORRECT answer. but at the same time, it enforces the idea that we would thus have to be as accurate in our info as possible.
nonverbal communication is also very imp't. such as facial and hand gestures. from there, it is easier to understand what the others are trying to say.
I definitely learn more when i was the group leader because i pushed myself to read up more materials. But when i'm the group member, there is a tendency to not read up as much
in a discussion forum, we get to read each other's contributions, and have the time to ponder and think about what each other has said. in a face-to-face discussion, we may not have the time to process what other tutorial mates have said since what we absorb is dependent on what we hear. when we leave the classroom, we may not remember all that have been discussed.
because people tend to look at different sources of information. but constantly having to contribute to the forums is very time consuming.
I believe that in a face-to-face discussion format, with a tutor present would help direct the flow of the discussion. Also, a f-t-f discussion is more interactive. However, some students might not feel comfortable expressing their views. In this case, the IVLE discussion might be more helpful for them.
because it is easier to speak up and u have more time to gather info.
not really, as sometimes the tutor explains the concepts better
both will benefit as viewpoints are exchanged.the exchange of arguments wld be faster thru face to face, hence generating more opinions whereas forum takes longer. however as forum are posted online, we haf a reference if we forgot any point later on.
Perhaps people will discuss more at ease rather than a personal interaction.
There's no intervention from the lecturer, so we sometimes aren't sure if we are on the right track.
both have their pros and cons.

i would learn more because i have to complete some readings in order to contribute. however, i'm not ablt to log on frequently enough to read what others have posted.
It boils down to individual differences and personality of the individuals in that group. I think introverts will benefit more.
Both will be beneficial so long as everyone actively participates.
No preferance really. Maybe I learn more in face to face discussion because it is easier to follow what other groupmembers say.
around the same..just have much more to read
i think both has good and bad points-easier to clarify face to face, whereas on the ivle discussion, we have more time to build on our ideas and to give more concrete ideas with the back up of references
there are pros and cons..in ivle forum, the discussion is not guided by the lecturer, sometimes we tend to digress. but at the same time, we have more freedom to explore the topics.
Subjective and it varies from topic to topic and weeks. No strong opinion on this.
Face to face participation takes place with a teacher present whi might be able to give info that we've missed out and also guide us better, but people tend to contribut more in forums as we are not spoon-fed. However, all in the end boils down to whether teh student has done his or her work beforehand, so the amount learnt is not only based on how the discussion is held.
Depending on the quality of discussions in either formats, the amount learnt would differ. I learn more factual information and individual opinions in IVLE forum. In face-to-face discussion, I learn to communicate effectively and to rebutt or support an opinion brought up. If readings were assigned prior to face-to-face discussions, the content of discussion can be of good quality as well. For IVLE discussion, there may be more content but due to the lack of actual discussion (due to the voluntary nature to post messages), there may be less alternative opinions and lack of depth in discussion.

Why do you believe that you remember more from participating in the IVLE discussion forum or in the face-to-face discussion format?

people tend not to prepare for tutorials
First, you dun need to take notes, you jus copy and paste on to your microsoft word and ta-da!! you have your notes, which reinforces what you've remembered from the discussion so far.
I have to think through carefully in what i am going to write in the froum, in a way, I tend to remember more.
it is because i get a chance to be actively involved in discussing every aspect of an issue.
Through reading all the posts, I am able to retain more information rather than just listening to ifo in tutorials.
i can print out the discussions and use it as additional information
Because remembering what i read is easier than remembering what i've heard.
i can just print the discussions
because it is written and we can see each other's contributions.
Learning from peers makes for better remembering, perhaps because there is more interaction.
their ideas r interesting
It is less distracting and you can look through all the posts.
It is because what is posted online has already been processed/filtered through the cognitive system before being expressed in words.
mostly due to the visual stimulus. Such as seeing some author's name, or some figures on screen tends to remain in my mind longer than just listening to someone say the name or figure verbally in tutorial class.
I have the tendency to reread paragraphs of interest or contention more than once. This certainly aid memory rehearsal and retention.
Because I have thought through the issues, peoples' opinions stick in my mind.
have to type the ideas out, register more in mind compare to just verbal communication.
Because i've to contribute, the thing i write will be remembered better than just listening during tutorial
Active participation in the presentation of information.
because I can refresh my memory wnever I want and I can see clearly who says what
I can always reer baack for information and I need to really read through all to make sure i do not repeat their ideas
Since it is there in physical and static form, where I can read it over and over, as compared with if someone had said the same thing, wherein I'd have to rely on memory to remember what was said and

to follow the discussion.
Posting a contribution requires actually reading and understanding the topic. Forums follow on each other's heels and materials in one forum are often relevant to another, which helps integrating what I've learned and making associations. Besides, contributions may overlap and repeat stuff that are remembered through sheer repetition
Being "forced" to participate, I can definitely remember more about what I and/or other group mates say :P
i bother to look for information
I can actually get to read & think through each & every account made by the members of the group. After which I also had to make comments about what others had contributed.
We work at the topic for about a week and we discuss more and we are forced to think more and in greater depth even when not writing any comments
Having a longer time to think through and visually see what the other group members have contributed enables a deeper understanding of the issue and hence better recall.
I have to think through other members' comments and respond to them, hence the discussions are better remembered.
Due to more preparation time by myself.
it takes me lots of time to get into every messy post to look at every word, of course i remember this better.
each of us have to read the posting of others to have a better view of the topics mentioned and add or give comments.
I believe that i remember more in a face-to-face discussion because i would take notes in the former setting and not in forum.
Face to face discussion because then you have some pegs (like faces) to place the information on.
Face to face discussion helps me to retain information in many ways- audio, visual etc whereas for IVLE discussion it is mainly visual.
i guess for me,things heard is better remembered than seen...sometimes, when i see the whole chunk of msgs, i just dunnoe what i'm reading, what's more,remember.
Though i learn more via the IVLE discussion, it is face to face that i remember more because of the way the knowledge is being processed. the on going discussion has a deeper impact than a discussion that can be hard to follow because it breaks off in the IVLE.
hmm..b'coz sometimes tutor will point out those important point which we may overlook. this help us in learning as well as remember those term.
As mentioned above, I pay greater attention when I see people & when they speak verbally. When discussions are presented to me in words, I have the tendency to just skim through the content instead of reading through carefully. Furthermore, when you see people, you form impressions and there are other forms of visual cues to remind you that certain people brought up certain points. I find that I prefer face-to-face discussions because they are richer in content & meaning.
Face to face, I guess when I listen to the tutor or other classmates speak, I remember more, and it tend to leave a more vivid impression in my mind rather than reading something.
face to face discussion allows immediate processing of thoughts and thru the agruements allow me to remember more clearly.
Perhaps it's due to plain reading of someone's posting and then going on to make mine, without really absorbing much. In face-to-face discussions, at least something someone said or did would be lodged in my head.
i learn less in the IVLE discussion because i rarely visit the postings of others, but in the face-to-face discussion format, i have to listen and engage in what others say
too tiring to read all the postings on IVLE, there's no difference from reading my other readings, and sometimes audio seems to make a better credit in helping memory:)
i can learn better thru speaking wif other people. as in audio learning...i can remember if i hear abt it rather than read it.
Sometimes reading the discussion seems tiring when it's super long. While face-to face have cues ie environment to remember the contents for discussion.
I don't keep notes when using the discussion forum, and once the forum closes, there's no way of looking back and checking what we have discussed.
Face-to-face discussions provide more info and is easier to remember.
It's rather boring just to read the whole load of information. With interaction, I can remember the information in a specific context.

