A Case Study of Student Participation in Discussion in an Online Higher Education Course

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Doctor of Philosophy

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With love and affection to my
daughters ***Anika*** and ***Anisha***
who were away from me during the period of
this research

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STATEMENT OF AUTHORSHIP

This thesis contains no material, which has been previously submitted for any other degree or diploma in any University, and to the best of the author's knowledge and belief, the thesis contains no material previously published or written by another person, except where due reference has been made in the text.

Md Kabirul Islam

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ABSTRACT

This research used a mixed method research design to investigate online participation on discussion tasks by students. The research also explored the relationship between online participation and academic performance, and the teacher's role in designing the tasks and providing support for students. Ninety-five paramedic students were participants in this study. They were enrolled in a course that was delivered through the *TopClass* system in 2000.

The research observed message posting by students and teachers' support of discussion for five subjects. Students' expectations of online participation in discussion and perceptions of studying online were collected through questionnaires and telephone interviews. These data were compared with the actual number and nature of the messages posted. Teachers' perceptions of students' engagement in online discussion were gained through interviews.

The study found that student message posting in online learning situations is likely to be related to the cognitive demand and accessibility of discussion tasks that staff design and to the quality of teacher facilitation of discussion. These factors are likely to influence students' willingness to participate in online discussion and to encourage interaction with peers, although situational and personal differences between students are also factors affecting participation. Online message posting is perceived by staff and students to contribute to knowledge building among students and may be associated with improved academic performance. Further research concerning the engagement of students in online discussion is needed.

CHAPTER 1
INTRODUCTION

1.1 Context of the Study

The concept of interaction in a face-to-face classroom situation in a developing country context is different from that in Australia or other western countries. This researcher is experienced in teaching-learning activities in a face-to-face class and in a traditional distance education setting in Bangladesh as a student, and then as a teacher, teacher trainer and staff member in a traditional open university.

The researcher perceived that in a face-to-face teaching and learning situation the lecture method was considered by the teachers as the main method, regardless of the subject. In that face-to-face situation the teacher was responsible for delivering the lecture materials according to a certain lesson plan. The students were expected to listen to the lecture and to remember it when asked to submit an answer to a question to ensure that the student understood the topic. A kind of 'teacher-student' interaction was present although the scope was very limited. In that interaction students had the opportunity to ask questions and the teacher responded to these. Practically most students did not tend to ask questions because their lack of familiarity with the materials meant that they were not well prepared to ask questions about new content. Also students had a lack of confidence about the questions to be asked and/ or critique of others. In that class students were not given any activity or task to discuss between them, nor were they give an opportunity to present their ideas. As a result, the aspect of sharing ideas and acquiring knowledge through interaction between students (Vygotsky, 1978) was absolutely absent. In some subjects the demonstration method was used but the teacher played the active role. Sometimes students' participation was invited but every student did not have that opportunity.

As a member of the student support services department of a traditional open university, the experience of this researcher was that the printed materials, limited audio and video broadcasting, and occasional tutorial programs supplied were not

enough to meet students' learning needs. These educational activities were also teacher-centered. Students mainly depended on the various resources supplied to them. The occasional tutorial program was organized to meet students' enquiry to give them better understanding of the topic. The nature of this student-teacher interaction in these occasional face-to-face settings was that the teacher responded to students' questions that they faced during their personal study of the supplied printed materials in the form of modules and other resources. The concept of 'interaction between students' and its effect on students' understanding (Rogoff, 1990) was ignored. As a result listening, reading, and remembering the acquired ideas became a practice for learning and passing the examination.

Bangladesh is a country where English is the second language but in higher education English is considered as main medium of instruction. In many countries (Asian and Arabian) where English is not a first language teachers do the all talking in classroom situations (Cryer and Okorocha, 1999; Sandeman-Gay, 1999) similar to the teaching-learning situation in Bangladesh. These observations were made on the basis of Non-English Speaking Background postgraduate students who came from different cultures within their countries. They found that these students had a lack of experience of academic discourse that exists in western universities. Sandiman-Gay's (1999) work illustrated postgraduate students' inadequate understanding of peer interaction due to the prior learning style in their home country (Iran), which was based on memorization. So the practice of social learning (Vygotsky, 1978) has not been developed properly in many Non-English Speaking countries.

Conversely, Nagata's (1999) experience of studying in a western university indicates that discussion of topics by students is the main aspect of classroom activities. Students have to engage in interaction with their fellows. Teaching staff create an environment in classes that inspires and encourages learners to contribute experiences and ideas to other fellow student rather than delivering a straight lecture.

This researcher felt that the support provided to the students for learning was not adequate in his home country in Bangladesh and tried to find a solution to fill the gap

in the teaching-learning system. The opportunity to undertake research promoted this researcher's curiosity and interest to understand more about student interaction. Initially the intention was to study distance learning in an Australian context. After reading and reviewing the literature the subsequent decision was to focus on distance learning delivered by new technologies. The interest was to see how the interactions take place in an electronic communication. The researcher's view is that this new technology has created opportunities within the learning cycle by capturing the collaboration and communication, between groups of learners and teachers, in a form which allows that interaction to become an educational resource for other students (Falchikov, 2001).

In Australia, government policy regarding education, especially distance education and vocational and higher education, encourages online and flexible delivery (DEST, 2002b). The aim is to increase access to learning opportunities, offer more accessible teaching and learning materials, and enhance the quality of learning outcomes through optimum use of Information and Communication Technologies. In recent years, more than fifty percent of all courses offered by Australian universities contain online components (DEST, 2002a). A total of 207 courses are delivered online by Australian Universities and 90 percent of the online courses are postgraduate (Bell et al, 2002). Through the expansion of this challenging online education environment Australian universities have become members of the global e-learning community enabling them to share expertise and resources.

Through reading and becoming familiar with the scope of education and research in Australia, the researcher felt very confident about conducting research in the online learning area. An undergraduate course for paramedics was selected as the case for the current study for several reasons. It was a pioneering fully online course in the university at the time that the study commenced. It was offered to non-graduate paramedics and opened up the opportunity for international students to study in this professional field. The course coordinator was enthusiastic and supportive about finding more about how the students perceived the course and took advantage of the opportunities for online interaction that it offered. The researcher felt that the outcome

of the research would illustrate the phenomenon of online teaching learning that would apply more broadly in higher education. Since commencing the study the whole topic of student interaction on-line has become of great interest (Tarbin and Trevitt, 2001; Gunawardena, Plass, and Salisbury, 2001).

The main focus of the current study is on the 'interaction' between participants in the course. In the developing country context interaction involves repeating back to the teachers what they have said, responding to factual questions of students which are 'teacher-student' and 'student-teacher' interaction. Interaction in that context reflects the idea of learning as remembering facts.

In Australia, interaction is a very different concept from that which the researcher perceived in his own country, Bangladesh. In a face-to-face class the students are expected to be active in the class, that is to participate in discussion with group members, present their own ideas, respond to other students' inquiries, find a common solution to the problem and to exchange views with other students and the teacher to develop and complete assignments (Wilson, 1981; Boud, 2001; Sampson and Cohen, 2001). The teachers act as facilitators who plan the discourse and act as leaders of the discussion groups. In general, they plan the lecture, provide resources for students to act on them and guide students to proceed further in their knowledge gaining process.

To understand 'interaction' the intention of the current study was to find out (i) how students interact and why interaction occurs, (ii) who interacts with whom, (iii) what is the level of interaction of individual students, (iv) how participation in online discussion is related to academic performance, and (v) what role the teachers play during interaction and how they plan the interaction to be.

Previous research on online learning gave emphasis to students' perceptions of the technology, and their feelings of interaction with fellow students rather than the actual interaction scenario, that is, how many of them participated, what was the level of participation, and how they conducted discussion on the tasks and helped each other (Ahern and Repman, 1994; Graham and Scarborough, 1999; Dawson et al, 1999;

Gunawardena, Plass and Salisbury, 2001). Many authors have highlighted the teachers' role in computer mediated communication (Feenberg, 1993; Harasim et al, 1996; Makakis, 1998) but very little research has been conducted to discern the role that the teacher plays to engage students in discussion. Rudestam and Schoenholtz-Read (2002) have reported that in the area of online education much of the research has been conducted on the basis of relatively small samples focused on the satisfaction and quality of learning experience, and well-designed outcome research is still very limited.

The current study sought to investigate online participation from both students' and teachers' perspectives and to examine the evidence of students' online participation and its relationship to academic performance in the course. The intention was to gain a broader understanding of the teaching and learning practice of the online course under study.

In this chapter a professional context has been provided for the current study. In the following chapter, literature on online learning is reviewed prior to specifying the research questions for the study in chapter 3. More information about the course used for the case study and the way that data were gathered from students and teachers, and by observation are presented in chapter 4. The findings of this study are presented in the following three chapters. The final chapter places these findings in the context of current research and discusses the teaching and learning activities and their effect on students' learning in an online situation.

CHAPTER 2
LITERATURE REVIEW

The student peer group acts as a key resource in the conventional face-to-face teaching-learning situation in the acquisition of knowledge, development of various skills (critical enquiry, communication, self and peer assessment) and academic performance. In higher education, the online environment of teaching and learning is being used as a supplement to face-to-face teaching. Many institutes have moved from face-to-face settings to courses online and put their effort into developing this promising medium. The asynchronous type of the online environment has created a unique opportunity for learners and instructors to communicate their ideas about the subject matter. Some research indicates that the online conversation which takes place between learners, and learners and instructors include questions, answers, feedback from teacher and other categories of interaction. Research shows (Moore and Kearsley, 1996; Bates, 1995) that the online environment may encourage students to interact with their fellow students. The new online technology could therefore mean that the peer group has an enhanced role in acquisition of knowledge through the interaction activities. But in fact little is known about the extent to which students participate in online discussion. To what extent is online participation, or lack of it, related to academic performance on the course? Nor is much known about what role the online teacher plays to structure the lecture materials to engage students in interaction and provide support during students' online discussion.

In this literature review, an overview of the distance education history, practices, and its theoretical standpoint, online environment, student and teacher participation in online discussion, the relevance of constructivism to the online peer interaction and the nature of the face-to-face peer group will be presented. The existing knowledge and critiques of empirical studies, especially those conducted at the higher education level will be the focus of this review. The first section is a discussion of distance education practices since its early stage to the present situations and the theories associated to these practices. The second section is a

brief discussion of the online environment. In this section the way that online technology supports participants' communication is discussed. Section 3 includes an overview of online interaction of participants (student and teacher). Different types of online interaction, interaction between students, and the teacher's role in managing online interactions are discussed. A brief discussion of adult learning in a distance education setting is included in this section because the learners in the current study are adult professionals. The last section shows the theoretical relevance of social constructivism to online peer group interaction. This section also includes a brief discussion of the nature of the face-to-face peer group.

2.1 Distance Education- From teacher centred to student centred learning

2.1.1 Distance Education History, Theory and Practice

A brief description of distance education history, practice, and the constructivist theory of learning associated with the practices are presented in this section.

Historically, distance education has used a teacher centred approach of transferring study materials/knowledge to students although a kind of communication took place between students and the supporting organization. It was considered as an alternative to traditional face-to-face education in order to offer courses to adult learners. The purpose was to give those a chance to study who could not go to a traditional school or university for financial, social, professional, geographical or medical reasons (Holmberg, 1985). It was a response to a belief in the value of education for students' own sake as well as for professional development or promotion and for improving social status.

Initially, distance education was a kind of correspondence study where printed materials sent through the mail to students were the principal way of communication, teaching and learning (Nasseh, 1997). The introduction of radio and television broadcasting were also the means of transmission of content to students where students had no scope to react to delivered lectures. Parer (1994)

called these resources 'packaged knowledge'. Students received and studied these resource materials to become educated and obtain a degree.

With the growth of popularity and needs for distance education, various questions such as learners' characteristics, students' needs and satisfaction, effectiveness of communication, value of learning outcomes in comparison with the traditional face-to-face study became public interests (Nasseh, 1997). Researchers and educators efforts in finding answers to these questions contributed to the growth of knowledge about distance education. Some of their findings are incorporated in this section.

It is reported in the literature that distance education was based on educational philosophy of learners' individual activity (study) and independence (Holmberg, 1985; Lynch, 1997). All learning is basically an individual activity by learners even though supported by other people such as a tutor or fellow students. However, distance education is typically based on personal work performed by individual students more or less independently without direct guidance of tutors (Holmberg, 1985). If we consider the present online learning environment where users have the opportunity to interact with each other by posting textual messages, the students are independent in a sense that they have got the freedom and ability to adopt any role in that discourse (Juler, 1994).

Holmberg (1985) pointed out from previous literature that this individual learning in distance education is aligned with the cognitive domain that concerns the acquisition of intellectual knowledge. He suggested that the students were not deprived of tutoring in teacher centred distance education. The printed materials (modules), radio, and television broadcasting including audio and videocassette were various kinds of tutoring. These gave opportunities for learners to select an appropriate learning matter in order to solve problems and connect with the cognitive structures already developed. On the other hand it was a means of motivating students for learning. Jegede (1991) pointed out that many distance education researchers gave emphasis to the development of a theoretical model

based on constructivist epistemology and to the conditions in which individuals learn best (McIsaac and Gunawardena, 1996).

Following the establishment of Britain's Open University in 1970s the distance study began to use developing technologies to provide comparatively more effective distance education (McIsaac and Gunawardena, 1996; Nasseh, 1997). Since then the communication between instructors and students began to be supported by a variety of technologies although the course materials were primarily print based. Some researchers (Strain, 1994; Murphy, 1994; Hamilton, 1994; Parer, 1994) gave emphasis to creating a distance learning environment that offered adult learners the opportunity to share their past experiences and beliefs in relation to their course contents. With the advent of the Computer Mediated Communication (CMC) in early 1980's, technologists have integrated the delivery of course content with the method of communication and interaction (Harasim, 1999; Dykes, 2001). Salmon (2001a) has pointed out that online technology changes the learning environment, student experience, and the role of the instructor. So it appears that a transition has occurred in teaching learning methods in distance education as educators have taken up the new online technology.

Researchers like Laurillard, (1997 & 2002), Salmon (2001b & 2000), Jonassen, Peck & Wilson (1999) discussed teaching and learning through advanced technology based on learning theories especially constructivism (Piaget, 1965) and social constructivism (Vygotsky, 1978). Laurillard (2002) thinks that the intention of teaching has to be on the way the individual interacts with their world. Based on the Piaget's work Laurillard (2002) defines constructivism as an active process of constructing rather than acquiring knowledge. She admits that 'the use of communication media in education is based on the assumption that students can learn through discussion and collaboration, even at a distance and asynchronous'. Jonassen, Peck & Wilson (1999), Laurillard (2002) pointed out that good instructional design such as computer mediate communication creates an environment that allows learners' construction of knowledge and social interaction by reflecting individual experiences.

Salmon (2001b) has presented a model of teaching and learning online that suggests online socialisation, and knowledge construction through peer collaboration. She viewed that the online learning environment enables the opportunity of online socialisation that involves individual learners establishing their identities, finding peers with whom to interact and make relationships, present personal views and get familiar with the learning environment. The exchange of course related information occurs between students in the form of cooperation and support for each other. Following this peer support, group discussions occur on the contents and interaction becomes more collaborative where participants become online authors rather than transmitter of information. Finally, construction of knowledge happens through the integration of the ideas of the topic, teachers' and participants' contribution to the experience of teaching and learning. This researcher (Salmon, 2001b) emphasised the importance of students' interaction activities for knowledge construction. Salmon (2001a) considered the teachers as e-moderators who create the interaction activities with attention to contents, processes, and outcomes.

Crosta's (2002) experience of studying online reflected that the ideas she presented helped others to construct knowledge and vice versa through group discussion or group work. She considered herself an independent learner and observed that the leader was no more the teacher but the individual member of the discourse group. This indicates the knowledge constructed was facilitated by the peer interaction and cooperation. Moreover, Croasta viewed the teachers' role as a facilitator who helped in knowledge construction rather than transferring knowledge. Crosta's experience indicates that the online environment may support social interaction (Vygotsky, 1978), which is a fundamental requirement for cognitive development where learners acquire knowledge from each other's scholarly presentation, experiences, and skills.