experiential learning?
I believe I am more into it in the face-to-face discussion format, because I see people and all seems to be more impulsive. It is more emotions involved when you see people, I think.
I believe that the voice and facial expressions that go into talking to other people play a big part in my memory. Im a visual learner, and so I remember things much better if they are tied with a sight and even better with a sound.
face-to-face discussion is always more animated, i remember things easier that way than reading or memorizing what i have read.
I don't necessarily remember more from IVLE because I might not go through all my group mates' postings.
disagree, remember less because hearing speaker's voice make me remember more easily usually due to event-related potential.
Too short a period to discuss. Again, no active dicussion on issues. Guidelines or example needed to tell students how to discuss
face to face enables me to remember more clearly the topics we have discussed. it makes a better impression.
I do not remember better from online discussion. Reading too many stuff online will cause one to switch off.
in a face to face format, one can remember the face and who said it, thus giving visual as well as verbal memory. In the forum, there is only visual and ideas can be hidden by excess words in the block.
as mentioned, I totally duno want i m doing now. No coordination and cooperation and explanation from lectures... make me feel helpness.
there're some things/comments so strong when said tt it will be hard to forget
no human touch. all one does is face the computer to post ur questions and wait for an answer.
I'm more of an audio + visual person. Hence, I tend to remember things that I listen to, but this option is not given to me in IVLE.
Having a face to face format allows us to remember more since we would actually be in the learning situation ourselves (more visual cues too); the discussion forum is rather detached and machine like.
Personally, I tend to remember a topic when it is being discussed verbally or presented verbally, than from reading it myself. It is more difficult for me to remember just by analyzing the text (messages) myself; I remember better when I can see and hear the person making the statement.
i prefer to listen
i think the topic of discussion affects the level of remembrance too. if a topic is interesting, no matter if the discussion is online or face-to-face, we can still remember it.
there will be visual imprinting from a face-to-face format which may help you recall info in the future. eg. using photographic memory.
This is because by arguing and participating, you would be able to remember and injest the material better...
It will only show during the exams.
perhaps because the ideas can easily be revisited.
U can go back to the forum and read through the suggestions posted.
participating in the forum enables me to revise what i've learnt because i contribute to it. however, as above, i rarely get to read what other group members have posted. thus i only remember the things that interest me in the readings.
Seriously, I would like the lecturer to participate in the forum too. I feel that sometimes there is this lack of guidance from a more qualified person.
I don't quite remember the stuff, but I can always go back and read up before the forum closed if I want to know more about the topic. This is not possible for face to face discussion.
I think either way, you'll remember more about a topic if it had been a fruitful discussion. Maybe IVLE encourages more fruitful discussions, but that doesn't mean face-to-face discussions aren't fruitful.
IVLE discussion makes sure u must type something in to contribute and that leaves a greater impression. Sometimes in face to face discussions, some people don't even speak at all.
I haven't got my result from this module yet. So ain't sure about this. But i do have to agree that there is more information being thrown around when using IVLE discussion forum rather than in depth arguments in tutorials. Have to weigh the pros and cons.
As above, moreover, some people do not read others people's work or just contribute due to the obligation, thus remembering or not is also not dependant on how the discussion is held per se.

Why do you believe that playing the role of a member of a team of "consultants" is a good or bad strategy for learning?

It kind of boosts the self-esteem of those discussing about the topics and makes students feel professional.
Because it is related to the "real word".
I believe it is a good idea as it gives as a sense of responsibility and made us feel good about ourselves. Being a member of a team makes us feel that we are not alone.
people usually put up the same materials, its boring when you are the leader and u got much more info than them. Especially when they just summarise the points from articles u have read and not providing fresh ideas
i think its good or bad, it depends on the quality of the advice given. But generally, i think its beneficial. Cuz you know more from others and otherd from you.
no difference actually,because i do my research either way...
it makes you think before you say so that you don't waste other people's time reading your junk. and so it makes sure that you give useful comments that truly helps.
you get to understand views from different individuals. different individuals may perceive things differently.
Because this way one would feel that what he has to say is important and contribute more
Good, because this way each member who is the leader for the topic will be sort of an "expertr" in that particular topic.
enforces the responsibility factor
it helps us learn from each other and biulds our confidence.
Everybody has the chance to contribute something to the topic, unlike other times where it is always the same few members who were contributing.
This is because as we expressed our own opinion, and the team debated about it, more ideas and opinion are generated. Also throughout the discussion there will also be more materials being brought up that would be useful to our understanding of the topic.
I suppose it is good because it seems that we are entrusted a resposibilty so wewould be more motivated to do uor work...
So we know that all of us are going on the right track.
it allows us to visualise what we are supposed to do.
it becomes the onus of the member to find out more about the topic. the responsibility/ obligation results in learning.
sets our brains working harder with the perceived role we are assuming
perhaps the feeling of professionalism comes into play and we feel more responsible for what we do.
While I think that it's an interesting & novel strategy, it's hard to keep reminding yourself that you're playing a role. After a while,it becomes just another discussion forum.
i don't feel that we have enough background on the topics to contribute substantially
you can apply what you know to a situation and think in broader terms (like consider the target's age and environment) instead of being restricted by your own assumptions....
It is a rather good strategy as all members have to make contributions and share their information and ideas.
It focuses my discussion to more practical issues, rather than theoretical ones.
There's pressure on the leader to lead the discussion. Problematic when the research qn is ambiguous and everyone is equally confused.
it gives us e responsibility to read up n provide more useful info
it is good because we are being trained to think critically and independently and applying knowledge to real situations
learn to organise thoughts and post questions, trigger the mind in terms of the topic covered in which would help recognise the main / key terms/questions/issues arrised.
You are forced to keep up with the readings and think through each topic.
It is because such a role enables one to assume some amount of responsibility for the information posted online, & hence we are more likely to look for credible sources of information.
more application
It is more efficient as everyone contributes and more information is pooled together. Also more views are aired and more exposure is gained.



Humans love to roleplay when they are children. They learn through roleplaying, and grownups do retain that inherent love and learning associated to roleplaying.
Honestly, we all tend to ignore that part.
Gives a perspective to work from.
Someone to spearhead discussions.
i think it is a good strategy because you get to hear other people's opinions and their reactions to yours. this enables one to clarify doubts and rethink one's stand. however, i still believe face to face interaction is really important.
Depends on individual differences again. Some will benefit more from others.
You get to share your view and opinion
Possible to see both sides of the issue.
It makes us want to produce quality answers.
This actually cultivates a working environment, to ensure efficient running of the discussion. but it becomes very impersonal too.
Good thing for learning, because you have to read about the topic, and you are given the responsibility for others to get information.
we can get into the role and relate ourselves to the questions as we answer
it make me think more creatively and out of the text.
We can see how oyers feel about the topic
It seems to me like it is just a medium for discussion. At least in my group, people don't seem to be taking that role-play very seriously.
People can share their knowledge and opinions about a certain topic. It also makes you think more about the different approaches towards the same topic.
Then we can apply what we learn to real-life scenarios.
Instead of passively accepting info from texts/lectures etc, we are encouraged to actively form opinions. It's requires processing and output from students instead of just receiving input.
I think most of us never really took on the role of 'consultant' when doing the online postings, so I really don't know how effective this is as a learning strategy.
it is quite good because you get to think in the shoes of someone who is giving advice.
This enhances our critical thinking :)
We can share and clarify our ideas.
members will be less restricted as 'consultants',so they might fell more free to express their opinions.
immediate feedback,opinions and suggestions given
neutral because that depends if group memebers are helpful, it's a fine line
Roleplaying seems to have increased my motivation.
However, what is the use of consultants when there is no effective leader. Leaders only post the questions which we all know, which makes it redundant.
You'll really have to know your stuffs well to be able to criticise or advise others.
It will give the discussion more direction.
I can learn more about the topic which I am assigned to.
allows us to think from the perspective of real consultations and thus come up with more practical solutions to the problems.
I gives us a sense of challenge and also, everyone is supporting the next person and providing feedback to one another
It is good because it forces us to apply our knowledge to very real problems which this course is trying to gear us toward
It allows us to apply what we have learnt to the local context.
it gives us more real to life experiences
I did not engage in role playing; rather I just posted my views when they were relevant.
It is gd but we still need "professional" to guide in case of out of tract~~~
I don't think that assuming a certain role enhances learning. Judging from other discussion forums (for other modules), there doesn't seem to be any difference whether one assumes a role or not.
you would put in more effort and pay more attention to everyone's opinions
I am sorry to say I have forgotten that I am in a "consultant" role.
we are able to apply our knowledge to a realistic problem
coz at least i have forgot this role already
If it is the responsibilty of the student to contribute, then it doesn't matter what role is given.