2.1.2 Summary and Implications for Further Research

The literature in this section shows that the distance education at its early stage was based on the concepts of student individual activity and independence, although it

was a teacher centred approach of transmission of knowledge. Researchers viewed that distance study aligned with the cognitive domain.

The growth of the distance education as a result of successful research, and adoption of technology to support teaching and learning more effectively, and then modernisation of the technology in the recent years, has created an environment for collaboration among the users in the teaching learning community. This sophisticated online facility is supposed to provide student centred learning, which is an essential element of a constructivist epistemology.

2.2 Online Environment: Computer mediated communication network

2.2.1 Online Learning Situations and Benefits

This section of the literature review is an introduction to online education environments where communication between participants can take place. This section also includes a discussion of the potential benefits of online educational settings.

The use of computer mediated communication technologies in a teaching and learning situation is accomplished by learning networks. Like other social situations, the online classroom is a network relationship between participants (Harasim, Hiltz, Teles, and Turof, 1996). The computer network has been used as a mediator for communication rather than for students' process of learning (Porter, 1997; Bates, 1995). Using the telecommunication technologies, the computer and computer networks have created a new environment for learners, teachers and educators that has the potential to enhance teaching and learning opportunities.

Jonassen, Peck & Wilson (1999) suggested that the asynchronous kind of setting allows learners to discuss topics where they can read and reply to others independently of time. The online learning environment is also place-independent (Baxter, 2001). Ellsworth (1995) highlighted the fact that the learning network could provide learners with access to communication, various kinds of resource

materials and information independent of time and distance. By accessing networks using the Internet, students and teachers can communicate with others in their community around the world and share a variety of ideas, culture and information in addition to local resources. Harasim (1996) highlighted that in an online situation, students send messages and then discuss them. Articulating and sharing ideas in the group has important cognitive benefits and ongoing group interactions can enhance the knowledge building process. The communities of learners that enter the learning networks may also develop themselves personally and educationally through interactions. According to Cotton (1996) learners using the Internet are not isolated but part of a large sphere of interest and influence that encompasses the world. Cotton believes that by expanding their horizons, learners consider local, regional, national and international perspectives to gain better understanding of a particular aspect. They become more active participants in their global community.

Online education can be as effective as traditional face-to-face education by enhancing interactivity between learners (Moore and Kearsley, 1996). Porter (1997) took the view that the virtual classroom is not much different from a real classroom. The characteristics of face-to-face learning such as input of ideas, class discussions, asking questions, providing answers for acquiring knowledge may exist in an online situation through participants' interactions (Harasim et al., 1996).

2.2.2 Summary and Implications for Further Research

The new Internet based online environment provides an excellent opportunity for communication between learner and instructor, and amongst learners. The asynchronous type of online environment can store participants' messages. Students and teachers can access the messages when they are ready to use them. Students are able to view the lecture materials on the computer screen given by the teacher and to respond at their convenience. The views presented in this section are based on the speculation of writers. What is not known is how far these opportunities for interaction are taken up, what the interactions consist of that is from who to whom and how much they interact, the nature of their exchanges, and

what is the relation between participation and academic performance. These aspects are important to investigate.

2.3 Participation in Online Discussion

2.3.1 Online Participation, Participants, and Interaction

Online participation is defined as the online contribution of participants as indicated by their posting textual messages in an online class (Bates, 1995; Moore & Kearsley, 1996) where the learners and the teacher are the participants. Interaction is mainly the two-way communication between the participants (both learners and instructor) in the class where one participant responds to another to share ideas and information. Some researchers (Palloff & Pratt, 1999) have acknowledged that others who do not post messages can listen or observe others' interactions in an online class but the researchers do not tend to consider these observers as participants. Students in a traditional classroom are participants even though they do not participate in discussion. So it can be claimed that in an online class the students who belong to the learners' community under the same network are all participants even if they do not post any messages.

2.3.2 Types of Online Interaction

In the distance education setting the separation of teacher and student seems to be a troublesome barrier to communication (Moore and Kearsley, 1996). The online technology bridges the gap to overcome that problematic issue by enabling interaction between teacher and learners. Bates (1995) noted that appropriate interaction between teacher and students, as well as among students themselves, is important for effective teaching and learning but overall interaction obviously depends on the content, teaching philosophy, maturity of students and the technology used to deliver the course. Laurillard (1997) used case studies in different academic subjects to argue that the new information technologies can be used to support a 'deep' approach to academic learning that is integration of new ideas with existing ones. Laurillard argued that students can actively involve with the content, combine many ideas gained through conversations and integrate these

to their previous knowledge and experiences. She did not present any data to support this argument.

Moore and Kearsley (1996) theorised that there were three types of interaction: learner-content interaction, learner-teacher interaction and learner-learner interaction. In web-based asynchronous learning students first interact with the content. Since the content or the task is provided by the teacher students reflect on that content. It is the interaction between students and content on which further interaction takes place. The task (content) presented by the teacher leads to learners constructing knowledge by accommodating new understanding into their cognitive structures. By reflecting on the task learners compare their ideas and accumulate new information and with their previous experience formulate a new understanding. Learner-teacher interaction helps the learner to verify that they have acquired the new knowledge after having feedback, counselling and other support from the teacher. Learner-learner interaction between individuals, or in group settings is important at the time when new ideas are being introduced.

Soo and Bonk (1998) collected empirical evidence related to these three types of online interaction using the Delphi Technique to explain and rank essential interaction for online learning. Eight experts in distance education were involved in the study. They reported that the most important interaction for learning was between learner and learner as the students are responsible for their own learning and the exchanges of information between learners enhance their knowledge building process. Teacher-learner interaction ranked second by the experts, concerned teachers' feedback and guidance to promote actual understanding and thoughtfulness. The researchers concluded that asynchronous online learning is more convenient than synchronous communication and can fulfil learners' interaction needs. Additionally, Wright (1999) found that asynchronous delivery of course content, via the Internet was as effective with respect to knowledge and satisfaction as traditional synchronous delivery in a graduate level technology course. Similarly, Perez Cereijo (1999) reported a number of advantages of asynchronous web based courses such as flexibility and convenience that

encourage classroom communication between fellow students. Again, Kumari (1999) concluded from the previous literature that three dimensions of interactions are critical factors to successful implementations of online learning: teacher-to-student, student-to-student, and student-to-resources. This requires management, technical expertise, and traditional teaching and communication skills in the members of the team organizing the course implementation.

Thorpe (2000) identified three key elements of interactivity in successful online learning from her observations of a number of open learning undergraduate courses in the UK. These were:

1. Students must see the importance of online interaction for achieving the learning outcomes of their courses.
2. Active learning requires support from someone who takes the responsibility for the process of interacting online. The subject expert or the tutor may play the role where he/she encourages students to join in, focuses discussion, summarizes interactions, and ensures questions and answers.
3. Participation in online learning depends on the willingness of the learners to interact between themselves, and the resources that they bring to it.

Thorpe's study has given emphasis to the factors that cause students to interact with each other and with the teacher. The reliability of these findings is unclear because the researcher mentioned her overall observation of the online courses but did not explain the data collection and analysis processes in sufficient detail.

2.3.3 Nature of Students' Online Interaction

In this section the findings of empirical studies on students' online interactions in higher education are presented.

Ahern and Repman (1994) conducted a study to find out the effect of online synchronous technology delivery on graduate students' learning in selecting and acquiring materials for school libraries. A total of twenty-six students were taught for a three hour session once a week over a 14 week semester. The classes were videotaped and later analysed. The researcher found that higher levels of

interaction, that is question, answer and feedback, took place between learners, than between learners and instructors. This study reported a high level of student-student interaction (38% of the total number of messages) but did not provide any data of how many messages were actually posted by students.

Graham and Scarborough (1999) investigated the learning experience of 206 undergraduate economics students and the usefulness of computer mediated communication (CMC) in an online situation. The students were given a questionnaire at the beginning of the semester for testing their attitude toward collaborative learning and CMC. The students who returned the first questionnaire were also given a follow-up questionnaire at the end of the semester to find out any change in attitude and the degree of satisfaction. The online discussion enhanced students' understanding of the subject matter as reported by the participating students. The researcher found that the academic performance of the students involved in discussion improved in year 2, and 60% of students received a final grade of distinction or higher. A total of 206 students participated in the study but the researcher did not show the number of students who participated in the online discussion or the number of interactions by each student or the total number of interactions. It was known that the number of students participating in the online program was below the teachers' expectations. The researchers concluded that in CMC the emphasis should be on group interaction and learning as a result of interaction.

A qualitative study by Bragg (1999) examined the online interaction of graduate students in a Web-based course and evidence of constructivist learning principles within their interactions. The researcher coded and categorized the online messages posted by 51 students associated with the principles of constructivism. The results suggested the following online constructivist behaviors: social negotiation, internal negotiation, knowledge sharing, mentoring, helping peers, and story telling. Most messages were posted in five major sections of the online course delivery system: technical issues, announcement, reflection, teaching faculty lounge, and social/ recreation center. The researcher did not explain these sections of message posting.

Bragg's study observed the interaction of the participants and the total messages posted but did not focus on the number of interactions between individual students nor how many times they responded to each other or to the discussion task. On the other hand Bragg's study did not consider the online support made by the course staff. He proposed three questions for further investigation: (i) what were the students talking about? (ii) how were they talking? and (iii) what were the more significant and salient topics in students' dialogue?

Dawson, Taylor, Geelan, Fox, Herrmann, and Parker (1999) examined the Web-based component of a postgraduate course in science and mathematics offered to a group of teachers. The course was designed on constructivist principles that encouraged students to construct knowledge through peer group interactions. Seven out of 12 experienced teachers participated in an online discussion room on the activities given by the teacher over a 15 week period. The researcher reported that the course leaders observed and valued learners' skill of sharing personal experience, peer empathy and adopting a collaborative approach in their learning. The course leader summarized students' responses at the end of every week. But the researchers did not provide any quantitative data of student interaction nor the method of data analysis. A similar study was conducted by the researchers Herrmann, Fox, Taylor, Geelan, Dawson, Stapleton, and Parker, (1999). They investigated the issues in building students' understanding in an online postgraduate course. The students were given opportunities to participate in an online discussion via the Internet, contact with fellow students and tutors by email, and access to the online resources. The students were engaged in sharing and comparing ideas, providing feedback to each other's ideas and searching for group solutions to issues. The teacher who monitored students' interactions reported that the students were forming mutually supportive groups during discussion. The researchers provided no qualitative data of such a claim.

The qualitative study of Mahesh (2000) outlines the forms of feedback in an online learning situation. Data were collected from synchronous electronic exchanges among eight students and the teacher in an online graduate course. The

qualitative analysis (coding and categorizing) of online interactions indicated that in addition to the written feedback that students received from teachers, students received feedback from their peers. Traditional feedback consisting of procedural guidance, analytical guidance, support and motivation provided students with information that helped them to construct knowledge. Mason and Weller (2000) identified three factors that affect students' satisfaction in a web-based graduate course: the support of their tutor or students; the amount of time, patience and motivation they have to devote to the course; and the extent to which the course content and presentation fit the students' expectations and learning styles.

A quantitative study by Jung, Choi, Lim, Leem, and Junghoon (2002) investigated the effects of academic, collaborative, and social interaction on learning, satisfaction, participation and attitude towards online learning in a web based instruction course for 120 undergraduate students over six weeks. Of these students, 48 students were in the academic interaction group (control group), 45 in the collaborative group, and 27 were in the social interaction group. Each of the three groups completed five modules (analyzing yourself, exploring job opportunities, improving interview skills etc.). Academic interaction occurred between instructor and student only for content related matter (control group), collaborative interaction occurred between students themselves on the discussion topics given by the instructor (collaborative group), and social interaction took place between students and instructors when the instructor provided various kinds of interpersonal and social feedback (social interaction group). Pre-test at the beginning and post-test at the end of all modules were conducted to measure attitude towards online learning and a questionnaire to measure satisfaction. Learning achievement was measured by calculating scores on five modules. Data analyses were done using ANOVA and post-hoc Scheffe analysis.

The results suggested that the social interaction group outperformed the other two groups. Each of social interaction group and the collaborative group posted more messages than the academic interaction group. The collaborative interaction group expressed highest level of satisfaction. The researchers showed group means and

standard deviations (SD) of online messages posted and scores on five assignments. Considering the scores obtained by the students in five assignments as learning achievement may not be justified without analyzing the content of students' messages. The researchers suggested that further research was required on what specific messages from the instructor or peers stimulated the learners to be involved in learning and interaction.

Alexander and Woods (1999) examined undergraduate students' perceptions of online courses. The students were asked to complete an online feedback questionnaire at the end of each of three modules. The results suggested that the students' reactions were positive towards the quality of the course and the students were very enthusiastic about doing group work. However, the students who were beginners to computing found the course overloaded. Nine hundred students registered in different courses but how many of them completed the questionnaires was not known from this study. Oliver and Omari (1999) examined undergraduate students' perception of problem-based learning using online technology. The students were asked to develop solutions to a problem. The results showed that the learning situation was enjoyable, stimulating and enhanced students' personal skills such as information literacy and metacognition.

Tarbin and Trevitt (2001) explored their perceptions of students' online contributions in an on campus online delivery of an undergraduate course with 45 students in a Medieval History tutorial group. They introduced an email discussion list in the second semester of the course and provided on campus technical facilities for students to contribute in the email list outside tutorial time. The researchers hoped that the students would generate new topics of inquiry, cooperate to solve problems, and discuss topics to develop an understanding of the process of historical interpretation and other relevant issues. According to the initial questionnaire data, very few students were keen to use the email discussion list, and among the rest some were interested in using this novel and modern approach, some students were not confident to use the computer and two had no desire to contribute. By the end of the semester the messages were sporadic. However in the

following semester, by making student participation in the e-mail discussion list part of the assessment, teachers were successful in engaging student participation in discussions. On-campus support for accessing computers was provided and other incentives included staff contribution in the discussion list; encouragement of informal short email contributions, and written instructions for using the email list. Out of 44 students, 37 posted an average of four messages per student over the semester.

The staff found that students respond to other students' messages but the interaction was less than they had expected. The quality of interaction was not so high. Finally, they hypothesized on the basis of students' feedback and their observation that first year students were reluctant to engage directly with the ideas and arguments of others for fear of appearing critical or of being attacked in return.

Gunawardena, Plass, and Salisbury (2001) conducted a similar study with a group of graduate students in Instructional System Design (ISD). All students were previously familiar with the online environment. Students were given 16 lessons and were expected to participate in online discussion on each lesson, and in helping and supporting each other. The instructors encouraged students and posted questions to initiate discussion but very few students contributed. Collaboration and sharing ideas between students did not occur according to instructors' expectations. The instructors felt that there was a need to open up many opportunities for communication between students and instructors and to develop their online moderating skill. They also felt that priority must be given on discussion taking into account student characteristics, and the structure of the content. The researchers did not mention how many questions were posted and how many of them were addressed by the students or the number of messages posted.

Many researchers (Briano, 1997; Graham, 1999; Chao, 1999) have found that by interacting with each other students could overcome their isolation although they and the teacher were in different geographical locations. Some researchers

(Serwatka, 1999; Taylor, 1995) concluded from their experience that many teachers and learners lack the technological expertise to fully engage in online participation.

2.3.4 Teachers' Role in Online Participation

In an online situation the role of teacher is indirect. Posting textual messages the teacher can facilitate students' interaction. The technology or the teacher can support and stimulate students' activities (Jonassen, Peak & Wilson, 1999) that engage them in thinking and presenting the topic or the task. From the theoretical point of view, teaching is a process of helping students to construct their knowledge using the past experience that they have and providing guidance in their meaning making process (Jonassen, Peak & Wilson, 1999). The constructivist notion of generative learning strategies supports the teacher's role as a guide in a learning environment to enable discovery by the students (Applefield, Huber & Moallem, 2001). So the teacher's role is to guide students to generate their own questions, interpretations, and reflections when listening to the other members of the student's group. Technology-mediated learning offers teachers the opportunity to create an environment of learning that enables students to undertake a discussion task (Harasim, 1996) and acquire the skills (reflect on the task and evaluate students' messages) to discuss the task between students. Harasim suggested that the teacher plays a background role by observing interaction and progress and offering guidance, encouraging presentation and providing feedback where necessary. Jonassen and his colleagues (1999) argued that the teacher's role is to promote ideas or views and provide suggestions in appropriate ways so that the students can understand the topic as a whole.

For an online course Makrakis (1998) categorized the teacher's role as instructional and organizational. In instructional roles, the teacher acts as reflective practitioner, as facilitator, and as scaffolder. In organizational roles, the teacher acts as resource, as technology manager and curriculum developer. The teacher's role as facilitator and scaffolder aims to have learners regard each other as learning resources rather than as competitors who depend solely on the teacher as an instructor and leader of the group. As a manager of the course it is the teacher's responsibility to ensure

accessibility to the distance education course and instructional materials. Makrakis emphasized both online and off-line collaborative interactions of students for preparing assignments and critiquing each other's work.

Researchers like Feenberg (1993) and Harasim et al (1996) emphasised the following jobs for instructors in online learning:

1. Providing clear directions on the structure of the technological system.
2. Creating a warm, welcoming and supportive environment at the start of the course to begin participation.
3. Observing peer group participation.
4. Encouraging participation and introducing strategies that maximize student interactions (Makrakis, 1998).
5. Facilitating peer interactions by providing information, feedback and guidance (Makrakis, 1998).

Based on the constructivist learning theory Liu (2002) offered a course online in which 30 graduate students participated in Research Methods in Education. The author organized two face-to-face sessions at the start of the one semester course where the students had an opportunity to introduce themselves, exchanged ideas of using WEBCT learning facilities and select group members to work on a particular project during the semester.

First, the teacher created an opportunity for interaction between students by asking them to critique on individual project that they presented online every week. Second, the students were asked to plan their group project, collect information or materials needed for the project, and evaluate their own project. Finally, the students discussed each other's project and provided feedback. The teacher guided and facilitated students' online collaboration but Liu did not present any examples of teacher's support or students' messages. However, the transcripts of students responses to a questionnaire given at course completion showed positive perceptions of learning outcomes. This study suggests that in an online learning environment knowledge construction may happen through peer group interaction.

Moreover, this study reflects that the teacher's role in planning the interaction and managing discussion is a crucial aspect for students' knowledge construction.

2.3.5 Adult Learning in Distance Education Settings

Distance learning is suitable for adult learners especially for those who continue their study and professional duties together. Adult learners are motivated, aware and can take responsibility for their own learning.

Brookfield (1996) pointed out that most adult learning occurs in distance education settings where they take the responsibility. Fellow students participate in discussion and the instructor acts as a facilitator who provides feedback and offers guidance to enhance understanding. Adult learners are conscious about their learning and ability to justify their knowledge. Their participation in distance education has been encouraged for increasing professional and personal commitments which is a balance between living and learning using preferred media through adulthood (Knox, 1993). Elias and Merriam (1980) highlighted that adult learners are motivated, participate in interaction, and are directed by their own interests towards professional and personal development. Knowles (1980), Hiemstra (1996), and Houtkoop and Oosterbeek (1997) had the similar view that adult learning is self-directed where the learners select their topic of study, gather relevant information and suggest a resolution to a problem in his/her area of expertise. Doray and Arrowsmith (1997) noted that vocational adult education can be a means of involving learners in discussion and as a result they acquire a set of new knowledge and professional skills.

Porter (1997) also reported the advantage of Internet based learning for the learners who continue study and employment together as they can access the course at their work place. They can go over the information and resources many times during the day, after work and even at midnight. The students can manage their own time to study. To get the benefit from this online situation the learners need to be self-motivated (Pena, 2001).

Starr and Milheim (1996) conducted an Internet based survey on the educational uses of the Internet of 147 professionals aged between 40 to 59 most of whom worked in colleges or universities. The results suggested that most respondents accessed the Internet from home. They acquired Internet skill from various sources such as personal experience, friends, text books and attending conference presentations. The participants used the Internet for various reasons such as email, personal research, and to access online library resources and study materials.

Hudson et al (1998) conducted an Internet based course for 45 adult learners who worked full time. The results of telephone interviews with the learners suggested that the learners faced several challenges. These were newness to the technology, access to the network, software learning, lack of time, and family demands. The students found that the Internet based course saved a lot of time.

2.3.6 Summary and Implications for Further Research

In relation to participants' online interaction researchers have asserted that in an online situation three types of interactions can take place: student-content, student-student, and student-teacher. Of these three types of interaction the highest value has been placed on the interaction between students. However, the findings in this section show that the researchers focused their attention on students' satisfaction in using the computer mediated communication, and on the usefulness of the technology. Some researchers have reported that the overall participation was low and not up to their expectations. There was no evidence of the actual number of messages posted in response to the given tasks or the level of student participation. Very few researchers have studied the nature of students' interactions, those that have reported the sharing of experience but provided no evidence of peer group relationship between students. One study has shown a positive relationship between online participation and academic performance, such a relationship may only exist for that particular course. There is need for further investigation with a different sample and technique. There is research evidence that distance education, especially the online environment, is suitable for adult who continue their professional job and study together because the learners are motivated to participate

in interaction, they are conscientious and can take responsibility for their own learning.

Research further indicates that the teacher's role is to provide resource material, guidance during online discussion and to promote students' participation. Researchers have perceived that engaging students in online discussion is a challenging task.

2.4 Social Constructivism and Peer Group Interaction

In this section a definition and meaning of the key term 'peer group' with examples from a previous study is presented. Then the relevance of online peer interaction to social constructivism and the nature of face-to-face peer group are discussed.

2.4.1 Peer Group

In the beginning of this section it is necessary to define 'peer group' because this term is being used in both traditional and distance education settings. On the basis of the literature on peer group in higher education it can be stated that the students who enrolled in the same level of study (Wilson, 1981) and with whom one interacts (Falchikov, 2001) are called the peer group. Some researchers in this area (Topping and Ehly, 1998; Falchikov, 2001) have highlighted that a peer is in equal social standing, while a peer group consists of those of the same status with whom interaction can take place. So it is interaction that is the essence of the idea of the 'peer group' and some form of student interaction (peer tutoring, peer feedback, peer evaluation etc) is involved between the members of the group (Falchikov, 2001). The discussion above indicates that interaction is not a condition to be a member of the peer group but interaction takes place between group members. For example, in the Becker, Geer, and Hughes (1968) study, students felt themselves to be members of a peer group without necessarily interacting with all students in their peer group. Another main focus of this section is to show the relevance of online peer group discussion to social constructivism as well as presenting the nature of the face-to-face peer group. The justification for including literature on

face-to-face peer group is that the ideas of peer group interaction originated and were developed in a face-to-face educational context. It is unclear whether the theories of peer group interaction and formation will apply to emerging online learning environments.

2.4.2 Relevance of Social Constructivism with Online Peer Interaction

According to epistemology, knowledge is constructed by the learner and not transferred by the instructor. This knowledge building involves an active process of interaction within a particular context. Providing instruction by the teacher, therefore, is a process of helping students rather than imparting knowledge (Jonassen, Peak, and Wilson, 1999). In an online situation students are able to post messages in which other members of the group may be helped to construct their understanding through a process like a conversation. Students can share their experience, argue, and negotiate within the communities of learners for a common wisdom. In this student-centered approach students can integrate new information with prior knowledge and experience (Jonassen et al, 1999) through conversation between members of the peer group. In an online education context the peer group is the students in the class. The teacher is also a participant who can support and promote students' online discussion.

Moreover, while interacting with the online lecture material including the task set the student may need to show that they have understood the task set by responding to it. In doing so students may need to adapt their prior knowledge to accommodate new understanding (Bates, 1995). The teacher mediates the learning materials including the task set for the students and then follows discussion between students. So theoretically, the three different contexts: (i) individual interaction with the lecture material, (ii) peer interactions with each other and (iii) interaction between teacher and students are important for knowledge construction in an online situation.

2.4.3 Nature of the Face-to-face Peer Group

Face-to-face peer group has a long history. Many psychologists of the twentieth century (Piaget, 1965; Vygotsky, 1978; Rogoff, 1990) found that peer group interaction between adult learners is the basis by which some kind of knowledge building proceeds and that members of the group having different levels of experiences can help each other through that social interaction between them. A capable adult learner can achieve a greater knowledge from an interactive situation than anything that they can acquire alone (Vygotsky, 1978). So interaction with peers at the higher education level can result in the development of knowledge and understanding (Falchikov, 2001).

In a face-to-face situation many researchers have found that the peer group plays an important role for learners' personal, social, and cognitive development as well as their academic performance especially in higher education. Becker, Geer, and Hughes (1968) conducted a classic ethnographic study of the role of the undergraduate peer group in face-to-face learning. The researchers studied the perspective that students developed towards academic work in Kansas University. Four observers studied seven thousand students daily life for more than two years. They studied in such a way that the students were not conscious of the observers' role. They observed students' participation in all activities inside and outside the university. The participant observers took detailed field notes of the observations and information provided by the staff. Sometimes the students were asked about reasons for their activities. The students formed different academic groups and developed working relationships among themselves and university staff. Academic competition occurred between groups. The students were evaluated by grade point average (GPA) and the level of GPA of a group contributed to the prestige of the campus. Academically good members in a group tried to help others who had academic weaknesses to improve the group achievement. Analysis showed that women had the highest academic performance. It was evident from the study that the peer group helped in promoting personal and social development. Finally, the peer group contributed to academic achievement, and personal and social development.

Becker's study highlighted an important aspect 'visibility' in face-to-face peer group. Sports stars were more visible than the academic stars. So students felt themselves to be members of the peer group of their sporting heroes, even though they did not interact with them.

Recently, Hogan, Nastasi and Pressley (1999) investigated the discourse pattern and sophistication of peer groups' collaborative scientific reasoning with and without teacher guidance. The researcher examined the verbal interchange of 12 science students of grade eight over a 12 week period when the classes were videotaped and audio taped. They coded the transcripts of students' interactions and refined codes. Finally, the codes were categorized into three main categories of statement. These were conceptual statements, metacognitive statements, and question-queries. Conceptual statements included 'presenting an idea', 'presenting a partial idea', 'presenting information', and 'presenting a summary'. Some of the codes under metacognitive categories were 'evaluating own ideas', 'evaluating other's idea', 'evaluating task difficulty', 'reflecting on task standards', and 'reflecting on task difficulty'. The question-queries category included 'presenting query' and 'requesting information'. The researcher found the pattern of peer group participation as 'consensual', 'responsive' and 'elaborative'. In a consensual pattern one student presented substantive statement and another member agreed or acknowledged that statement. In a responsive pattern two speakers contributed substantive statements to a discussion. In an elaborative pattern all students presented substantive statements in the discussion. In their study, students' statements were very short consisting mainly of one or two sentences. Peer group discussions guided by the teacher found more efficient means of attaining higher levels of reasoning and higher quality explanations.

In recent years, many researchers and authors of peer learning area (in higher education), for example McLaughlan and Kirkpatrick (2001), have acknowledged the need for further investigation of how well the idea of peer group activities that apply in face-to-face situation translate to the new online environment where the learners no longer meet in person but only electronically.

2.4.4 Summary and Implications for Further Research

Social constructivist theory suggests that knowledge acquisition occurs through the active process of interaction. In an online situation, first of all these active process may be initiated by responding to the lecture material designed by the instructor and then in the next stage interaction between learners and between learners and instructor. Substantial interaction between members of the group is important for mutual understanding in the context of the given topic and eventually for fostering 'deep' approaches to learning. Teacher's participation is considered an important component of interaction. It can monitor whether the students' interaction continues in the context of the topic and provide support to enhance interaction. So there is a need to investigate teachers' role in providing support in online discussion.

2.5 Conclusion

Computer mediated Internet based distance education settings can support communication between learners and instructors. In this online situation students feel isolation and the researchers claim that they can overcome their isolation by interacting with the teacher and fellow students. Various types of online interaction are possible in an online situation, of which learner-learner interaction is perceived to be most important (Moore & Kearsley, 1996; Soo & Bonk, 1998; Kumari, 1999). Interacting with the content, students can integrate new information with their previous knowledge. While learners are central to the learning process, teachers' guidance is still necessary. Students may receive feedback and support during student-teacher interaction and can justify their understanding. Researchers have also claimed that the nature and the amount of interaction varies according to the teaching methods applied, the nature of the subject matter, and the maturity of the students. Many researchers found that the students were very enthusiastic and had positive reactions toward the quality of their online course (Oliver & Omari, 1999; Alexander & Woods, 1999) but success of the interaction for acquiring knowledge depends on the support from fellow students and tutors (Mason & Weller, 2000). Some studies showed that the students engaged in sharing

experience, comparing ideas, and providing feedback to each other's ideas developed understanding. Research shows that in the online situation, the asynchronous mode is convenient for delivering courses that can meet students' interaction needs. Little is known about how the students respond to the online task presented by the teacher, what the levels of individual student online participation are, and their pattern of message posting.

Some researchers have claimed that the teachers can create interaction opportunities and support discussion but there is a lack of research on the ways in which teachers do facilitate and promote peer group interaction in an online situation. Previous research also did not focus on offline study patterns of online students, and their effect on academic performance. Much research has been conducted about the online situation but very few have focused on the relationship of online participation to students' academic performance in the course.

Observation of online participation may indicate how the interaction is taken up by the students in online discussion and the role played by the teacher to support interaction. Questionnaire, diary, and interviews with the students may also illuminate the offline study pattern of students, students' experience of studying online, and teachers' perceptions of students' online participation. The frequency of online interactions may have a relationship with academic performance in the course.

CHAPTER 3
RESEARCH QUESTIONS AND RATIONALE

In chapter 2 the literature on the online environment, students' online interactions, the role of the instructor in providing support for discussion, and the importance of online peer group interaction for students' learning was reviewed. Previous research gave more emphasis to students' satisfaction in using the technology and interaction with fellow students, rather than the actual interaction behavior of students and staff support for promoting discussion. The current study will focus on both students and staff perspectives in relation to online message posting and the relationship between students' online participation and their academic performance. This chapter is included to present a justification for the research questions.

Web-based Internet technology is being used as mediator for communication for teaching and learning purposes. Use of this technology has continued to spread. The role of the academic staff for creating interaction opportunities and promoting students' interaction in the online situation needs to be researched. Many authors have noted that online technology offers teachers the opportunity to create an environment for learning that enables students to undertake a discussion task and acquire the skills to discuss the task between students. Simultaneously the teacher can support and stimulate students' activities that can engage students to participate in discussion. From a theoretical point of view, the teacher's role in a teaching learning situation is in helping students to construct their knowledge and integrate past experience and providing guidance to generate questions, interpretation, and reflections.

The literature suggests that the teacher can design the course materials and the discussion task for the students to facilitate learning and provide support in students' online interactions and that successful implementation of the course may depend on the various aspects of the teaching learning situation such as the content of discussion, teaching methods and students' contributions. However, there is a

lack of research about the teacher's role in an online course. Within this context a key research question (RQ1) is the teacher's role in promoting online interaction among students in a course.

> RQ1: How do teachers seek to use the peer group as a resource to promote interaction in the task that they assign participants?

It will illuminate how far the task designed by the teacher is appropriate to engage students in discussion, and how they provide support in discussion, and how the students valued teachers' contributions.

The current study defines the peer group as the students who enrolled in the same course of study with whom interaction can take place. There is an assumption in RQ1 that the students do seek to use the peer group as a resource. Courses aim to achieve specific goals to develop knowledge and understanding of students. Previous research has provided little evidence of how far staff were successful in promoting discussion online. So it is important to understand how well the online interactions meet the expectations of the staff in the context of a particular online course. A second research question (RQ2) asks about the achievement of course goals after offering interaction opportunities and support to the student peer group.