It allows for brainstorming, which is good. But it takes a good facilitator to lead and continue the discussions. Not everyone can be a good facilitator.
It is a good thing since it allows you to explore every aspect of the issues at hand. In a way, being a consultant means that you have to tackle the question in an interesting yet objective way. Otherwise, the client would not even need to consult you if you are just providing him with insights which he already knows.
we will be able to see different aspects and get different ideas from our members
The role influences us subconsciously to be more realistic and professional in our replies, instead of giving textbook answers which might work theoretically but has no practicality. This also allows us to actively apply knowledge into our lives and not apply it only during exams.

## Survey II – Open Answers

If you do prefer one format over another, list your reason(s).

I can get work done faster meeting face-to-face.
I prefer a face-to-face discussion because in such discussions, we're able express ourselves not only verbally/ using words, but also using body language and facial expressions. I believe this contribute to a more effective communication, with clearer messages.
I think face-to-face is much more personal and from experience I know that I learn a lot more and remember more with this approach.
i can ask qns on the stop and they can be answered/ debated on the spot instead of waiting for replies over the internet which can be slow and which some students will not answer the questions i post so i cannot get full contributions to that particular question
its easier to collate the points as you can simply cut and paste.
i guess, face-face interaction suits me better...i'm a more interactive person
As a leader,it would be better that menbers contribute online so I can make reference to it and note who made the comments, as compared to noting and writing down what others say in face-to-face discussion,in which one can easily miss out other's comments .However, it does require more effort for the members to type out one's contributions and post them on the forum, which sometimes can be exhausting when done on a weekly basis. On the other hand, members do tend to contribute more in online discussion.
it would allow all the members to respond to each other because everyone has to meet up. it allows more generation of ideas if they had done enough research beforehand because they would have to listen to everyone's ideas. online discussion, on the other hand, may not have much discussion of a topic if everyone is very busy and only respond to selected topics.
because not everyone is online at the same time, it's hard to coordinate ideas and get instant answers.
so that students can do some research before they post a message. If its the tutorial format, many may not prepare for it before they go for tutorial.
discussion will proceed at a faster rate for face-to-face. this makes completeting the paper faster and more efficient
personally,actually I prefer a face-to face discussion, but because it is with people that I am not familiar with, I would prefer an IVIE format.This is because I would feel uneasy and embarassed. If it were with familiar and close friends, I would prefer a face-to-face discussion session.
A face-2-face discussion wld be more convenient to iron out certain enquiries and assigning on parts for doing the paper as a grp.
more flexible...eg i can do the posting anytime i like..
a face to face discussion would serve a a better interaction channel and to understand each other's points more clearly and immediately.
so that everyone can contribute fairly, and it also makes discussion and debating easier, rather than to post and wait for replies. also minimises repetition.
they seem to express better through ivle then just mere discussion that might not have any substance
can refer to it over and over again
everyone's contribution is apparent to the rest
during face to face discussion, it may be harder to note down what each member is saying. it is different in the case of the ivle discussion format as everything is noted in words, and i can refer to them when needed.
No need to arrange incredulous meeting times to suit members' varied timetables, especially in FAss.
It's easier to guide fellow students back to address the main question and I find it easier to understand

and clarify the points they put forth. Furthermore, I feel that face-to-face discussions are more meaningful & enriching.
easier to sort out the ideas if everyone comes prepared
face to face discussion allows clarification of information on hand rather than waiting for replies which may never come furthermore more people can get involve in the discussion. online discussion have people posting things on their own with no one giving differing info or disagreeing
The ivle discussion format allows group members to do research in their own time and post their comments so that it is accessible to all. While writing the position paper, i could freely refer to comments if i had forgotten them. However, it loses the real-time interaction and visual interaction in the face-to-face discussions.
A face to face discussion is immediate. And can ask for clarification immediately if need to. So the train of thoughts won't be lost unlike in the ivle discussion, i often have to see what did i wrote previously.
It is more specific and clearer to discuss face-to-face and also less time consuming
More efficient clarification of doubts. Human touch.
ivle allows students to have enough time to find information on the topics before posting them. but sometimes the postings aren't related, as in there is no follow up or responds from other group members, each just post their own opinions.
the points are written down clearly. easier to refer to when writing a paper...all contributions made are clear and visible. wont lose any information.
more room for discussion
I think more details can be expressed and more concise than on IVLE.
I like to have eye contact during discussions. Plus, misunderstandings can be avoided more easily compared to discussing online.
We will feel more direct responsibility for the paper and its contents if we meet face to face, and there is more urgency rather than the feeling of "own-time-own-target" in using forum.
it's easier to discuss when you see one another face to face, even though using the online discussion saves time.
I feel that face to face discussion is more efficient, whatever doubts can be cleared on the spots whereas on IVLE discussion, we still have to wait for the other party to log on to see the message and then reply again.
It is more convenient and easy to refer to.
IVLE discussion is not spontaneous enough.
although a face-to-face discussion facilitates clearing up of misunderstandings the minute they appear, i would prefer to read what my groups members have written rather than try to jot down everything said which can be quite troublesome.
I feel in the ivle online forum, there is a lack of guidance from the lecturer, maybe some feedback and if possible, the lecturer can reply to some posts if we are on the wrong track.
for a face-to-face discussion, the leader will have to take notes and may miss out points if the discussion goes too fast.
there is more interaction and quicker response
it is more interactive and flexible.
immediate respons is better. also everybody are more involved.
clearer and we have all had more time to think through our ideas we can cite sources that can help each other
I feel like more things could be organized/clarified in a face to face discussion, that sometimes cannot be conveyed through the computer. Emotions, stressing of certain facts, etc can all be addressed in a face to face discussion, but are more difficult in IVLE forums. Also, the organization of the topics makes the conversation over the computer much more limited, and discourages collaboration and creative input. People seem to just post things for the sake of posting them , and not because they have anything interesting to say about the topic.
face to face discussion may lead to digression of topics
IVLE forum is much more convenient than having to gather everyone in person to discuss the various points. Besides, it is a more convenient method as we can add on to our comments freely at anytime.
we can immediately clarify doubts and suggest ideas and work on it.
can clarify questions on the spot.
More people will be able to offer some actual research options (e.g. articles) not only at the beginning but also as the discussion progresses.
easier and faster to understand each other's points when discussing face to face. views and opinions can get across straightaway and easily.

more convenient
it's easier and more efficient to sort out disagreements, ideas etc. in real-time than in IVLE, which is delayed. Also, face-to-face is more personal and fun.
ivle discussion necessitates putting thoughts down in writing. To do so requires organisation of points into coherent topics and facilitates transfer into written reports. often forget points when just talking about things.
In a face-to-face discussion, its easier to clear up any things we disagree upon as all would be present. Sometimes during discussion, members misinterpret what other members wrote about. Thus in a face-to-face discussion such misunderstandings can be immediately cleared instead of waiting for the other party to realise it on his/her next log on to the discussion forum.
Can be more clear of the points contributed towards writing of the paper. Also more clear of contribution of the different group members.
black and white so documentation of traces available
Not restricted by the lack of information or the lack of note taking skills.
a face to face interaction allows better communication as questions would not be misinterpreted and answers are recieved straight away
Everything is written down so there is less chance that i wil forget what is discussed
All the points discussed are presented in long-lasting form for me to access.
It is more personal; one latent function of group work is to know your group mates better and what better than face-to-face.
Spontaneous opinions are sometimes better than scripted answers. We can also clarify doubts immediately over someone else's remarks.
There is more personal touch in formal sessions
2 hours to talk over a 10 page paper seems too hasty. besides, i'm sure there'll be some people who keep quiet throughout. and without the rating system, there's probably no incentive to contribute anyway. of course, the really big plus of using the forum is, you have time to formulate and contemplate over the use of words. and anyway, i'm the sort who is more comfortable to converse with written words than orally. yeah, so i'm definitely for the forum.
It is easier for us to clarify any doubts with a face-to-face discussion quickly. Everyone is obligated to participate in the discussion unlike the ivle discussion.
Instantaneous question and answer
actually, it really depends on the people. if they are willing to make an effort, an online way is much more efficient and faster as compared to wastign time in settling a time to meet.
There are times when some things written on the ivle is not very clear in the sense that what the reader perceive might not be what the writer meant. I think that using the ivle for discussion is feasible only after meeting up before hand, when the members have a clearer idea of what each is supposed to do.
easier and faster to clear any misunderstandings or to explain things that we're not clear about
It would be better to discuss and sort things out over a face to face meeting when it comes to writing an actual paper for an assignment, due to possible misunderstandings which may surface over a internet discussion.
The issues and suggestions brought up by the other members were already "recorded" down through their postings, and it was easy for the writer of the essay to compile and refer to them. Another advantage is that information can be referred to anytime we want.