> RQ2: How does the peer group interaction enable achievement of the course goals?

RQ2 focuses on how teachers claim their achievement of the course goals in relation to the created opportunities for interaction and their views of students' engagement with the task.

In relation to interaction opportunities created by the staff, little is known about students' online interaction: how far these opportunities for interaction are taken up, what the interaction consists of that is from whom to whom, and how many times. In short very little is known about the nature of online interaction, the

factors that affect students' satisfaction, level of participation, and the effect of participation on academic performance.

In an online context students have opportunities to present their own ideas by posting messages on the given tasks and to respond to messages posted by other students. A third research question (RQ3) asks about students' participation on the task set, the level of participation of individuals, and the pattern of interactions.

RQ3: How do students individually respond to the task set in online discussion?

Besides online message posting by students, RQ3 will focus on how many messages on the tasks were posted by the students, how the students responded to each other and the task and the nature of their messages, and how much time the students spend to perform online and offline academic activities. This study will also focus on the students' expectations to post messages and perceptions of the task and messages posted by their fellow students. Analysis of the actual evidence of messages posted in relation to the task set in an online course, the number of students who contributed to discussions, the amount of contribution by individual students and the pattern of their interactions, will illuminate the phenomenon of online participation.

In any course of study students are expected to complete the assessment processes as course requirements. On the other hand students desire to achieve certain grades through completing the assessment process. In an online environment, there is a lack of research about the relationship between online participation of students and their academic performances. A fourth research question (RQ4) asks about the extent to which student level of participation is related to the different grades obtained.

RQ4: How is online participation related to students' academic performance?

How well do levels of online participation correlate with students' academic performances? Academic performance is defined as the marks or the grades obtained by the students for assessment in each subject.

Both quantitative and qualitative techniques will be used to collect and analyze the data of students' online participation and to include the perspectives of the participants.

CHAPTER 4
METHODOLOGY

In chapter 2 the current research findings on online learning were reviewed and the issues to be investigated were raised. Research questions about online interaction with specific references to the role of staff in promoting online interaction amongst students, and student responses to these online interaction opportunities were presented in chapter 3. In this chapter the methods and techniques used to study these research questions are presented. This chapter has five sections. Section 1 is a description of the methodology used for conducting this study. Section 2 is a discussion of the site used for the study, and the participants, and includes a description of the sampling procedure. In section 3 the data collection tools, and the data collection process are discussed. Both quantitative and qualitative data analysis techniques are described in section 4. Section 5 is an overview of the weaknesses and limitations of the study.

The main purpose of the current research was to:
Investigate online participation in an online course, from student and staff perspectives over the academic year 2000, and to examine the evidence of students' online participation and its relationship with their academic performance.

There were a number of specific aims. These were to:
1. Find out how the staff create interaction opportunity and support students' online discussion;
2. Establish the extent to which students participate in online discussion, investigate the nature of their interactions, and find out how students with different levels of online participation undertake academic work, that is, how long they study, and the relationship between study hours and online interaction;
3. Examine the relationship between level of participation and academic performance on the course; and
4. Investigate the way to which online interaction contributes to the achievement of course goals.

4.1 Overview of the Methodology

4.1.1 Case Study Approach

The research was conducted on two groups of paramedic students who continued their study and performed professional duties simultaneously and who studied either part-time or full time through an online course for a professional degree qualification. The students were expected to participate in an online discussion of a task with their colleagues in each week for two semesters. The staff who delivered the subjects of the course- the 'course teachers' included these discussion tasks for the students in a weekly online lecture.

This research used mixed methods (Stake, 2000) where, in the case study design, an ethnographic approach was adopted for observation of online interaction of students and teachers. A case study is an in-depth analysis of the phenomenon of a social group within its real life context (Yin, 1994; McMillan, 2000). The main purpose of a case study is to gain a rich understanding about the case and to generalize the findings if the case is typical of other similar situations.

The course was delivered online through the *TopClass* system. From an ethnographic point of view the researcher observed and recorded the online interaction behavior of participants as a non-participant observer (Taft, 1997). The researcher expressed his intention of studying the online paramedic course to the coordinator and other staff. They were very supportive of the current study and allowed the researcher to access the online course for observation of online discussion and the collection of messages posted by students and teachers. In the beginning of the course, with the help of the course coordinator the researcher posted online information on the *TopClass* for the students about the study and the assistance required from them. The information was visible to the students during both semesters and they were aware that the researcher was observing their discussion. No participant objected to the observation of their online discussion.

The current research was an embedded case study type 2 (Yin, 1994) where the single case comprised multiple units of analysis. The course was the single case, but first year students participated in online interaction in three subjects and second year students in two subjects. Online interaction of these five sub-groups was observed. The teachers' online support in each class was also observed. In both year levels some students discontinued their study, that is, did not complete the course or submit their assignments. As a separate study to investigate the relationship between reported study hours, and online participation and academic performance a sub-sample of students was selected from each year level. This was done on the basis of the total number of messages posted by the students in semester 1. Details are presented in sections 4.2.3.1 and 4.2.3.2 of this chapter. So within the single case five sub-groups in five subjects of first and second year students and a sub-sample from each year level were studied.

A case study can encompass the whole range of research methods and techniques (Verma & Mallick, 1999). In this study qualitative analysis (Miles & Huberman, 1974) of the students' messages and the teachers' support for creating online discussion facilities, and quantitative analysis (McMillan, 2000) of online interaction behavior of students were done to illustrate the phenomena of students' messages posting in an online situation.

This study examined the phenomena of student online interaction in a "natural setting" (Gall, Borg & Gall, 1996) that is concurrently with the course being delivered online and students sending and receiving messages. The researcher observed and recorded (McMillan & Schumacher, 1997) online participation during the two semesters of the course. This involved recording the frequency of participation and the pattern of online interaction and the nature of messages posted by the students in class discussion. The teachers' messages to support students' online interaction was also observed and recorded.

Besides observing online discussion, data of students' experiences of the online course and peer group interaction was collected by administering questionnaires, and

conducting telephone interviews (McMillan, 2000). Teachers' views of students' online message posting in relation to the tasks provided to them were gathered by conducting interviews on three different occasions.

4.2 Site and Participants

4.2.1 Description of the Online Site

The online course under study was delivered through the *TopClass* system using World Wide Web. The *TopClass* software program comprised several features and navigational icons that helped users to post textual messages and view others' messages. This course was offered to paramedics or ambulance officers or equivalent, who had an associate diploma in Health Science and wanted to upgrade to a degree based qualification (Bachelor of Health Science). This online course was adopted for the current study for several reasons. It was a pioneering online course delivery in an Australian University. The course was the first degree level conversion course for paramedics in the world. The coordinator of the course was interested in learning more about how online delivery was working and was willing to have the researcher study the course. The course was appropriate for observing students' peer group interactions. Due to the asynchronous (Harasim et al, 1996) nature of the *TopClass* system the students were able to post the messages and reply to the others independent of time. The messages posted by the participants were available over the two semesters of the period of study. So, monitoring students' online interaction and collecting both electronic and hard copy of the students' messages was possible during any time of the course period.

The course 'Home' page of the *TopClass* contained Class Announcements, Discussion List, Course work, Read message and Send message, View tests, and Utilities sections. The visual of the course 'Home' page is shown in Figure 4.1.

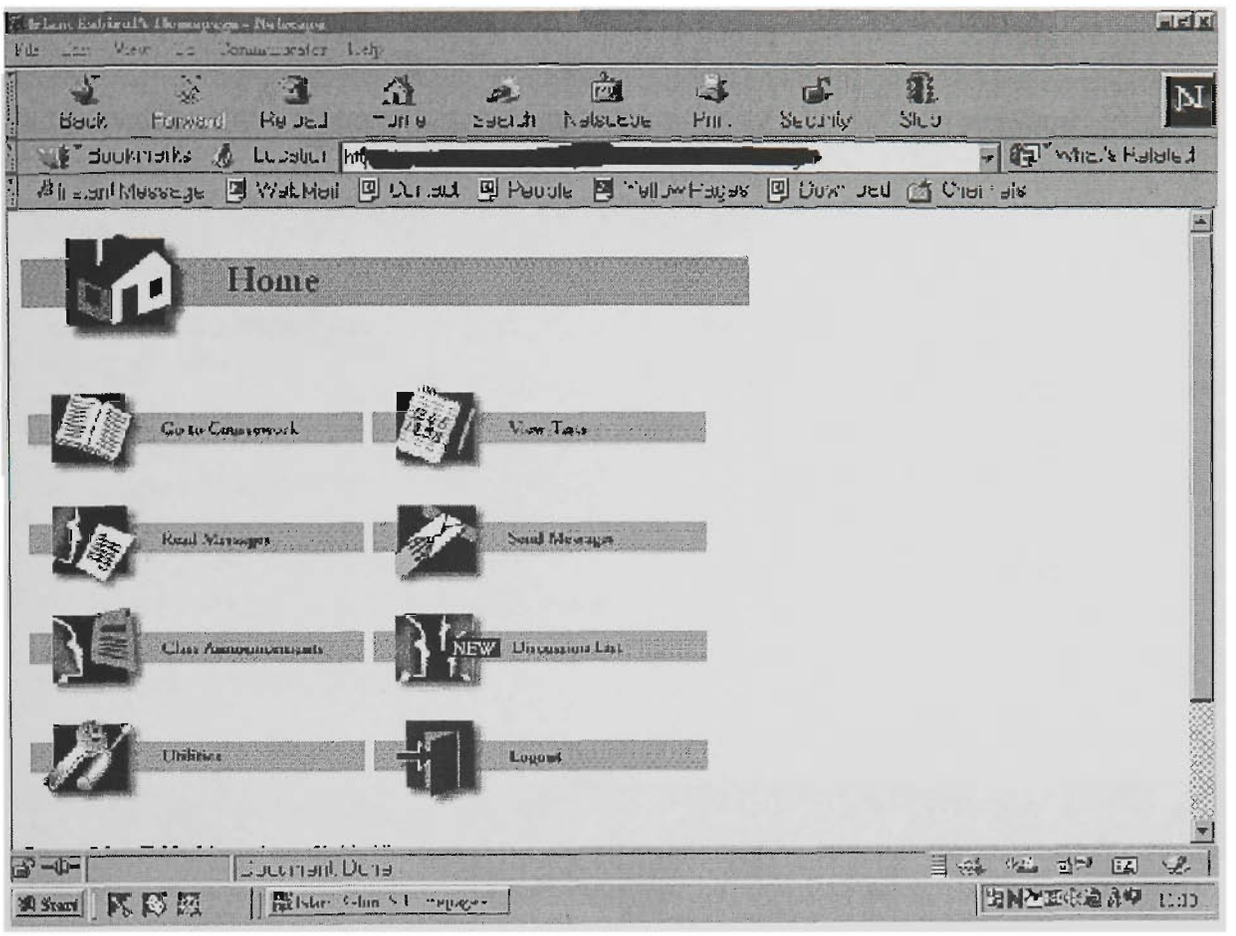

Figure 4.1 Home page of Bachelor of Health Science -Paramedic online course.

The teachers posted a weekly online lecture that contained discussion tasks for each subject under coursework. The 'Discussion List' was the area where the participants were able to post textual messages on the task set. The discussion list comprised five subjects out of seven that made up the Bachelor of Health Science course. Two subjects viz. Integration of Paramedic Practice 1 and 2 were not offered for online discussion. The course requirements for these two subjects are discussed later in this section. By clicking on the particular subject students were able to enter the weekly discussion folders of that subject.

In the folder named 'Paramedic Sciences' the course staff provided general information for all paramedic science students. General course information for Bachelor of Health Science students was given in the 'Bachelor of Health Science' folder.

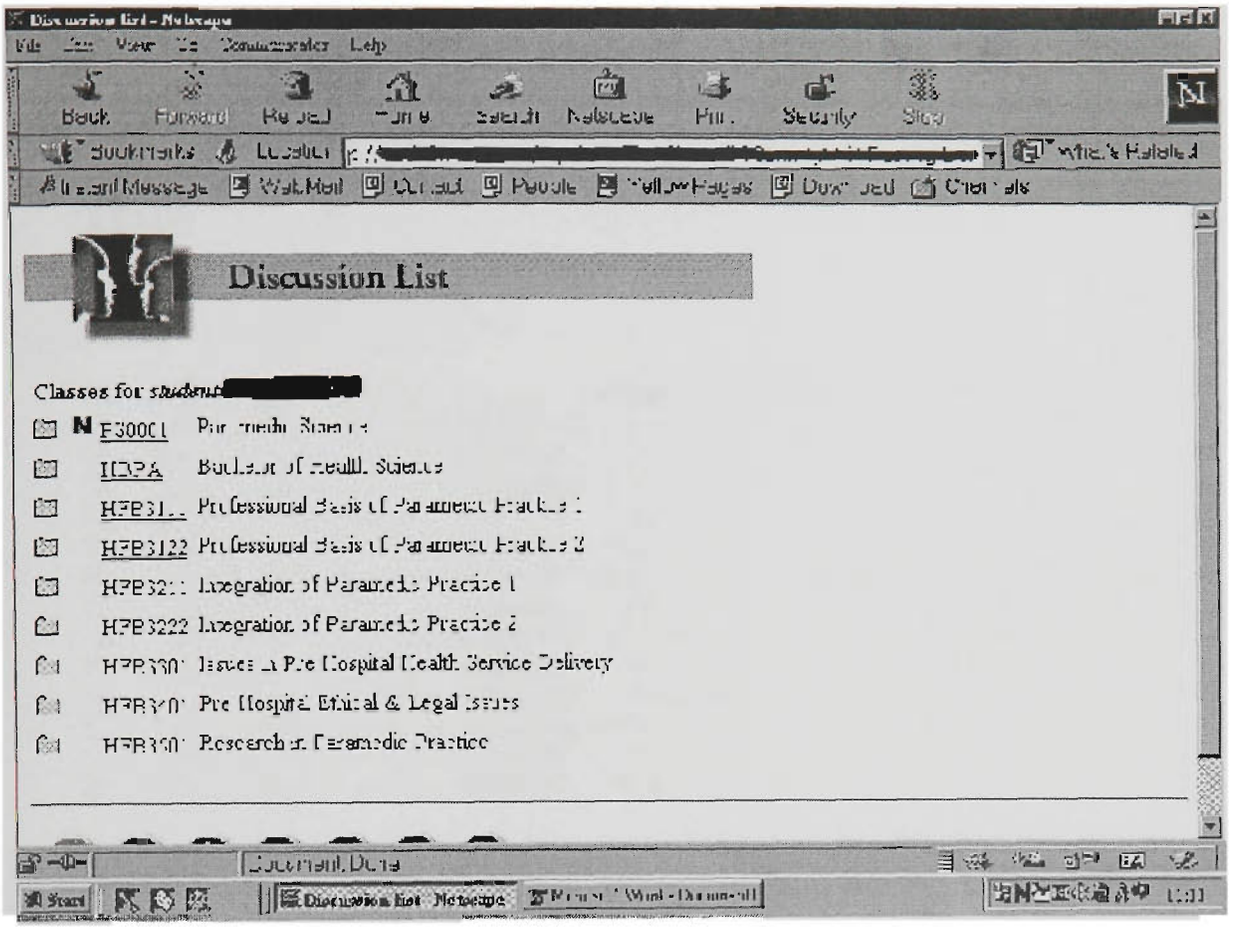

Figure 4.2 Discussion List: List of subjects.

In each subject the discussion folders indicated the total number of messages posted in each week as shown in Figure 4.3. There was a folder for general discussion, which was available to the students for any general discussion, request for help, messages unrelated to any specific subject on for example, good web sites and issues relevant to paramedic practice.

Figure 4.3 shows the discussion folders from week 1 to week 13 for the second year subject Research in Paramedic Practice. The number of messages posted by both students and the teacher in every week is shown in the bracket. The name of the teacher is blacked out for confidentiality.

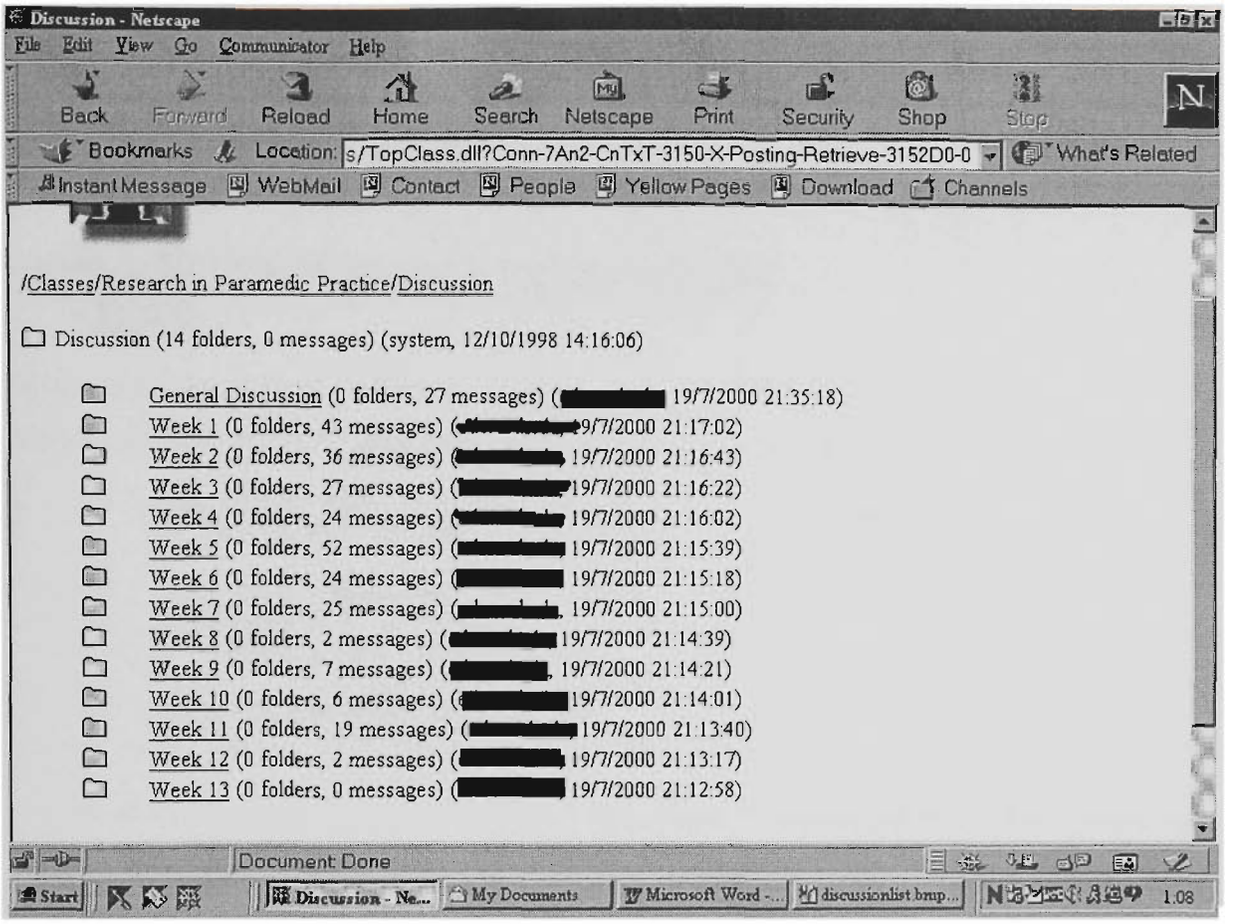

Figure 4.3 Weekly discussion folders of Research in Paramedic Practice.

The weekly folders had a mark 'N' if there were new messages from students or the teacher. Selecting a particular week a student could see other participants' messages on the screen. Figure 4.4 shows the messages posted by the students for week 9 in Research in Paramedic Practice. The participating students' name with each message has been covered up for reasons of confidentiality.

Students could read the text of a message by clicking on it. Participants were able to reply to a message or post new messages using the icons at the bottom of the message. The participants were able to check the weekly discussion area at any time to access any new messages.

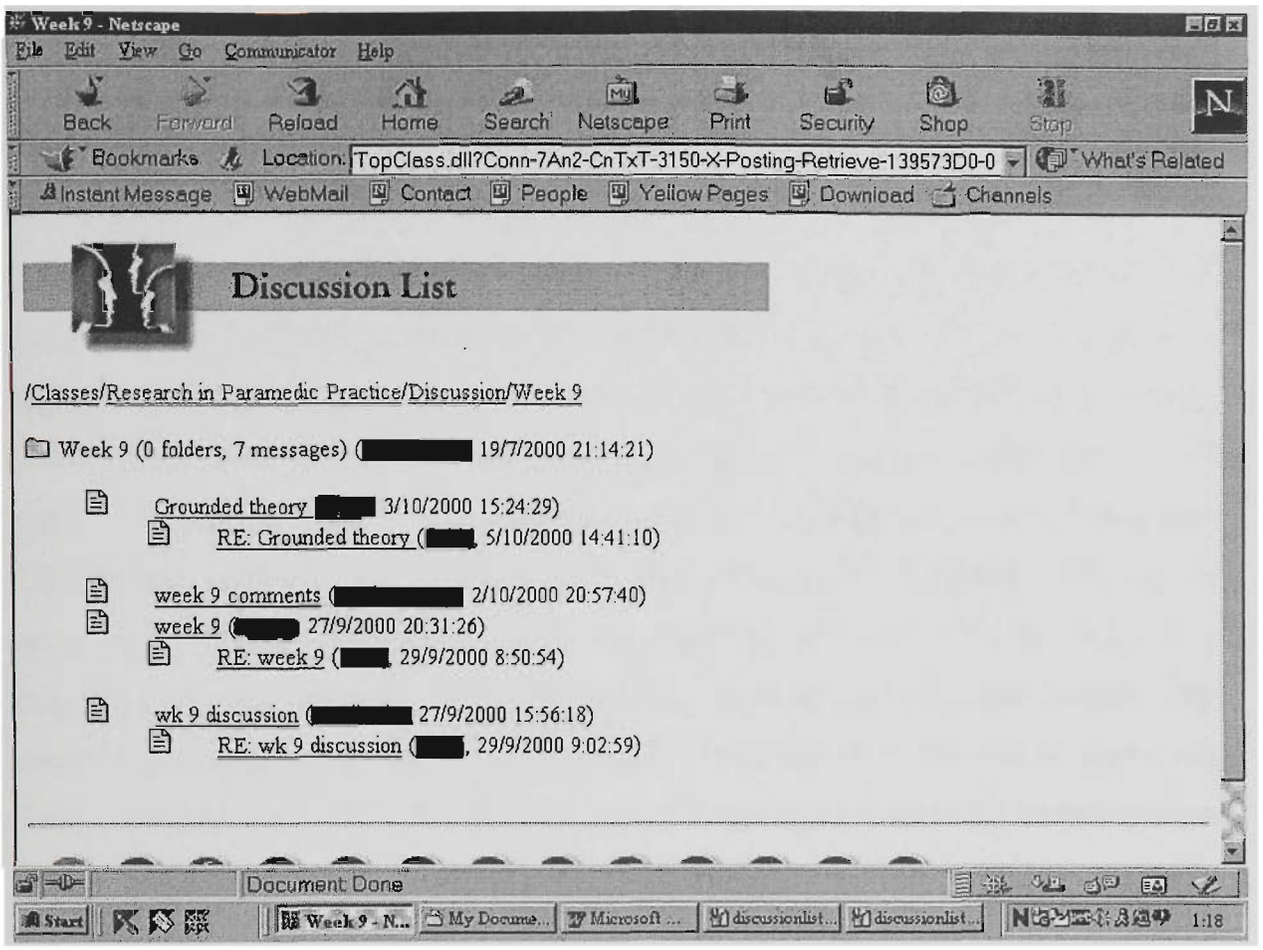

Figure 4.4 Messages posted in week 9 in Research in Paramedic Practice.

TopClass has its own built in e-mail system. Each participant had *TopClass* email, which was faster than other email systems. They were able to read and send messages by clicking on the 'Read Messages' and 'Send Messages' section of the course home page.

4.2.2 The Course Structure

The online paramedic course consists of seven compulsory subjects that were normally completed over one year full time or two years part time. The compulsory subjects were:

1. Professional Basis of Paramedic Practice 1 (PBPP1)
2. Professional Basis of Paramedic Practice 2 (PBPP2)
3. Integration of Paramedic Practice 1 (IPP1)
4. Integration of Paramedic Practice 2 (IPP2)
5. Issues in Prehospital Health Service Delivery (IPHSD)

6. Prehospital Ethical and Legal issues (PELI)
7. Research in Paramedic Practice (RPP)

For Integration of Paramedic Practice 1 and 2 students were attached to a hospital to meet the course requirements where they applied their knowledge and skill acquired from studying Professional Basis of Paramedic Practice 1 and 2. Five subjects were taught online. The first year students studied Professional Basis of Paramedic Practice 1 and Issues in Prehospital Health Service Delivery in semester 1 and Professional Basis of Paramedic Practice 2 in semester 2. Second year students studied Prehospital Ethical and Legal Issues in semester 1 and Research in Paramedic Practice in semester 2. Online message posting was observed and collected for these five subjects. For each a weekly online lecture was given. It comprised an abstract, key terms, required readings, overview of the content of the topic, discussion tasks, and further readings and web links. An example of a discussion task is given below from week 5 of Professional Basis of Paramedic Practice 2.

> My patient has chest pain that is not typical, they look well, but have an ambivalent family history. Can I base my recommendation on transport on the ECG? Why?

Various types of resources were available to the students to enable them to research answers to the discussion task such as a CD of resources, World Wide Web linked with the *TopClass*, online database of the University library, and online electronic journals. The CD of resources that was given to students on enrolment included course information, subject information for the seven subjects including the assessment information, and relevant articles from books and journals for each subject.

The following assessment methods were used: assignment, examination, *TopClass* presentation and Annotated Bibliography. Different combinations of these methods were used in different subjects as shown in Table 4.1.

Table 4.1

Assessment process in different subjects

Subject	Assessment method	Marks (%)
	First year	
PBPP1	Assignment	40
	Workbook	20
	Examination	40
		100
IPHSD	Assignment	60
	Workbook	30
	TopClass presentation	10
		100
PBPP2	Assignment	40
	Workbook	20
	Examination	40
		100
	Second year	
PELI	Assignment	60
	Annotated Bibliography	10
	TopClass presentation	30
		100
RPP	Critique of a research article	40
	Written research proposal	60
		100

The assignment could be placed in person or by airmail by the scheduled date to the teachers. The *TopClass* presentation and Annotated Bibliography were two online assessment processes. Students were asked to outline and identify issues in a case relevant to students' practices in prehospital care for *TopClass* presentation. For Annotated Bibliography, students were asked to provide annotations of two articles and then post them in on *TopClass*. The students had an off-campus examination in Professional Basis of Paramedic Practice 1 and Professional Basis of Paramedic Practice 2. The university organized a venue for examination for students in their own countries. Students' weekly online participation was not assessed. The teacher for each subject assessed the workbook, assignment and examination paper.

Examiners, who were the teachers of the subjects, summed the scores for each assessment process to give a score out of 100. Numerical grades were then converted into letter grades by the course coordinator using following scale:

1. HD (High Distinction): 80-100 % marks
2. D (Distinction): 70-79% marks
3. C (Credit): 60-69% marks
4. P (Pass): 50-59% marks
5. N (Fail): below 50% marks

4.2.3 Participants

The participants in this study were students and teachers of the Bachelor of Health Science- Paramedic course. Data were collected from these participants in both semester 1 and semester 2 in the year 2000.

4.2.3.1 Students

In the course a total of 50 year 1, and 45 year 2 students enrolled in semesters 1 and 2 of year 2000. Every student was randomly given an identification number (ID) but first year students were distinguished by having 1 as their front number while second year students by 2. For example, student 1001 as student 1 of first year group, and student 2001 as student 1 of second year group.

The students were from five different countries. The majority (58) of them were from Australia. Eleven students were from four overseas countries -New Zealand (6), Canada (2), Hong Kong (2) and Israel (1). The total number of students and their enrolment status are given in Table 4.2.

Table 4.2

Number of first year and second year students enrolled in year 2000

Semester	First year	Second year	Total	Australian student	Overseas student
Semester 1	35	34	69	58	11
Semester 2	34	35	69	58	11

In both semesters there were 61 part time and 8 full time students. The 35 first year students enrolled in semester 1 studied two subjects and 34 were enrolled in semester 2 studied one subject. The second year students studied one subject in each semester. Twelve year 1 and ten year 2 students did not complete the subjects and dropped out of the course.

The students were paramedics with different amounts of professional experience. They performed various duties in their work places. Table 4.3 lists the nature of main duties of the 53 students who supplied the data on this question in an initial questionnaire.

Table 4.3

Professional duties of the students

Nature of duties	Number of students
Prehospital and clinical care	36
Administrative work in relation to ambulance Service	4
Training	4
Prehospital and clinical care and administrative	4
Prehospital and clinical care, administrative, and training	4
Total	53

The nature of students' duties included pre-hospital and clinical care associated with ambulance services, administrative work, and training of new paramedics. Students' demographic information (age, gender, and nationality) was also collected. A list of students' identification numbers and their demographic information can be found in Appendix D.

4.2.3.2 Sampling decision

The number of messages posted by each student in both semesters was recorded. At the end of semester 1 (7 July, 2002) students of each year level were categorized into 'High' 'Moderate' and 'Low' groups on the basis of total number of messages posted in

semester 1. In order to get a suitable proportion of students from the whole group a random sample of 3 was drawn from each year from these three categories of students who posted different levels of messages to examine their study pattern and perceptions of online activities. These categorized students are referred to as 'selected group' students in this study. The purpose of identifying these students was to understand their experience of studying online, the role played by the peer group in the interaction, and their use of ideas in the messages posted by fellow students on the task set. The weekly study hours were also collected to explain their study pattern as a whole, both online and offline and its relationship with students' academic performance.

Students of each year level were categorized into high, moderate and low group using quartile deviation. The 35 first year students posted a total of 149 messages in semester 1, and 34 second year students posted a total of 132 messages.

Originally it was planned to select the students in the low group who posted messages up to 25% of all messages, moderate group from 25% to 75% and high group who posted above 75%. When the data were examined, it was found in the low group that out of 35 first year students 13 posted no messages and out of 34 second year students 13 posted either one or no messages. To reduce this different cut off point for low group in the two year levels, finally students who posted messages up to 50% were regarded as 'low', from 50% to 75% as 'moderate', and above 75% as the 'high' group.

The value of quartiles of online messages posted by the first year students, and the number of students in each quartile is shown in Table 4.4 below.

Out of 35 first year students, 18 students posted either 0 or 1 message in semester 1. These are regarded as 'low' category. Ten students posted 2 - 6 messages. These are regarded as 'moderate' category. Seven students posted 7 - 21 messages. These are regarded as 'high' category.

Table 4.4

Number of first year students in selected groups

Quartile	Value	Number of messages posted	Number of students	Category
50	1.0	0 - 1	18	Low
75	6.0	2 - 6	10	Moderate
Above 75	Above 6.0	7 - 21	7	High

The value of quartiles of online messages posted by the second year students, and the number of students in each quartile is shown in Table 4.5.

Table 4.5

Number of second year students in selected groups

Quartile	Value	Number of messages posted	Number of students	Category
50	2.5	0 - 2	17	Low
75	6.0	3 - 6	9	Moderate
Above 75	Above 6.0	7- 16	8	High

Out of 34 second year students, 17 students posted 0-2 messages. These are regarded as 'low' category. Nine students posted 3-6 messages. These are regarded as 'moderate' category. Eight students posted 7- 16 messages. These are regarded as 'high' category.