Has your trust in your group members increased, decreased or remained the same since the start of the semester?

I did not expect my group members to be so enthusiastic in the forum and contribute ideas of such high quality.
As the semester proceeded, less contributions were observed, partly due to the increasing amount of CAs of other modules, thus less time spent on this module.
they are giving factual information that i had gathered myself. i dont need someone to do research for me. i need fresh ideas
Most likely because i think some people did not contribute as much for one reason or another. I didn't contribute much for most discussions cuz i've totally forgotten about it!
They made very long and good comments which sometimes impressed me.
Everyone is participating and apparently, according to what is possible from them. There is no one who does not contribute at all, maybe also because it is graded.
it has increased as i could see that the contributions made this far have all been constructive and

relevant to the discussion topic.
postings are obviously not as many as in the beginning and people tend to cut and paste from websites with no personal opinions the postings also tend to cluster around the day before the forum closes hence no time to verify info and further discussion
There seem to be less information and less postings as the semester progress, probably due to increasing work load
due to the workload and tests/assignments etc, quality of discussion isn't as good, and late postings as well, leaving less time for others to respond to others' postings thus no 'discussion', merely posting own opinions.
I was afraid that some members would slack off but all have proved to be cooperative
in some members, i'm assured of the quality of their postings and also that they'll post regularly.
You never know if someone is going to post or not. Or if their ideas are good. No chance to really bash them out.
I don't blame them for making not so good contributions. Sometimes the work load of other modules is really overwhelming. But they do make an effort
At first, I was skeptical about the amount of effort my group mates would put in, as everyone was anonymous and no one could hold them accountable for the quality of their work face-to-face. However, from the first post onwards, I found my group mates very involved and committed, thus I changed my opinion of the online discussion format very quickly.
Perhaps due to the workload demanded from other modules, some members did not contribute at all for some forums.
They have made efforts to find out more about the topic inspite of the increasing workload near the end of the semester. Jus a little disappointed with a few group mates.
i get to work with them and they have proven to be reliable in helping one another in the discussions.
participation in the discussion declined as the semester progressed. not surprising since our workload has been very heavy but i didn't expect some people to post nothing at all.
Minimum contribution, some has plagiarised without mentioning
i guess that's because i was deeply disappointed. they didn't help as much as i expected. especially the people who contributed and were really active at the start of the semester, you kinda build up confidence and anticipation that they would be equally participative, yet they didn't. i realised too late that these same people were interested in helping themselves and were not reciprocating fairly to others who have helped them before. they stopped posting for the weeks after their papers, i suppose...
They were more helpful than I had expected and made many good contributions that helped me in writing my essay.
there were increaseing postings.
There is always bound to be someone who does not contribute anything and I consider this to be irresponsible.
some have been ver diligent in posting comments in the beginning but as the semester comes to an end, the same people do not contribute anymore. a bit unfair to those whose discussion topics and position papers have to be written towards the end of semester.

If your confidence has changed, list the reason(s).

i know my group members better throughout the sem.
in tutorial classes, usually the few who speak up are limited to that few people. but Online we can just post our opinion and people can take time to discuss what i have posted. We usually refer back to the person who posted that question initially, i think it is a good way.
everyone search the web so what you want to say may have already been stated..
I have gotten used to the format of discussion and as i'm better able to adapt to this new technology, it has been easier to contribute info. so i'm more confident in expressing myself.
initially i was quite apprehensive, but after a few sessions, i learnt that i could just voice my opinions and people would support. Made my learning more active than before.
ability and time to do more research before zooming inot th etopic specific itself.
seeing how others express ideas and the prtice of contributing my own has helped
more familiar with the different styles of each groupmate and know that others accept that we are all free to express our opinions
I'm more confident of expressing myself because i know others in the group will tactfully comment on my contributions.
I don't have to be confronted by the looks on my group members' face, either they disagree or agree. No added social pressure.

As I become used to the discussion format and my group's style of discussion, I feel more confident in contributing my opinions.
I've realised that almost everyone makes some comments that stray off the original topic and so feel less anxious when planning my argument.
i was chastised somewhere along the way by a few forumers who pointed out my suggestions were not practical. i kinda felt useless and definitely had the queasy feeling of inadequacy. after which, i practised more caution in making my comments.
Got the hang of it after a number of sessions.
dun have to face rejection of idea face to face
Made a conscious decision to be less inhibited.
posting on online forum eliminates the fact that we have to face others, thus may be a better way to express myself more clearly and not fearing that i might be wrong

If you feel that your relationship with the other group members has changed, list the reason(s).

They are easy to get along with and are serious in their contributions.
i only know them by their name, but i do not know their face and their character.
no one replies to postings directly addressing what others have said anymore
no one fun face to face discussion, now it's merely work, or task.
after working for about 9 weeks, the contribution part is quite formal, but people do add in little comments to soften the whole "business-like" touch to posting.
After exchanging so many postings, these can be regarded as a form of interaction whereby we will get to understand (or at least form some impression) the people in my group better
No face-to-face contact - hard to even know who is who in real life.
You go online for a contribution because it is graded and not so much of wanting to contribute
because we only communicate online and it's usually only one-way.
With no face-to-face contact, faces got fuzzier, and the communication more about getting your posts in and purely businesslike, without even the lightest of bantering.
Because I do not see most of them after the first get-together session. Some of the tutorial group members do not even recognize me when I see them around school.
No one says anything except what has to be said (discussion relevant only for the topic and only relevant for the thread under which they post)!
we get to know them more and some contributed personal experiences.
I hardly got to know any of my group members better, less remember how they look like. No doubt the online way of conducting tutorials saves time and allows more in depth discussion, the human touch is no longer there.
We don't even know our group members beyond their names and without a face to attach a name to it, it is harder to remember the name. Furthermore, as the semester was extremely busy, people just type what they have to without any time for small talk
I have established email correspondence with one group member outside of discussions.
I was able to learn more about them and felt that there was a sense of camaraderie between us.

## Appendix E

### Transcripts of End of Semester Interviews

Interview Student #1,

Interviewer: How did you find your experience using the discussion forum?

Student:— I think it's quite fun, quite interesting for me...I find it quite exciting, I get a feeling of different view points and usually in traditional class I rarely get to see them and some people don't even prepare for the assignments, then they just come in and give smoke or crap. Kind of useless and so I find it more productive. — you have to focus but at some time is quite tedious. We do a lot of research or at least we have to keep up with reading — for us nowadays, kind of tough.

At least I feel that I'm more secure especially when I'm near exams, at least I've done something and I can use whatever I've posted as my note taking — it's much easier and quite organized and for my group at least I find it quite organized — and everybody does respond to each others comments, but not every group is having that kind of active engagement because I've e asked my colleagues and they just post their individual posting and then it was quite ...because I've asked my colleagues and she said that everybody just posts their individual postings then it was quite different ...I don't know for them, it was quite different because they asked a question and nobody responded., and she was quite disappointed.

Interviewer: The team dynamics are important and in your team how was the dynamics?

Student:— it was kind of more or less spontaneous and more... on the whole I find it is okay Comparing with others lah I've heard worse and I think my group is at least better. At least there is ... they start the discussions on time especially by Friday or Saturday we have stared posting for the question and everybody has responded by Wednesday or Tuesday — at least not too bad.. Some groups I've heard very very poor response.

Interviewer: You were leader for one week, how did you like that? Did that work well for you?