A random sample of 3 students was drawn from each of high, moderate, and low category of first and second year group to select 9 students from each year level giving a total number of 18 selected students in six groups. At the start of semester 2, the researcher invited these by email to maintain a diary, and participate in a telephone interview. Of these 18 students, only nine students consented and

participated after being sent repeated requests by email. For this low response other students in each group were also invited to participate but no one responded. The total number of messages posted by the selected students in semester 1 who agreed to participate is given in Table 4.6.

Table 4.6

Number of messages posted in semester 1 by selected students

Year of study	Student ID	Category	Total number of messages posted
Year 2	2013	High	7
Year 2	2020	High	16
Year 2	2021	High	10
Year 1	1008	Moderate	5
Year 1	1009	Moderate	6
Year 1	1010	Moderate	2
Year 2	2008	Low	2
Year 2	2009	Low	1
Year 2	2031	Low	2

Of these nine students the high category and the low category students were from the second year group. Moderate category students were from first year group. These nine students were typical of the whole group with respect to gender, age, and experience. As a result of the criteria used to select participants for the selected group, one year 1 student was deemed to be in the moderate category, but he/she posted only 2 messages. As a consequence, the selected group continued more 'low' category than originally planned.

4.2.3.3. Teachers

Five teachers and a teacher/coordinator who organized the course and provided information were participants. Each of them was given an ID using a capital letter

from A to F. All six teachers were male. Most of them had previous experience of online teaching and learning. The course coordinator was responsible for sending resource materials, providing general information on the *TopClass*, posting discussion tasks, addressing students' inquiries and encouraging students to post messages.

Each teacher prepared online lecture and other resource materials for the subjects they were responsible for. Normally, one teacher was assigned for one particular subject. They observed the students' online interactions, and provided help to the students during weekly discussion on the task and assessed students' assignment and examination papers.

4.3 Data Collection Sources

This section includes a discussion of the data collection sources used in this study.

- **Online lecture materials posted on the *TopClass***

The online lecture posted on the *TopClass* for each subject included the discussion task and other course related information.

- **Online messages posted on the *TopClass***

Students' messages: The online messages posted by each student in each subject. A message was defined as any posting in the discussion list regardless of length and content of message.

Teachers' messages: The messages posted by each teacher in the discussion list to support students.

- **Questionnaires to students**

SQ1: Initial Questionnaire issued to all enrolled students in April 2000

SQ2: End of Year Questionnaire issued to all enrolled students in November 2000

- **Student diaries**

D1: Diaries completed by students in selected groups from week 3 to 13 in semester 2.

- **Interview data**

SST1: Telephone interviews with selected students in October 2000

TI1: Teacher Interview 1 – April 2000

TI2: Teacher Interview 2 and ranking students by teacher – July 2000

TI3: Teacher Interview 3 and ranking students by teacher – November 2000

- **Academic performance data**

AP1: Percentage marks awarded to students in each subject

Table 4.7 shows each research questions and the corresponding data sources used to answer the research questions.

Table 4.7

Research questions and corresponding sources of data

Research questions	Data sources
RQ1 How do teachers seek to use the peer group as a resource to promote interaction in the task that they assign participants?	Online lecture materials, Teacher interviews (TI1, TI2 and TI3), messages posted by students and teachers, and student questionnaires (SQ1 and SQ2).
RQ2 How does peer group interaction enable achievement of the course goals?	Teacher interviews (TI1, TI2 and TI3), and messages posted by students and teachers.
RQ3 How do students individually respond to the task set in online discussion?	Messages posted by students, Student questionnaires (SQ1 and SQ2), student diaries (D1), and interview data (SSTI).
RQ4 How is online participation related to students' academic performance?	Messages posted by students, academic performance (AP1), ranking of students by teachers

Data collection from students was done online. Data from teachers was collected by individual interview. An overview of the data collection timeline is shown in Table 4.8.

Table 4.8

Data collection time line

Time scale	Sources of data and dates when collected	
Year 2000	A	B
	Students	Teachers
March	Trial questionnaire	
	Monitoring of online participation (March-June) in semester 1 subjects	
April	Initial questionnaire (all)	Interview 1
May		
June		
July	Monitoring of online participation (July-November) in semester 2 subjects	Interview 2 + ranking of online participation at the end of semester 1
August	Diary evidence (Week 3 to week 13) of semester 2	
September		
	Telephone interviews (selected groups)	
October		
November	End of year questionnaire (All)	Interview 3 + ranking of online participation at the end of semester 2
December	Academic performance (five subjects)	

4.3.1 Online Lecture Materials Posted on the *TopClass*

The online lecture material posted by the teachers that included the discussion tasks for the students for each subject was collected in hard copy.

4.3.2 Online Messages Posted on the *TopClass*

Each online message from student and teacher had the following characteristics mentioned at the top of the message:

- Name and *TopClass* email within bracket
- Name of the subject for which message was posted
- Date and time of posting
- Subject of posting

The message was written below the above information. Sometimes students attached their message as an MS word file. So the students have the opportunity to compose on and offline to respond to a task or others messages. An example of a student message is given in Figure 4.5. The task to which this response was presented was "A man drinks 3 x 285 ml glasses of full strength beers and three nips (30ml) of scotch over a period of three hours. At the end of the three hours, what would be his expected blood alcohol level?"

Message
/Classes/Professional Basis of Paramedic Practice 2/Discussion/Week 9 - Neurological Pharmacology/blood alcohol
From:
Student's name (*TopClass* email)
To:
Professional Basis of Paramedic Practice 2 (HFB3122)
Date: 17/10/2000 21:58:35
Subject: blood alcohol
this to me sounds like a matter of simple maths. six standard drinks in 3 hours. 6 x 0.015 = 0.09 say for the purpose of the exercise this man drank 1 standard drink every 1/2 hour. you would expect metabolism to begin immediately. so after 3 hours he would have metabolised 3 standard drinks or 0.045% alcohol. i would expect his pca to be ~ 0.045% (im sceptical, could it be this easy?)
your thoughts

Figure 4.5 Example of an online message.

The messages posted by the student and teacher from March to November were saved electronically as an MS word file for further analysis. They were also printed out as hard copy.

4.3.3. Questionnaires to Students

The initial questionnaire (SQ1) sought to gather information from all students at the start of the course in April 2000 on age, gender, country, professional experiences, familiarity with online teaching and learning, and expectations of the course.

A trial was conducted with 20 students doing another online course using the *TopClass* to evaluate the effectiveness of the layout of the questionnaire and appropriateness of the language. They were professionals from a similar background. The questionnaire was revised in the light of feedback from 10 respondents.

The final version of the questionnaire (Appendix C) contained six open-ended questions about students' professional situation, professional experience and expectation of the course. An example of one of these questions:

- Describe briefly your current duties in the job as a paramedic or its equivalent.

In addition there were four closed questions. An example is:

- Were you familiar with online teaching learning before enrolling in this course? (a) Yes [ ] (b) No [ ]

The end of year questionnaire (SQ2) comprised 15 closed questions on students' views on the extent to which their expectations had been achieved, their experience of studying online and peer learning, and usefulness of the resource materials. The questions were developed on the basis of the experience gathered from the teaching and learning situations and the data collected in two semesters of the course. Examples of the questions are as follows:

- In studying on this course, how often did you read online discussion in response to the discussion task posed by the teachers?
  a. I read online discussion every week [ ]
  b. I read online discussion most weeks [ ]
  c. I read online discussion some weeks [ ]
  d. I read online discussion rarely or never [ ]

- Can you please indicate the factor(s) that influenced your decision to read online discussion?
  a. To compare my ideas and concepts with other colleagues [ ]
  b. To enhance knowledge about discussion topic [ ]
  c. To see relevance of discussion and variety of information [ ]
  d. To get feedback from teacher about the topic [ ]

SQ1 and SQ2 were sent by email as an MS word attachment file respectively in April and November 2002 (Table 4.7). The students were able to answer online. The students had enough time to receive and reply to SQ2 because the *TopClass* system remained open until one month after course completion (December 2002) to provide students with information regarding their assessment and results of examination. The students returned the completed questionnaires online with their answers to the researcher's email address.

4.3.4 Student Diaries

The diary template (D1) was designed to collect data in semester 2 from students in the 'high' 'moderate' and 'low' selected groups. D1 was sent to students' *TopClass* email. Students were asked to complete the diary for each day over a period of eleven weeks starting from week 3 and to send the completed diary back to the researcher at the end of each week. D1 (Cooper & Foy 1969; Wankowski 1973) was an instrument to enable asked students to record the hours that they studied each day of the week, and when they were studying. D1 was a tabular format developed in Microsoft Word having one row for each day of the week and the description of each item at the top. The MS Word nature of D1 allowed students to enter as much information as they wanted to provide with an opportunity of editing and deleting the information. The diary template is given in Appendix C.

4.3.5 Interview Data

Out of nine students of the selected groups seven participated in a telephone interview (SSTI) in October 2000. The interview explored students' experience of studying

online, use of ideas in messages posted by fellow students, and the usefulness of the teacher's contribution in online discussion. Examples of interview questions are:

- In what ways do online messages posted by other students enhance your knowledge about a topic?
- What role does your teacher play to promote interaction in the discussion list about a topic?

The interview questions were open-ended in nature (Appendix C). Students were contacted online to set up a convenient date and time before they were interviewed. Participating students were from Australia and New Zealand. Students' answers were recorded by hand.

Three sets of face-to-face interviews were conducted with the six teachers who developed the subjects of the course including the course coordinator. There were some exceptions as some teachers were not available. Table 4.9 shows the teachers who took part in each of the three interviews and when these occurred.

Table 4.9

Participants in teacher interviews

Teacher (ID)	Interview conducted with teacher		
	First interview April 2000	Second interview July 2000	Third interview November 2000
A	TI1	TI2	-
B	TI1	TI2	-
C	TI1	TI2	-
D	TI1	TI2	-
E	-	TI1	TI3
F	-	-	TI3

Note. Dash indicates that the teacher was not available for the interview

Interview 1 (TI1) was conducted in April 2000 with teachers to collect their views on online peer group participation, achieving course objectives through peer

participation, and pattern of online participation. Teacher E was interviewed in July 2000 using the questions of TI1. Teacher F was not available for the first interview. Examples of interview questions are:

- In what ways do you seek to exploit the potential of the students' peer group as a learning resource for achieving the objectives for the course?
- In what ways have you observed the online peer group act as a learning resource for the students?

Interview 2 (TI2) was conducted prior to the end of semester 2. Interview 3 (TI3) was conducted at the end of semester 2. In these interviews the teachers were asked about their views of students' message posting over the semester. This included overall messages posted by students in a class, level of messages posted by students, and ranking of students online participation. Examples of questions asked in these two interviews are as follows:

- Can you please rank students' online message posting in your subject?
- Can you comment on the overall messages posted by the students in the subject?

In TI1 and TI2 teachers were asked to rank students on the basis of the number of messages posted and the quality of messages in each subject. The teacher ranked the students who posted messages in the discussion of a subject. These interviews explored teachers' perceptions of students' responses to the task set for weekly online discussion. The interviews were recorded by audiotape and then a transcript prepared.

4.3.6 Students' Academic Performance

Academic performance of first year and second year students in two subjects was collected at the end of semester 2. The academic performance was the percentage of total marks in each subject. The letter grades (HD, D, C, P, and N) that were given on the basis of the marks obtained by the students in each subject were also collected. The percentage marks obtained by the students in each subject were used for analysis. The distribution of grades in each subject was also used to explain the pattern of the results.

4.4 Data Analysis

Both qualitative (Miles & Huberman 1994) and quantitative (McMillan & Schumacher 1997; McMillan, 2000) techniques were employed for data analyses.

4.4.1 Quantitative Data Analysis

Most data were quantitative. The quantitative data analysis included:

- The frequency of messages posted by individual students in each class and its pattern
- Total number of messages posted by students and teachers in each class
- The frequency of messages posted by students in weekly discussion in each class
- Students' weekly hours of study and relationship between online participation and academic performance
- Relationship between frequency of messages posted and academic performance
- Teachers' ranking of students' online message posting and academic performance
- The responses to closed questions collected by questionnaires

Most quantitative data were analyzed using SPSS (Statistical Package for Social Sciences). The variable labels for each item for example the variable 'level of exp' was for experience of students, 'op' was for online participation of students with a suitable range of values were created (where necessary) and then entered into the SPSS program. When the data were being entered into SPSS, visual checking and re-counting of data was done to ensure accuracy. This process of analysis using SPSS made it easier to manipulate data and ensure accuracy than handling manually.

4.4.1.1 Messages posted by individual students and its pattern

The online messages posted by students in each subject were counted and entered in a matrix (Appendix D). The students who posted no messages were also shown. Then the total number of messages posted by each first year students in three subjects and by each second year students in two subjects was calculated. The number of messages

posted by the students in each class was checked during data analysis and report writing.

In the next stage, the number of messages posted by each student in each subject in response to the discussion task, to their fellow students, and to the teacher was counted (Appendix H). The number of messages posted by students in each class was also counted to explain the level of message posting in each subject.

4.4.1.2 Messages posted in different subjects in weekly online discussion

Analyses of online messages posted by the students involved: (i) counting of messages posted in a specific week from week 1 to week 13 for each first year and second year subject, (ii) counting number of students who posted messages in each week, and (iii) calculating the percentage of messages posted in each week with respect to the total messages posted for the total period of a class.

The number of messages posted by each student in different subjects was entered into the SPSS version 10.0 windows. The mean, and standard deviation (SD) were calculated using the SPSS.

4.4.1.3 Relationship between online participation and academic performance

The relationship between online message posting and academic performance for the students who completed each subject was calculated using SPSS. The number of online messages posted by each student in each subject and the marks they obtained in that subject were entered into SPSS. The total number of messages posted by each first year student in three subjects and the overall academic performance (average marks obtained in three subjects) were entered in to SPSS. Similarly, the total number of messages posted by each second year student in two subjects and overall academic performance was also entered.

Establishing the relationship between the numbers of messages posted and academic performance was problematical. Chi-square test (online messages posted with grades obtained) was not appropriate due to lack of the required cell frequency. For example in

Professional Basis of Paramedic Practice 1, no student obtained grades C or P, 17 received HD and 7 received D. This pattern of grades was similar for other subjects. On the other hand in each class some students completed the subject but posted no messages and it was similar for all subjects. The number of scores for calculating Pearson's correlation was appropriate but not very large. Moreover, the scores for each variable (online messages and marks obtained) were not normally distributed. This problem was discussed with three quantitative researchers in the university for their suggestions to identify a suitable technique on the basis of the data set. The researchers preferred the Pearson's correlation technique to show the relationship between online message posting and marks obtained in each subject. They viewed that the Pearson's correlation was more appropriate than the Chi-square test on the basis of data that indicates the pattern and degree of linear relationship between online participation and academic performance.

Using the SPSS program the scatter diagram for number of messages and marks obtained was produced (online participation as X-axis, and academic performance as Y-axis) to show the degree of correlation between these two variables. The Pearson's correlation coefficient (r) was calculated for each of the three first year subjects and the two second year subjects. The Pearson's correlation for number of messages posted and marks obtained was also calculated for these five subjects to identify the relationship of between the two variables for the whole group.

4.4.1.4 Hours of study and relationship with academic performance

Quantitative analysis for students' study pattern was done using Microsoft Excel program. Weekly hours of study were graphed using a frequency polygon to compare study hours as well as patterns for each individual and across the three selected groups: high, moderate and low. The descriptive statistics (mean, range, and standard deviation) of study hours were found for each group. The Pearson's correlation between average study hours and academic performance was calculated using SPSS. One-tailed tests of significance were used.

4.4.1.5. Relationship between teachers' perceptions and academic performance

Teachers on the basis of messages posted in each subject ranked the students. The teachers were asked to rank considering the number of messages and the quality of content for each student. This ranking of students on the basis of online messages posted by an individual in a class by a teacher was defined as the teacher's perception of the students' online participation. The teachers did not rank the students who posted no messages. To rank the students the teachers gave number 1 to the best student, number 2 to the second highest, and so on. The teachers gave the same rank to some students in each subject. The students who posted messages and completed the subject were considered for this analysis (Appendix E). The teachers' perceptions of students' online participation were explored. The ranking, number of messages posted and the features of the content of the messages were compared for individual students. Spearman's Rank Correlation between teachers' perception and the academic performance of students in each subject was calculated using SPSS. A one-tailed test of significance was used.