Student:— That week was quite heavy, I was having other assignments. Then I didn't respond very much. So I just ....I find that the style of the leader was quite good in the sense that every time after some postings members had responded she would do a summary and sort of bring back the focus. Sometimes we go out of it and sometimes people talk too much about their own experience, then we go a bit out of the way...seems to go out of point. Then if you bring up the summary part we can sort of see where are we going ...have some sort of direction, then I think it's quite good.

Interviewer: In your week when you were leader, did you get enough information and comments from your group? Did you feel that that helped you create your paper?

Student: yah, it helped, it helped quite a lot because I think I was initially....I was thinking that maybe it could give me more research papers rather than their own comments, it would be better, but as I read through the thing I find that although they never site any reference, actually they did apply some concepts they just didn't site the references. So I find that when I was leader it was quite okay, it did help.

Interviewer: I was interested to know about your particular motivation. How important the course is for you.

Student:— I'm very interested in health so I think that interest in the module itself will push people to do even more research and think through the issues more. I also try to apply it into my life and that counts for making this module even more attractive.

Interviewer: Did you find writing to be difficult? I know you said it took a lot of time because it was more demanding. Was the writing in the discussion forum more difficult for you?

Student: Not really difficult, I don't know... somehow when I edited I started thinking about it, I get more and more thoughts. Then I kind of...it's kind of fun.

Interviewer: Okay so when you do type you think of more things...

Student: Yah, you get more ideas as you go along because I got sort of like a draft or a brief outline then as I got more points coming in then I added ...

Interviewer: Are there any other general comments or specific comments that you would like to make about the experience?

Student: I don't think it makes much sense. If all my modules having this kind of system I think I'll have no friends at the end. I think it's quite sad. I asked my friends for comments she also said that she find that it's like you see you get only fly by friends. If let's say you want to form a study group do you think it can work, because they're not really close to them.... It's quite sad....

Interviewer: So you didn't get a greater friendship with other people in the group that you didn't know?

Student: I don't know about the rest. I find that it's very kind of formal although they try to make it a bit less formal but I don't think it really ...I mean there's no space to say ...there's still something missing. I mean it's really not personal...

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## Interview Student #2

Interviewer: How do you view your experience in using the discussion forums?

Student: Everyone is quite into that ...sometimes I log into it to see everyone's postings but I thought that there are also members who like... are over what they contributed... Sometimes I feel that it was quite useful I think.

Interviewer: Did you learn a lot from the other postings?

Student: Yah, but sometimes I don't make use of what the others said in the forum.

Interviewer: Is there anything more in general comments or specific comments about the discussion forums?

Student: I think it is quite flexible ...and it's less intimidating without the presence of others.

Interviewer: Do you feel that you made relationships in the forum or that people stayed very much apart?

Student:- I think the feeling in the forum was quite close, but in reality we never spoke to each other at all, so the connection was only virtual.

Interviewer: How about your motivation... How important is the course academically?

Student:- Quite important, but it wasn't very important because I thought it was only 10 % of the overall grade. If I really cannot log on to contribute then I'll just give it a miss, but I make an effort to write at least one message for each week.

Interviewer: You were the leader once - how did you like the experience of being a leader?

Student:- Yah, I thought my team members were rather good because they contributed a lot. I was the first leader and there was quite a bit of confusion because of who should be doing the postings of the questions and so on....

Interviewer: So you did the organizing?

Student:- Yah,

Interviewer: Did you think it was good to have all these other views from other people?

Student:- Yes, definitely.



Interviewer: Did you find writing inside the forum difficult?

Student:— I didn't find any problems.

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#### Interview Student #4

Interviewer: So what I first wanted to talk about your experience in the discussion forum and how you saw discussion forums work...

Student:— I think I would like to access in the first week I was in charge so I was supposed to write the position paper. So because I was supposed to write the position paper I went to search for a lot of journals. Then I found other members, their contributions were actually more based on their own opinions than research, which to me I thought they weren't fully contributing so I didn't really think it was a good experience. But subsequently when I was just participant, not a leader, I found that it was actually very difficult for me to go and do extra readings for the forum itself. We have a lot of other projects and papers to write so in the end it becomes more like I access the forum tried to log onto the forum regularly but next day I just see what are the things people say and contribute my own opinion rather than do research. Then last week I was supposed to write the critique, then I did read up more about the things, and then I had more things to contribute. So I think the motivation factor I don't know, when you are in the forum you might have the illusion that you have lots of time and that you can have a lot of time to read other things. In actual fact there is very little time. I'm not sure about the previous years but for this current semester the forum starts on Friday early, then Saturday and Sunday, is the first few days....because it's Saturday and Sunday a lot of people actually never reply or never log onto the forum and they start replying on Monday, which leaves us only about four days which is very short, so maybe I just say that I learned a lot when I was the leader because I read a lot. There's the motivation factor there. But when I was a participant itself I didn't put a lot of effort.

Interviewer:— The opinions that were brought into the forum, did they bring in some perspective that you may not have thought of?

Student:— Yah, some of the time, the perspectives they brought in were actually insightful because I never thought of that, so it does help me to look at things in a different way. That definitely is true.

Interviewer:— Maybe a bit on the relationships did you feel that ...did you get to know people from the forum?

Student: Well I think it also depends on the style. Some people write in a more formal style, some people write in a more like they're in a chat room...chit chat.. So it helps when they are writing in a more personal style. It's like it allows me to get to know the person better, but if I were to compare with a tutorial it's definitely not. I only know the person by name and I know that person's writing style and what are the things he is likely to be contributing, that's all. So I just know the person by name.

Interviewer:— Did you get any ideas about which ones have good work ethics ...or other character traits?

Student:— Yah, definitely. Some people they do consistent readings, they do for almost every topic research...I'm sure whether is it because they don't have other work to do or because they are good workers. But they are people who consistently post at least four to five comments on the topic itself, and there are some who only last day they post one, and some they don't post anything. As well, as weeks go by I can see that some people you can be sure that these people they can respond something and they will try to bring in topics, but there are other people who doesn't.

Interviewer:— Do you think that may be a question of motivation?

Student: Could be. Something like what I said about being a leader. When I was a leader I read more, I know more then I put up more things. But when I'm not the leader there are more other important things.

Interviewer: Talking about motivation, your particular motivation for the class, was it high, just about normal?

Student:— So whether I wanted to do well or not, yah I really wanted to do well in the class, because I think I'm stronger in psychology. So if I get a good grade it can help for my CAP. But for the forum itself it's a different thing because there are times, which I think to myself ...it's only about ten percent, I can't get lower than about five percent. So I just get five percent and spend my other time doing my other work, my other project, which has a higher weightage so for the forum itself it's a bit lacking.

Interviewer:— Do you think that in the long run that at the end of the semester you acquired information about other topics?

Student: There are certain topics that I go and do more research on. I definitely learned more than I read from the textbook. Of course there is the tendency like other modules to concentrate on the textbook itself and suggested readings, but when I read more like when I was the leader itself, I do learn a lot more things than for other modules.

Interviewer:— Did you find that in your writing it was easy to express yourself?

Student:— For myself right, I take a long time to process my thoughts. After I write down the things I will go through and vet the things and make sure that the way I write it is clear enough to the people, so I take some time to redo my posting. The thing about the forum is that you can do it any time and you're supposed to have a lot of time to do it but when I have other things to do I'd rather try to spend as little time as possible for the posting itself. When I find myself taking too much time in posting and editing this style and making it coherent and clear...especially towards the end of semester I just type, I don't even care that's its actually coherent or not...I just type whatever I feel like typing.

Interviewer:— Are there any other general or specific comments you would like to bring up?

Student: Well maybe just one comment...there is one person who ...there are a few people in the forum who I think when ...there are a few weeks with very little people posting. So there are people who somehow like... ask the other people to try and post something to help the person who is writing a position paper. That sort of thing I feel heart warming actually, there are people who care about the others and we don't even know each other at all. So it does feel kind of heart warming.

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#### Interview Student #5

Interviewer:

Student: It's okay, everything is alright.....

Interviewer: Did you continue the relationship into the semester, in other words you met once, did you sort of informally meet during the semester?

Student: No, but when we go for a lecture we talk a bit.

Interviewer: Do you feel like you got to know people in the discussion forum a little bit...their character, their style, their attitude?

Student: There are some that post quite formal.

Interviewer: Now let's say about motivation, how well motivated are you for this particular module?

Student: This is not my major but because I have lab clusters I tend to do the lab clusters first, but it's helpful because I can write and then take a look – I think that's the best part.

Interviewer: Did you find it sort of difficult to write? Did you find that it suited your style of expressing yourself?

Student:— It's okay.

Interviewer:— Any other general or specific comments about your experience? Is there anything that stands out?

Student: I think I need to get used to not having somebody step in ...

Interviewer:— You would like more guidance?

Student:— Yes I would.

Interviewer:— You were leader at one point when you wrote the paper, how did it work out – did you get enough information to write the paper?

Student: Yes, a lot.

Interviewer:— Did you pick up some perspectives that you normally wouldn't have thought of?

Student: Yeh.

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#### Interview Student # 6

Interviewer:— How was your experience of the discussion forum?

Student:— It was good because you could come in at any time and if we had, like ideas to add on, we could and it wasn't just a one sit down session. You know sometimes your brain doesn't quite work at one point in time so it was good because we could add in comments at any time we felt like we had anything to add. The problem is that not everyone contributed as much as the rest and if you're busy for that week you tend to forget to do your postings. Friday morning and it's like 'bam, uh-oh' you know what I mean....because there is no stipulated time for you to go in to do your stuff and you tend to forget and you tend to procrastinate....like ' oh, it's only Tuesday, I still have until Thursday"...but when Thursday comes and you have other assignments to do, you just forget. That happened to me one week and after that I thought okay, better do your posting on Tuesdays.

Interviewer:— Did you like the style of the forum? Did you like writing?

Student:— Yeh, that was fine.

Interviewer:— How about relationships in the forum? Did you meet people in your group?

Student:— Not at all actually. Just the first gathering, that's all. Besides that, no. I don't remember how they looked like. I tried recognizing them who they were, but I couldn't.

Interviewer:— Did you throughout the semester ...through postings get to know people?

Student: Not really know on a personal level, maybe the level of conscientiousness and how hard working, how much they read...I mean how they accept your comments. You know like when I post let's say a question, there will be certain people who will reply and certain people who just won't bother about it.

Interviewer:— On motivation, how is your motivation for this course?

Student:— On a scale of lets say ten, this is an eight. Firstly it's interesting, and secondly I like the lecture format and this forum thing because it gives me more flexibility and yah, and I like the critique. It allowed me to look at two topics instead of just one...one is usually the case for every other module so... the critique is like getting a second viewpoint on how others would write the paper. Because you only see your own paper and you're like thinking whether is mine good or what... so when you read others you can kind of like get , you know....second opinion.

Interviewer: Do you have other general or specific comments about your experience?

Student: It's impersonal I would have to say. It was good when Dr. Bishop kind of like prompted us to get on with things because my group was slow to start with. In the first two or three discussions, he kind of like sent us emails to the group to get us started and that really helped because no one was going to get any work done and we were just procrastinating and waiting for each other, so that helped...

Interviewer:— Some students commented that they wanted a bit more guidance...

Student:— Yah, maybe a bit...because we wouldn't know if we had gone off track and we wouldn't know if what we are saying is relevant to the topic. So we just happy banter...yeh, maybe a bit of guidance....The problem with me is that when I'm posting something I'm always asking 'does this make sense?. Is this relevant to the topic?' Because like I said, the other group members won't really tell you 'like you're not making sense and you're off track'. , And so I was quite apprehensive at times. I didn't want to say something stupid.

Interviewer:— You were leader for one week, did the team support you?

Student:— I had the first paper so it was really slow. None of them actually posted so there wasn't really much discussion, only like say ten postings. I mean really few and honestly I really didn't read as much. Most of my research was on the net and books, very few from the forum, but it was just the first week so I understand that ...it got better.

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#### Interview Student # 7

Interviewer:— How did you personally like it... what was motivational...

Student: OK this is probably the most important thing about this online discussion is that it provides students with much more manoeuvring to plan their schedule because they don't have to come physically to class, but just log on to their computers and just make comments and stuff like that.

Interviewer: Is that good specifically for you?

Student: Yes it's good for me, but it's also good for most of my friends... Sometimes going for tutorials is a bit of a chore so I think it's good in that sense. Otherwise I feel that because it cut down on basic communication sometimes the discussions tend to get a bit weird... because people will just talk about their own thing... they don't really engage in a discussion per say... It's just like I post my thing, you post yours and then we'll see what will come from that. And also one thing about this is that in terms of getting to know your group members I think there are limitations there... you don't come to class, you don't interact basically, I don't even know what my group members look like.. I saw them once but like I can't remember them, I can't put the name to the faces, so things can get weird... there kind of like repeat the discussion a bit because we don't have interaction because I quite spontaneous.

Interviewer: Did you discover the character of individuals...

Student: Yea.. like for some people who are more .... slow... I remember that there are some that didn't really participate very actively .She was always late in posting and sometimes there are people didn't participate at all. Once we had to wait for three days before things started going.. so I guess... there are others in the group who are very active and will look for information on the web and the library and participate immediately when the forum is open... so there are people like that... there are a couple who are constantly doing the...

Interviewer: Your motivation for the course... was it high, medium

Student: I would say I was quite motivated... but that's just me because I want to do the best that I can for every thing that I do. If you want to talk about the online discussion as a motivator, I would say that's it's not that strong motivator because it's a very small percentage and I think that a lot of students probably won't even bother, but for me every week it actually forced me to do my readings and so anyway it's pretty good...

Interviewer: How about when you were the leader and you did the paper, did the discussions help you ...

Student: I think I was kind of flustered in a sense because during that week the quality of discussion wasn't so high especially when compared to the next week...I guess it was because of my topic... I was doing on .... disease and maybe for some people it's not as interesting as death and dying. But in some ways the research that we did was helpful... for example there was this one girl who actually posted a link with a research reference brought this paper to my attention and I actually incorporated it into my

paper. Also there was this other girl who did a great deal of research on the more technical aspects of the topic which I really appreciated.

Interviewer: Is there anything else

Student: (inaudible).....

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Interview Student # 8

Interviewer: How was your experience with the discussion forums?

Student: At first I was... well you know when you go for tutorials right no one really has to contribute because their attendance counts for the percentage as well, but with the discussion forum it's like every week you have to post something if not you'll be rated a zero... but at some point I kind of gave up on the forum because there was so much other work... at home my internet connection was quite slow, by the time I check my emails and download and all that I don't actually have time to log in to the discussion forum.

Interviewer: For the times that you did go in did you find that it was difficult to express yourself and did you understand what other peoples put un the discussion forum... how they expressed themselves?

Student: Because I'm the kind of person that doesn't like to speak up in class so I find it a better way of communicating, but if someone disagrees with a point then they want to tell you then you have to keep on posting and posting it's actually quite troublesome. It would be handled more conveniently in a tutorial session.

Interviewer: Were there a lot of contention in your group?

Student: Actually I really don't know. It was like the first week I logged in, it seemed to me that I was the only one who was contributing anything apart from the leader, and then after that eventually I just stopped logging-in. But just recently I was the group leader for the 8<sup>th</sup> week and Dr. Bishop kept writing me that I had to get my team members because nobody posted anything or so I thought. Then he told me that everyone posted something but I had to click on the class because everyone had posted in response to the first posting. So that could have been what had happened the previous weeks that I had logged-in.

Interviewer: So your experience with discussion forums was limited... you weren't sure on how to deal with the technology?

Student: I think there should be a segment were you teach the students how to use it, because some students...

Interviewer: So you hadn't used discussion forums before...

Student: I did but it was just a post...

Interviewer: Do you use this technology often... chat room

Student: Not really..

Interviewer: Did you use the points and perspectives that were brought in by the other students?

Student: By then I had already written my paper..

Interviewer: Did you make relationships with anyone else in the group?

Student: No.

Interviewer: Any other points?

Student: (inaudible).....

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Interview Student # 9

Interviewer: How do you view your experience with the discussion forum?