4.4.1.6 Analysis of questionnaire data

Among 69 students 53 responded to SQ1 (response rate 77.0%) and 40 students completed SQ2 (response rate 58.0%). Data from the questionnaires were also organized using SPSS where possible. The frequencies of responses against four alternate answers and their percentages for each question were produced. Using the statistical analysis menu on the SPSS, output for each item of the questionnaire data was created (number of respondents, and percentage) and described.

Students' responses to a number of items of SQ1 and SQ2 were compared with their levels of messages posting behavior viz. high, moderate and low. These comparisons were done using Crosstabs of the SPSS program. The items were about the students' expectations of online message posting, and usefulness of the online discussion task, messages posted by students and teachers' online support.

4.4.2. Qualitative Analysis

Qualitative analysis was done for online messages posted by the students, the discussion task designed by the teachers, individual interview with the teachers, and telephone interview with the selected group students. These are discussed below.

4.4.2.1 Qualitative analysis of online messages

The purpose of qualitative analysis of online messages posted by the students in Professional Basis of Paramedic Practice 2 was to understand the nature of peer group interaction that is how the students were talking about the given discussion task. The researcher used coding and categorizing (Miles, and Huberman, 1994) to identify emerging themes (Taylor, and Bogdan, 1998).

The exact text of online message is termed as the transcript of message. The researcher had to read each transcript a number of times for data analysis that is, at the time of observing online interactions, their development, for developing and refining the coding scheme, and counting the frequency of codes. For the analysis of the online messages the researcher performed the following steps:

1. Reading online messages on the screen and print out.
2. Preparing memos (Miles & Huberman, 1994) of observation for developing coding scheme.
3. Reading and coding (Miles & Huberman, 1994) the transcript of online messages and defining each code.
4. Sorting and classifying similar codes where possible, that is categorizing (Miles & Huberman, 1994), and defining each category.

An example of coding online transcript of Professional Basis of Paramedic Practice 2 on the topic 'Dysrhythmias – Atrial' is provided in Table 4.10. The Table comprises 4 columns. The participating student's number is shown in the first column from the left. The exact text of the student's message named 'transcript of message' was copied from the electronic form and then pasted in the second column. So some spelling mistakes and grammatical errors may happen in these transcripts of messages. In the third column

the code(s) is written with a code number after repeated reading of the transcript of a message. Definitions of each code are given in the fourth column.

Table 4.10

Coding student's online message and defining each code

Student ID	Transcript of message	Codes	Definition of code
Student 1049	Having searched high & low, I cannot find any rhythm other than AF that could be accurately described as an irregularly irregular rhythm. It was suggested to me that VF could be the same, but by definition: 'VF is a rhythm that is chaotic and disorganised' and therefore could not be considered rhythmic at all. The only other rhythm that I thought could be irregularly irregular was Torsades de pointes????? Or is this still a regular rhythm as some examples of Torsades appear regular whilst other strips I've seen are certainly not. Any suggestions?	1.Presented ideas	Explained discussion task using past experience.
		18. Asked for suggestion	Sought fellow students suggestion for a particular situation.

The coding schemes were gradually refined and sorted through repeated reading of the transcripts of new messages with course development. Ideas gained from the study of the researchers Hogan, Nastasi & Pressley (1999) on students' discourse analysis helped to refine the coding scheme. Communication with several researchers in the relevant field also guided the final coding scheme, identified the ambiguities in the definitions of the codes and the categories and overlap of the categories. Additionally, for the validation of this qualitative analysis of online messages a colleague who was involved in similar research was given transcripts of messages from week 1 and the list of codes and definitions to code the messages. The coding of transcripts by the colleague closely matched with the researcher's coding (Appendix B).

The coding schemes were numbered and 33 codes were found for 154 messages posted for Professional Basis of Paramedic Practice 2. Fifteen categories were generated and defined by classifying and sorting (Hogan, Nastasi & Pressley, 1999) the codes. The list of categories with definitions and the codes under each category can be found in Appendix B.

4.4.2.2 Qualitative analysis of discussion task set

Qualitative analysis of the discussion tasks was done to illuminate the nature of the task. The tasks were summarized and categorized as open ended or closed. On the basis of students' messages they were also categorized as relevant or not relevant to students' professional practice, controversial or not, and whether they were an application of knowledge. The number of messages posted in relation to the nature of the task was shown for most tasks in eleven weeks' of Professional Basis of Paramedic Practice 2 (Appendix J).

4.4.2.3 Qualitative analysis of questionnaires and interview data

Transcripts (Maxwell 1996) of the teachers' interviews conducted on three different occasions were prepared. The interview transcripts of all teachers for all interviews were read a number of times to identify code instances (for example interesting task or relevant to professional duties) to signify categories of responses for each question. Then the incidence of categories of responses was summarized and compared.

The responses of the seven students who participated in the telephone interview were written down, categorized, and then summarized and compared.

5.5 Limitations

This study contained certain limitations in data collection, data analysis, data interpretation, and responses from the participants. These were related to administering the questionnaire, responses from the high, moderate and low group students, and interpreting data from selected students.

The main limitation of the study is that it was a single case with a professional group of students who are not necessarily typical of the other professional groups, and certainly not of undergraduate groups. Therefore, generalization of the results to other groups of online students may not be warranted.

A second limitation was in administering SQ1 and SQ2 for students. These questionnaires were sent to students' *TopClass* email addresses. For both SQ1 and SQ2 the response rate may have been higher if the students were contactable by their personal email or the postal addresses.

A third limitation was the level of cooperation from selected group students who maintained a diary, and the difficulty of checking the reliability of and validity of the diary data. Only nine students participated but the research was designed to use a sample size of 18.

A fourth limitation was the attenuation of data analysis to show the correlation between students' online participation and academic performance. The students who posted messages and completed the subjects were considered for this analysis. So the sample size had been reduced in this case. Similarly, the rank correlation of the teachers' perceptions of students' online participation and their academic performance was done only for those few students who posted messages and completed the subjects.

In spite of these limitations, the researcher has given careful attention to analyzing the data and interpreting the results. He is confident that the techniques used are valid and useful for generating findings for the research questions that the current study focused on.

CHAPTER 5
STUDENTS' EXPECTATION AND TEACHERS' ROLE

In the review of the literature (Chapter 2) an argument has been made that interaction is important for student learning. In an online situation the instructors have the opportunity to maximize students' interaction by planning the course to structure and support discussion. Previous research (Tarbin and Trevett, 2001) has reported anecdotal evidence of how people have gone about planning and delivering an online course and the results they obtained indicate a positive impact on students online interaction. However in computer mediated communications there is a lack of systematic studies of interaction in an online course from multiple perspectives that include students and non-participant's observations as well as from the teachers' points of view.

Drawing on interview data from staff and student responses to SQ1 this chapter presents students' expectations of the course, the teachers' role in structuring and providing support for online discussion, and their view of peer group interaction in relation to the achievement of the course goals. Students' actual online interaction will also be presented for triangulation purposes. The results address the research questions: (i) How do teachers seek to use the peer group as a resource to promote interaction in the task that they assign participants? (ii) How does the peer group interaction enable the achievement of the course goals?

This chapter contains three sections. The first section is a brief discussion of students' expectations from studying the course. The second section includes the teachers' role for designing the task set for promoting interaction and providing support in online discussion. The third section focuses on the teachers' views of peer group interaction in relation to the achievement of the course goals.

5.1 Students' Expectations of the Course

The students were paramedics (Ambulance Officers). They performed duties relevant to prehospital and clinical care of patients. They also provided training to their junior

colleagues. They had professional experience from 3 to 19 years with an average of 8.5 years. Out of a total of 95 students, 67 were male and 28 female. They were aged between 28 years and 40 years with an average of 32.4 years. Most of the students (84) were from different states of Australia and eleven students were from four overseas countries- New Zealand (6), Canada (2), Hong Kong (2) and Israel (1).

A total of 69 students, 35 in their first year and 34 in their second year who enrolled in semester 1 of year 2000 were sent SQ1 at the start of the course. Fifty-three replied, a response rate of 77.0%.

Of the respondents only 13.0% claimed to be familiar with online teaching and learning, while 87.0% had no previous online experience. Information was sought on students' purposes for studying the course, their expectations of course staff, and their expectations of learning with fellow students.

5.1.1 Purpose for Studying the Course

Some students had reported multiple motivations with regard to their purpose of studying the online course. The two main purposes for undertaking the course were: further study (10 students), and professional and personal development (50 students). They also expressed their motivation to obtain a tertiary qualification or university degree, or complete a postgraduate degree in the next stage (5 students). Since the course was relevant to students' professional practice they intended to enhance their knowledge and skills in that area, and increase their experience. Besides this, they wanted to meet their professional needs, undertake self- improvement and improve their chances of promotion (10 students). The students were motivated to study because of the flexible nature of the online course (45 students). The students did not have to attend a traditional course and were able to study and continue their professional paid work. The course was accessible from home using the Internet, and their time was easily managed.

Most of the students were highly motivated to finish the course. Among 53 students 47 students (88.7%) answered that they would be 'very likely' to finish course. Two

students (3.8%) answered 'moderately likely', four (7.5%) were 'not sure'. None answered 'not likely'.

5.1.2 Expectations of Teachers

Students expected teachers to support them through facilitating online access, and providing online accessibility, academic and assessment feedback, and general information.

In relation to the teachers' support most students stated more than one reason. All 53 respondents wanted their teachers to be easily accessible online by email and to reply promptly to telephone and email questions. They wanted assistance with their technological problems (38.0%), and specific feedback and guidance including comments on whether they were right or wrong (60.0%). They also expected help when they had problems understanding the subject matter or the discussion tasks (32.0%). Students also expected help and feedback while preparing their assignments (62.0%). They expected general help in clarification of specific subject information and assistance in collecting resources and accessing the university library online database and journals.

The students expected to use the CD materials given to them at the start of the course, relevant books, journals, university library online database and electronic journals on the basis of availability of these resources.

5.1.3 Expectations of Online Learning

Students expected to read online messages from fellow students and to compare their own ideas, contribute in discussion for sharing experience, inviting others' thoughts, asking questions of peers, and interact with the teacher. Students were specifically asked how likely they were to participate in online discussion during the course. Students' expectations of posting messages in weekly discussion are presented in Table 5.1. At that point only 1 in 6 said that they were very likely to participate while more than 1 in 3 did not expect to participate.

Table 5.1

Expectations of posting messages in weekly discussion

Response type	Number of respondent	Percent
Very likely	9	17.0
Moderately likely	22	41.5
Not likely	19	35.8
Don't know	3	5.7
Total	53	100

The students believed that the availability of time and the relevance of the discussion topic to current paramedic practices could influence their decision to post messages. For some students an important factor in determining their level of interaction would be if the participation were mandatory.

5.1.4 Summary

Students expected the online course to provide them with a flexible route to a degree qualification, and professional and personal development. The flexible nature of the online delivery attracted them to the course. The students wanted teachers to provide feedback during online interaction and on their assignments. Almost one in five students were highly motivated to participate in online discussion. More than one third said that they were moderately likely to participate, one third said that they were not likely to participate, and a few were not sure.

5.2 Teachers' Role in Promoting Message Posting

The results in this section will attempt to answer the research question: 'How do teachers use the peer group as a resource to promote interaction in the task that they assign participants?'

Student interaction took place in the discussion list in relation to the weekly discussion tasks posted for each subject. In the guidelines for students in each subject, students were encouraged to take part in each session for discussion, and share their experience with the group.

5.2.1 Design of Discussion Tasks

The teacher interview data show that the teachers gave emphasis to designing the 'discussion task' and 'providing support in discussion' in relation to use of peer group as resources for promoting interaction.

To encourage and involve students in online interactions the teachers used discussion tasks relevant to the content of the topic as well as to students' professional practice. They said that they tried to make the discussion tasks easy to understand, interesting and to attract students' attention. Teacher C (TI1, April 2000) said:

> *We try and make the subject matter interesting as much as possible. We should be able to keep the students' attention in online discussion with very interesting material which is relevant.*

The teachers designed the tasks set to enable students to draw on all their past experience. Teacher D (TI1, April 2000) said:

> *I put the ideas and concepts to them in the task, have them discuss those using their professional experience that they have and then the discussion as goes on through learning takes place.*

The teacher hoped that the discussion tasks would stimulate students to participate in discussion. Teacher B (TI1, April 2000) said:

> *We put the materials and the discussion question online and we expect these to stimulate students to respond to them.*

5.2.2. Examples of Discussion Tasks

For each subject, there was an online lecture each week. The weekly lecture included more than one discussion task. The highest number of tasks was eight posted in week 2 of Professional Basis of Paramedic Practice 2. The lowest was two tasks. The number of discussion tasks in other subjects varied between two and seven.

Examples of discussion tasks from first year and second year subjects are presented. Transcripts of discussion tasks included in some online lectures are presented below.

The following examples are given from Professional Basis of Paramedic Practice 2 subject. In week 1, students' were introduced to the methods of ECG and its various aspects in relation to patient assessment and asked to comment on a number of questions, for example:

> What method do you utilize to ensure that you always note the important information on any ECG? How does the ECG waveform relate to the mechanical activity taking place in the heart, what implications does this relationship have for our clinical observations and assessment of our patient?'

In week 2, the task was relevant to patient diagnosis and to use of medication for patient treatment. One of the tasks set in week 2 was:

> Dioxin is a common drug for the treatment of AF, what are the ECG characteristics of dioxin toxicity? What are some of the common reasons why AF patients are at risk of dioxin toxicity?

In week 3 the discussion task was about the practical application of patient assessment in prehospital emergency care. In the lecture note students were given references to different articles and then asked to comment on the tasks. Examples are:

> How will determination of a Bundle Branch Block (BBB) affect the prehospital care of my patient? What is the point of looking for BBB when I only have three leads?

In week 4 the discussion tasks were related to the use of equipment for patient assessment in different situations. Examples are given below.

> If a 12 lead is so important when making a diagnosis of aberrancy why don't we have them on the ambulance? How can I make a differential diagnosis without a 12 lead?

In week 5 students were asked to comment on their decision making process in various patient situations in prehospital care. An example is:

> My patient has chest pain that is not typical, they look well, but have an ambivalent family history. Can I base my recommendation on transport on the ECG? Why? My patient had ST segment elevation in leads II & III while in our care but the hospital shows normal sinus rhythm. Why?

In week 7 the students were given ideas of application of an instrument used by a patient and its implications in medical science and then asked to comment on given tasks. Examples are:

> How can I tell if my patient has a pacemaker that is failing to capture? Why left side down preferred for emergent treatment of a pacemaker that is failing to capture or sense rather than the right?

The discussion questions for week 9 were about the drug administration regimens, drug interactions, the language used to describe prescription medications, and effect of some specific drugs in patient treatment. Examples are:

> A man drinks 3 x 285 ml glasses of full strength beers and three 'nips' (30ml) of scotch over a period of three hours. At the end of the three hours, what would be his expected blood alcohol level? For each of the drug groups (TCAs, SSRIs, and NSRIs), state an example generic agent and its trade name.

In week 10 students were asked to read two given articles relevant to use of some drugs and comment on different aspects, for example:

> Comment on the speed and appropriateness in which evidence presented in the literature translates to altered practices within your local service, particularly in the area of antidysrhythmic drug therapy.

The above discussion tasks were about the use of different equipment for patient assessment, interpretation of the results of patient assessment, use of drugs for patient treatment in different situations and decision making in prehospital settings. The tasks for the first year subject Professional Basis of Paramedic Practice 1 were also relevant to the principles of intervention for acutely ill or injured person in prehospital settings. The discussion tasks for Issues in Prehospital Health Service Delivery were about various key concepts (medical dominance, professionalism) relevant to the role of paramedic practice in health service delivery. Examples of the lecture notes and the discussion tasks for each subject can be found in Appendix A.