Student: (inaudible)..... we're not actually interacting because of I post my own you post your own. (inaudible)..... towards the end it gets quite lonely and for the leaders it gets quite sad because they don't get a lot of comments from people. I didn't know these people and I expected them to help each other... when it came to my turn it wasn't happening... it gets a bit sad your enthusiasm for that week as a leader is low because of a lack of response. So I guess it's quite sad. (inaudible).....

Interviewer: How was your motivation for the course?

Student: (inaudible).....

Interviewer: Are there any other general or specific issues...

Student: (inaudible).....

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Interview Student # 10

Interviewer: How do you view your experience with the discussion forum?

Student: It's actually quite easy to use. In the long term it gets actually quite troublesome because you have to go online to contribute something... I mean that it's good that you have to contribute something but sometimes you may just forget... There a lot of postings from all the group mates so we may not have time to look at all the postings and by the time we have time to spare the forum might be closed. So probably one good way is to open the forum a little bit longer.

Interviewer: More on how you interacted in the forum... did you find it difficult to write... could you express yourself easily?

Student: There are times when I couldn't because I just couldn't find the correct words to describe what I wanted to say but probably (inaudible).....

Interviewer: Some students wrote formally some very informally... did you have a preference?

Student: I am comfortable with both. But in face-to-face I can just ask .... Sometimes in postings someone will ask what that means but the person may not reply. The forum is good because we have something to refer back to instead of you have to write down everything.

Interviewer: When you were the leader did you get support from the team?

Student: (inaudible).....

Interviewer: In regards to relationships, do you think that you have gotten to know a little bit about the people?

Student: (inaudible).....

Interviewer: How about your personal motivation for the course?

Student: I try to do my best... I try hard for every module.... Probably my motivation is that I'll learn something out of this so that for future...

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Interview Student # 11

Interviewer: How do you view your experience with the discussion forum?

Student: Actually I've been using a few discussion forums before using this format for this module. I actually quite enjoy in the past discussion forums in other modules. (inaudible)..... for our discussion

forum it is different since it is compulsory so people do contribute. By and large talking about personal nature... it's hard to get personal with discussion forums (inaudible)..... everybody started their own contributions but then there is not much interaction anymore. But the motivation to do this is actually does not arise from the 10% because all of us can calculate that this is only 1% per session... it's just 1%... so it's more like an obligation for everyone to... contribute to the leader, I must at least do some research do it...

Interviewer: Did you find that you got to know the members of the team by their writing?

Student: I can like distinguish those who actually do last minute work and I personally don't quite like them even though I don't know how they look like. I prefer those who actually do some nice presentation.... Somehow can show about the persons orientation towards this module.

Interviewer: In your writing style... do you like the forum as a tool for communicating... do you feel that you express yourself well?

Student: .... Usually after writing I will reread a few times before posting... I hope that the others would do the same. You're portraying yourself to others and you don't want to look shabby and unorganized. This format allows me to do editing.

Interviewer: How about you experience as a leader... how did you like that?

Student: I liked being the leader... I liked the contributions they made and I made an effort to reply to every single one.

Interviewer: Do you feel that it was helpful to get other perspectives?

Student: Yes correct.

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#### Interview Student # 12

Interviewer: What are your views on the experience?

Student: Basically I think the online discussion was quite flexible because we can post on the forum on our own time.... We were quite into it like the first few weeks we were very enthusiastic about it, but recently in the past 3 or 4 weeks things are dying down.... But maybe its because of the topics as well, some topics are more interesting so we'll post more while some subjects like AIDS or talking about death some people may not know too much about it so... The one thing about discussion online although it's quite flexible, I find it's quite impersonal, you're basically typing... there are some feelings and opinions which cannot be typed... but through facial expressions and body language which can better put through the idea that you want to put through. But I thought it was quite OK.

Interviewer: How about reading stuff from other people, were you able to grasp the ideas.

Student: Basically it was quite fine they were quite readable, better than text books. We can grasp more of the ideas.

Interviewer: When you were leader did you get enough different perspectives?

Student: I was the leader for the first week I was quite lost as to what I had to do. Actually I posed questions which would not help me in my paper but my member they still gave me something which... helped me (inaudible).....

Interviewer: How about the organization of the forum?

Student: I noticed that in the forum everyone would post 2 days just before the deadline (inaudible).....

Interviewer: Did you feel that there was a group responsibility towards the leader?

Student: I guess so. (inaudible).....

Interviewer: Relationships... Did you make any friends at all? You said it was impersonal...

Student: No actually... (inaudible).....

Interviewer: Your personal motivation?

Student: I was quite motivated because it was something new. (inaudible).....

Interviewer: Any other general or specific issues...

Student: I guess it's rather difficult to have online discussion without being impersonal. I'd like to have both tutorial and online discussion.

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#### Interview Student # 13

Interviewer: How do you view your experience with the discussion forum?

Student: It was quite interesting because it was (inaudible)..... we plan before hand that everybody has to post early so that the leader has the time to ask questions before the forum closes on Friday. (inaudible).....

Interviewer: When you were leader did you practice the same kind of organization?

Student: (inaudible).....

Interviewer: So when you were leader how did you like it?

Student: It was quite organized (inaudible).....

Interviewer: How did you like the writing aspect?

Student: Some members were very office oriented types (inaudible).....

Interviewer: so there was some socializing in the forums... Do you think that you got to know some of the people even though you haven't met them?

Student: (inaudible).....

Interviewer: How about your motivation in the discussion forums?

Student: (inaudible).....

Interviewer: Any thing else?

Student: (inaudible).....

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#### Interview Student # 14

Interviewer: How do you view your experience with the discussion forum?

Student: not too bad (inaudible).....the good thing about the forum is that people tend to work harder (inaudible)..... What I don't like about it is that it's very impersonal, there's like no interaction because I think that people (inaudible)..... There is a kind of (inaudible)..... the forum is very like cold. Some people are so very like... Oh there's one time my group we talked about hospitalization and then I thought they were more (inaudible) that was better, but there are some who are still really text in post. That's why I really don't like the forums lah.

Interviewer: Some people in the forums are more formal in their writing and other people are very informal in their writing. How was your experience in you forums? Did you get along well with the two kinds?



Student: (inaudible)..... I tend to write a bit more informally because we kind of know each other so it's kind of like just talk, but year three they tend to write more (inaudible)..... it is very formal, yea very formal, but I guess it's ok lah. I like both styles.

Interviewer: Did you get to know some of the people in the forum just by their style?

Student: (inaudible)..... When you see them outside the forum there's no relationship, unless you already know the person.

Interviewer: At one time you were leader. How did that go?

Student: (inaudible)..... It was a bit harder to answer, I didn't get many postings (inaudible).....

Interviewer: If you had done the paper on your own would you have had as many perspectives and ideas or did people bring things that you hadn't thought about.

Student: Yea there were certain perspectives that (inaudible)..... that I didn't think of it. (inaudible).....

Interviewer: How was your motivation? How did you manage your time?

Student: When I first started (inaudible).....

Interviewer: Did you find it difficult to write in the forum? And how did you find the organization of the forum? Was it difficult for you to adapt to?

Student: (inaudible)..... no problems.

Interviewer: So you didn't have any problems.

Student: (inaudible)..... If the group leader doesn't like come up with clear (inaudible).....

Interviewer: Any other general or specific things?

Student: (inaudible).....

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#### Interview Student # 15

Interviewer: How do you view your experience with the discussion forum?

Student: It was ok lah, but towards the end it got a little dry. Because I tend to usually every semester to (inaudible)..... towards the end I tend to tail off both in terms of work and participation. So even in terms of the discussion forum you can see that postings went up and towards the end...

Interviewer: Is that a condition of work overload with other courses or is it a condition that there was 10 points for the forum and I've got enough points and I've got other things to do.

Student: I don't think so. I don't think it has anything to do with points because (inaudible)..... every week is weighted equally so (inaudible)..... It's just the way I am. I think it's just you do the thing over and over again and after a while it gets a little dry.

Interviewer: How was the organization of the forum? Was it easy to express yourself? Did you pick up on the points from other people quickly? Was it a nice or easy environment to work in or was it constrictive?

Student: It's alright. I think the problem with discussion forums is that you get a lot of people saying things already said (inaudible)..... you get one post and the next post is I agree with that (inaudible)..... let's say the first poster gives some (inaudible)..... what else do I say?

Interviewer: Some people were very organized or formal in their postings others were informal in their postings. Did you get along with that easily?

Student: I tend towards the informal in pretty much every situation. (inaudible)..... To me the most difficult thing is that you don't know the other person, you don't see their faces, you don't you know... Most work can be misinterpreted the same sentence can be you know... different tones and stuff. So I think that's a potential problem.

Interviewer: Was it a problem in your group?

Student: In terms of misinterpretation? Once or twice.

Interviewer: So people were able to make themselves understood?

Student: I think the problem with the forum is that you don't really get people disagreeing with each other. In this sort of thing it's... if you don't agree, you just put another post bringing up a totally different thing. Nobody cares... So there's no argument or discussion, it's more like one point of view, one point of view. There's no conversation.

Interviewer: You were leader at one time. How did you like that experience?

Student: I think that when I was leader the most useful thing is that it was a good tool to get information. I was leader quite early on so because I set the tone right at the start you know... let's keep it informal. So my discussion was pretty informal. People calling each other by name.

Interviewer: Did people come up with things that you had not thought of at all?

Student: Not really. Not for my discussion because I was doing the health behaviour.

Interviewer: In terms of relationships, did you.... Get an idea from their writing as to how people were... did you get insight into...?

Student: I think the thing is ... in my group I knew one of the guys. I start to wonder... I take a look at the others... who the people are... what they are like... I mean you get some idea as to whether they are hard working... I mean that there are some people in my group who post once... maybe 2 hours before the closing of the forum and that's the standard for them... so maybe out of that you can think that you know they are a little unconscientious. But aside from that you really can't tell who a person is and what they are like.

Interviewer: Is there anything throughout the semester that struck you... and you were sort of surprised... working in the discussion forum?

Student: Well to me the most significant thing was that the longer it went, the less postings there were. Because the first few discussions you would scroll up and down 2 or 3 pages and towards the end it became like one third of a page or less.

Interviewer: Is there any thing you'd like to add?

Student: If anything my group had a problem with somebody taking charge even the leader. Usually nobody put up a posting until the leader post. I know in some forums the leaders forgot so sometimes the first posting will come on Tuesday... That was a problem.. no one take charge and if the leader only post once, it doesn't really carry on.

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Interview Student # 16

Interviewer: How do you view your experience with the discussion forum?

Student: Actually there are two kinds of views. First of all I think it saved my time very much because I don't have to come to school and I can get online at any time, but the other I think I don't like it because the other students in the group is online at different time so after maybe two three days if I online then I have to like review back the messages and posts. The when I online again I forget so I have to refer back... so it's quite troublesome but it save a lot of (inaudible)..... like during the daytime I don't need to come to school.

Interviewer: Did you find it easy to put up your ideas... to write your ideas in the discussion forum format or was it difficult?

Student: It was quite easy because there are no strict format for us we can just simply write our ideas so it's similar to a conversation.

Interviewer: Some students have very formal writing styles, others students have very informal writing styles. Was there any difficulty adapting to the different styles?

Student: (inaudible).....

Interviewer: Did you notice anything particular about the individuals within your group and their style?

Student: Yea, sometimes I can guess the style, the personality of the person. Like some in my group... there's a person she will arrange all the (inaudible)..... very very organized style... So I think she is well prepared before she posts a message. Then some other group members will like respond to your previous message, some others maybe they have read but no replies...

Interviewer: How were the replies to your postings? Did you get some good feedback?

Student: Most of the time it was good feedback.... They agree with my points (inaudible).....

Interviewer: What if they disagree?

Student: Disagree? I don't think there was disagreement...

Interviewer: So you got to know some people in your group?

Student: Yes, most of the time we stick together for the lectures.

Interviewer: And you didn't know each other beforehand?

Student: No.

Interviewer: So did you make friends?

Student: Yes. About three to four it's like quite close now.

Interviewer: And how did this come about?

Student: It just happened... just go to the lecture (inaudible)..... sometime we would discuss about the forum.

Interviewer: Did that help the team do better or be very cohesive?

Student: For sure it helped much, because we exchange some ideas and then like for some topics we will find some reference (inaudible).....

Interviewer: The information and the ideas that were generated in the forum... were there a lot of perspectives generated?

Student: (inaudible)..... lots of different perspectives. I've learned a lot from them because sometime I just stick on one perspective but I can see (inaudible).....

Interviewer: When you ere leader, did those perspectives really help you in adding on to what you would have normally included in the paper?

Student: Because when I was the leader, I would post different sub topics for them most of them would write according to the sub topic and reply to me and then a few will like add up the other sub topics (inaudible)..... it kind of helped.

Interviewer: How was your personal motivation for course? Was this course very important?

Student: Yea, because actually I wanted to take this module last year but the timetable clash. My father was (inaudible)..... but last year I wanted to learn more about health (inaudible)..... so I can advise him (inaudible).....

Interviewer: Any other general comments about the experience?

Student: Sometimes on the discussion forum what the other people write some points may be hard to understand... a lack of understanding of what they are trying to say if we can meet up during a lecture or one hour during the month we can meet up together maybe we can ask face to face what people are saying in referring to their post. If you use the online discussion to ask the that then you have to wait for their answers. Then maybe after one day I forget about it.

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Interview Student # 17

Interviewer: How do you view your experience with the online discussion forums?

Student: I think it's hard to keep track, because sometimes when there is nothing much to say (inaudible)..... we post at odd times so a lot of times we end up forgetting. (inaudible).....

Interviewer: Throughout the semester did you have any difficulty understanding the structure of the forum? how people post things?

Student: No I think it was pretty straight forward. Pretty easy to post the comments except that I guess that it's just reading it that tedious. So sometimes the posting kind of drop (inaudible).....

Interviewer: Some people were pretty formal in their postings, other people used very informal language. Did you have a preference for one or the other?

Student: I prefer the informal, because they tended to put things in (inaudible)..... easy to understand. (inaudible).....

Interviewer: In your particular group do you feel they had a good organization?

Student: I think the leaders (inaudible)..... drop off summarizing what (inaudible)..... so that helps me focus on what your supposed to look for. At the same time (inaudible)..... first it's not a weekly tutorial so you don't end up cramming the information in the last three days (inaudible)..... when you finally access there's too much to read so we end doing.. Oh this is to much... yea.

Interviewer: When you were leader did the other people in the group contribute good perspectives that you would not necessarily have thought of?

Student: Mine was on healthy living so they contributed information that is (inaudible)..... they gave a lot of information on articles so we actually got into a discussion about how we could possibly include that (inaudible)..... we did kind of relate it to the local (inaudible)..... so they were helpful in that sense.

Interviewer: How about the relationships? Did you anyone in your group before?

Student: No.

Interviewer: Did you get an idea of peoples characters or did you get an impression of people by working with them in the discussion form throughout the semester?

Student: I don't think so. Basically there is just information and a lot of times (inaudible)..... so it's just like reading information. You are not quite sure who exactly did the posting and (inaudible)..... it's not like you get to meet these people you know.. it's not like we get to interact with them so... so it's not such a big deal (inaudible).....

Interviewer: If you were to do some other collaborative work, would you know who to pick that would be a good person to work with?

Student: (inaudible).....

Interviewer: So you do pick out character traits like thoroughness, the ability to express well, work ethics.

Student: I think I pick out work ethics.

Interviewer: And you never got together with your group outside of class?

Student: No we didn't It somehow never got discussed... like nobody actually asked us if we wanted to... a lot of us don't really want to do that anyway so it's hard to get a time were everyone is free... so it's not a dialogue

Interviewer: Your personal motivation... is the course very important to your academic standing?

Student: I think it's really important yea. It is important to me (inaudible).....

Interviewer: So this course wasn't too difficult for you?

Student: It wasn't difficult but it was (inaudible)..... keeping up with the postings

Interviewer: Did you have any difficulty expressing yourself in the forums?

Student: Actually I thought it was quite good. When you type something in you can actually go back and edit it... so that's a good idea.

Interviewer: As a group leader you managed the group well?

Student: (inaudible).....

Interviewer: Any thing else about your experience?

Student: No.

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