Examples of the discussion tasks from second year subject Prehospital Ethical and Legal Issues are presented. In week 1, students were introduced to different laws relevant to ambulance service. One of the discussion tasks for this week was:

> Who do you think of when you hear the term "rescuer"? Eburn (author of the book) may be talking about the average neighbor who jumps the fence and smears butter over a burn victim's severely burnt back after a lawn mower explodes. What if a trained Ambulance Paramedic (AP) treated the victim in this way?

Similarly, in week 3 the students were asked to read three articles, for example the case of 'The South Australian Ambulance Transport Incorporated v Wahleim' and then comment in the discussion list on a number of tasks. One of the tasks was:

> Would the average ambulance office realize the extent to which an incident, spanning a matter of seconds in time, can be dissected and examined so carefully?

In week 4 referring to the 'Medical Treatment Act 1988' the students were asked to comment on:

> In circumstances where an ambulance officer holds a professional opinion, should that ambulance officer obey a refusal of treatment certificate?

In week 5, the discussion tasks were on the topic 'Negligence and Vicarious Liability' related to the legal responsibilities of paramedics to perform their duties in prehospital patient care. Example of a task is:

> Is there a duty to inform the patient that his symptoms may be a precursor to a heart attack? If there is a duty, what steps would the ambulance officers have to take in order to discharge that duty to the requisite standard of care?

The discussion tasks for the Prehospital and Ethical and Legal Issues were relevant to various aspects of ethical and legal decisions and their implications in the area of paramedic practice.

Examples are also given from the second year subject Research in Paramedic Practice. In week 1, students were asked to read a number of articles and develop three qualitative and three quantitative research questions relevant to paramedic practice. For each question students were asked to write:

> What you are trying to find out, why you would like to know this, where would this research be presented, and what values have led you to ask this research questions.

In week 2 the students were given ideas on the topic research proposal and literature review, and two scenarios relevant to paramedic practice. The discussion tasks on these issues were:

> Find two articles that would help you research one of the two scenarios at the beginning of this lesson. After reading these articles develop a research question to help solve the issues outlined in the scenario. What type of research method do you think you would use and why? What level of research question is this, use the table taken from Depoy and Giltin to answer this.

In week 3, the topic was the scientific approach to research and its characteristics. Students were given references to a number of articles and then asked to review a specific article relevant to paramedic research. The tasks for the week were:

> In what ways does this article reflect the strengths and weaknesses of the scientific method? What research strategies have been utilized? Do you think the sampling techniques are valid? Are there any issues of control, or internal and external validity that arise?

In week 5 students were introduced to statistical analysis techniques and then asked to calculate different statistical measures from a given set of data relevant to paramedic research. Examples of the tasks are:

> Work out mean, mode, and median for each type of vehicle. Do this twice using age in one set of scores and kilometers in the next. Write three or four lines on which piece of data is the most useful and why.

The tasks for week 6 discussion were also on the use of statistical techniques in research, for example normal distribution, z scores, probability, sampling and statistical significance. For the remaining weeks in the semester tasks were related to various research methods and techniques and their application in the area of paramedic practice. In week 9 students were asked to read articles relevant to qualitative research methods. Examples of discussion tasks for week 9 are:

> What social processes are unique to paramedic practice? Have they been described? Try databases and the net, see what you find, comment on the nature of the literature you find. By describing such processes can we establish the nature of paramedic practice? Discuss the political processes at work in paramedic research and practice.

The discussion tasks for Research in Paramedic Practice were relevant to research methods and techniques, their application within paramedic practice, and the ways in which the application could be facilitated.

The above examples of the discussion tasks present the ideas given in the task and how it was related to the paramedic practice in relation to each subject. More detailed data of the nature of the task and the messages posted on specific tasks will be presented in chapter 7.

5.2.3 Supporting Discussion

The teachers observed the message posting of students and contributed in discussion. They posted different numbers of messages in different subjects as shown in Table 5.2.

Table 5.2

Messages posted by the teachers in online discussion

Subject	Year level	Total number of messages posted
PBPP1	First year	25
IPHSD	First year	21
PBPP2	First year	37
PELI	Second year	52
RPP	Second year	141

The teacher for Research in Paramedic Practice not only posted the highest number of messages but posted more messages than the teachers in the other four subjects combined. The teachers posted messages in the same weeks where students posted their message. In Research in Paramedic Practice the teacher responded to every student when they posted messages in response to the given task. However, in the other four subjects the teachers did not respond to every student's message. In these classes the teacher responded to the whole class or sometimes to specific students. Examples of these two kinds of teachers' support in interaction are given from the first year subject Professional Basis of Paramedic Practice 2, and the second year subject Research in Paramedic Practice below.

In week 1 of Professional Basis of Paramedic Practice 2 students posted messages (Figure 5.1) on the discussion task 'If a rhythm is irregularly irregular is it always AF?'

Message	Student 1039	Student 1049	Student 1043	Teacher
Message 1	To discussion task			
Message 2		To student 1039		
Message 3			To student 1049 & 1039	
Message 4	To student 1043			
Message 5				On previous discussion between students 1039, 1049 & 1043

Note. The discussion continued further between students.

Figure 5.1 Teacher's contribution during students' discussion in Professional Basis of Paramedic Practice 2 in week 2.

Figure 5.1 shows that the students posted messages on the task and responded to each other, and that the teacher posted a message during students' interaction but did not respond to every student. This pattern of teachers' support in interaction was similar to other first and second year subjects. Exceptionally, for a few weeks in Professional Basis of Paramedic Practice 2, the teacher posted messages at the beginning of the week before the students to summarize previous weeks discussion or to stimulate students to respond to the task in the current week.

In week 1 of Research in Paramedic Practice, students were asked to read a number of research articles and develop three qualitative and three quantitative research questions relevant to their paramedic practice. The teacher's contribution is shown in Figure 5.2.

Figure 5.2 shows that the students posted messages in relation to the task and the teacher responded to every student who posted a message.

Message	Student 2003	Teacher	Student 2036	Student 2024
Message 1	To the task			
Message 2		To student 2003		
Message 3			To the task	
Message 4		To student 2036		
Message 5				To the task
Message 6		To student 2024		

Note. The discussion continued further

Figure 5.2 Teacher's contribution in discussion in Research in Paramedic Practice in week 1.

The successive messages posted by the teacher every week in Research in Paramedic Practice, and Professional Basis of Paramedic Practice is given in Appendix B. In chapter 6 it will be shown that in Research in Paramedic Practice class few interactions occurred between students themselves while in other classes interactions occurred mainly between fellow students.

Since the interaction in each class was observed, examples of teachers' messages are given from Professional Basis of Paramedic Practice 2 (PBPP2) and Research in Paramedic Practice (RPP). At the beginning of week 2 the teacher posted following message to the group for PBPP2 subject.

Hi group,
Well congratulations, you made it to week 2 – Electrocardiography component. By now you should be able to methodically scrutinise 12 lead ECG's and calculate vectors in your sleep...not. Never mind, with practice it will lock itself into place and the thrill of competently analysing a 12 lead in the emerg dept will make it all worthwhile.
Note the emphasis on the words methodical and competent. Cowboys rush in and shoot from the hip, often making incorrect and foolishly embarrassing mistakes in the process. The give away sign of the true professional is watching him/her keep their mouth shut whilst using their own special investigative technique in analysing the various components of an ECG. Remember, not all that's elevated is infarction and not all that's wide is VT. The moral – don't rush.
Now on to week 2 – dysrhythmias of atrial and juntional origin. Please be encouraged to participate on the discussion page with particular relevance to the discussion questions written into the week 2 course notes. As always, feel free to message me with any queries you may have or any difficulties you are having trouble coming to grips with.
Regards,

In above message the teacher summarized the previous week's discussion, thanked students for their interaction and encouraged students to participate further in discussion.

An example of a teacher's message in Research in Paramedic Practice class is given below. In week 1 the teacher responded to a student:

Student,
What is wrong with the subject matter? An excellent area for research and your questions etc are right on the mark. I think your last qualitative would be better as a quantitative. Welcome and good stuff.

The message from the teacher indicates an attempt to guide the student and appreciation for responding to the task. The teacher's message also acknowledged the high quality of the student's message and that he/she understood the task and provided the correct answer.

5.2.4 Teachers' Views of Providing Support in Discussion

The teachers observed students' interactions with a view to supporting students' discussion on the task. They said that their intention was to further involve students in online interaction and help them to understand the topic. For example teacher B (TI1, April 2000) said:

> *I need to get them online first. Once they are online we can then start asking questions. Then we can go to the next level and make them more involved.*

The teachers reported that they guided interaction by some strategies such as asking questions of the students or focusing students attention on the content of the task. They indicated aspects that students did not consider in their messages. In this way they helped them to further discuss issues related to the content of the topic. They also encouraged students to post more messages. Teacher D (TI1, April 2000) explained:

> *I like to act as a catalyst and, to start an argument. Then as I go through and see what students say, if I see that a student may be on the right track, then I pose a question to that student. It indicates something that the student hasn't thought about and may also draw in other students. If I see that the argument is logical and using the concepts they develop through the course, then I let the students themselves argue with each other, because they have a respect for each other as professionals.*

The above view of teacher D indicates here that he left the students to interact on tasks, observing their discussion and providing support where necessary.

5.2.5 Summary

The teachers reported that they designed tasks for online discussion relevant to students' professional duties and supported them in the discussion. The examples of the discussion tasks that were presented show that these tasks were directly relevant to students' professional practice in all but one subject. Even though the tasks were relevant for the students the teachers did not frame the questions in such a way that required students to describe, report or reflect on their professional practice or

experiences from their work place. Some tasks, however provided students with an opportunity to share their professional experience. In four subjects (three first year and one second year) the teacher provided support in students' interaction but did not respond to every student. The teachers also differed in the number of messages they posted. In Research in Paramedic Practice where the tasks were mainly based on research methods and their application to paramedic research the teacher responded to every student who posted a message. He posted more messages than the teachers in the other four classes combined. The teachers provided support in discussion when the students posted messages.

5.3 Teachers' Views of Peer Group Interaction

This section examines how far teachers were successful in promoting interaction to achieve course goals. The goals for the course, perceptions of interaction between students and the number of messages posted by students are included in this section.

5.3.1 Goals for the Course

There are the official goals of the course as per Faculty Handbook (2000), teachers' goals for each subject derived from interview, and students' goals for the course as derived from SQ1. The Faculty Handbook (2000) defined the goals of the course as:

- providing a route to a degree qualification in paramedic practice for professionals who currently hold an associate diploma, diploma or equivalent;
- enhancing the knowledge base and ability of paramedics enabling them to function more effectively and introducing current developments in paramedic practice and their implications;
- developing the use of problem solving techniques in the planning and implementation of prehospital emergency care; and
- developing research skills relevant to students professional practice.

In interview teachers reporting on different subjects, described the specific goals they had for each. The teacher for Prehospital Ethical and Legal Issues stated the goals for that subject as:

> *As per my understanding over this is to give paramedics a broader understanding in what they do as far as ethics is concerned, and helping them to understand the decision-making process within the law in prehospital settings.*

In relation to the goals for Professional Basis of Paramedic Practice 1, the teacher explained:

> *It would be to enhance students' understanding of evaluating a patient, assessing patient, and incorporating new methods of assessment.*

Students' goals for undertaking the course that they reported in response to SQ1 were to: (i) develop themselves professionally and personally, (ii) complete a postgraduate course (iii) enhance knowledge, skills, and experience in the area of paramedic practice, and (iv) get a chance of promotion.

In summary, the goals that the teachers expected to achieve through this course were in providing understanding of the overall professional practices so that the students were able to understand their duties in particular situations, and to upgrade students' knowledge and understanding in their current paramedic practices. These goals are aligned with the official goals set out for the course. The goals reported by students' are also consistent with these goals but they had other goals too which were related to their personal career.

5.3.2 Perceptions of Interaction between Students

All of the teachers' who participated in TI2 and TI3 had positive perceptions of the nature of students' interaction. Their view was that online discussion provided students with the opportunity of sharing their experience, and that while responding to the weekly discussion task the students drew on past experience to present their ideas on them.

In relation to sharing experience, teacher B said:

> *I have discussion questions in the lecture, the students go through the lecture and then post messages using past experience, and they stimulate themselves.*

As a professional group most of the teachers (5) perceived that the students responded to their fellow students, and argued with them and answered their enquiries. Teacher D explained:

> *They usually make statements from experience and ideas and answer to each other. When an experienced professional gives an opinion, another experienced may disagree for one reason or another. They justify their opinion and they justify what arguments they put up with reference to ethical principle or legal principle. As they argue with each other, they develop. So they develop each other's understanding.*

Teacher B stated that while discussing various aspects of paramedic practice the students presented new ideas and concepts that provided insights for the decision-making processes in a particular situation:

> *When the experienced people from Australia and overseas countries discussing new concepts and why these concepts relate to what they do on a day to day basis, then as they discuss - these things are introducing new concepts or ideas.*

Teacher F had a similar view. He claimed that because of the nature of the students' profession they help each other during topic discussion. This process enhanced students' understanding.

> *Through the process of reading, responding and discussing, they see things from a number of different perspectives. Initially they may have their own view, having the number of different views enhance the understanding of the situation.*

To illustrate the ways in which students responded to the tasks and sharing professional experience following example is provided from Professional Basis of Paramedic Practice 2. In week 1, one of the first year students responded to the task 'Why is the

determination of cardiac axis important in ECG interpretation, surely it is just an academic exercise?'

> *ECG Interpretation:*
> *In the past I have used the "that looks like.." method of interpretation of ECG's and endured the subsequent ridicule of those in the know despite reading the advice of the many ECG texts as to be methodical with your analysis. I have put together a prompt card that reminds me of ALL the steps involved in assessment and this has been more accurate in my assessment.*

The message also reflects that the students understood the task and the ideas presented were relevant to the content of the task.

An example from Professional Basis of Paramedic Practice 2 (week 9) illustrates how students shared experience to respond to each other on 'the use of Neurological drugs (narcotics, antidepressants and alcohol) and their effects'.

> *Student 1038:*
> *And just a recent dilemma I found myself in and thought I'd run by some of you. Pt herion OD staggered onto roadway was struck by car. Respiratory depression was evident, however considering the injuries the patient did not really have much in the way of pain (funny that). Here's the dilemma, do I treat the respiratory depression and block the opiate receptors, or do I bag her to hospital and leave her largely pain free. I know what I did and it has caused some discussion, would like some more opinions if you wouldn't mind.*
> *Regards,*

> *Student 1039 to student 1038:*
> *Whilst, you haven't indicated what actual injuries the patient had I'm guessing by the fact that "despite the injuries she had she didn't have much pain" she probably had significant injuries. In this case I would not have given her narcan unless I was unable to control her ventilation and airway adequately without it. My reasons for this would be that firstly, give her narcan and she is probably going to get pain (heroin is a much more potent analgesic than morphine), secondly if she were to require intubation and mechanical ventilation then the two drugs given to facilitate this pre-hospitally are morphine and midazolam.*
> *So I think that in general I would not give trauma patients narcan. In this case I would even prefer to intubate/LMA and ventilate than wake them up.*

These two messages between students indicate exchange of views on the task when they referred to their professional experience. Through responding to a fellow student's inquiry, student 1039 provided new ideas relevant to the task and justification of answers that indicates positive understanding of the task. This may indicate a deep approach to learning.

The teachers believed that discussion between fellow students of various backgrounds, some of whom were highly motivated, promoted broader understanding of the overall professional practices. This helped the students' understanding of their duties in particular situations and enhanced their decision-making processes. The teachers also believed that information and skills that students gained from peer discussion would help them to perform their job better. In these ways participant in online discussion was likely to develop students both personally and professionally.

5.3.3 Number of Messages Posted by Students

The teachers commented on the frequency of interaction, number of students who posted messages in each subject, the reasons for low participation in each subject, and the overall quality of messages.

Table 5.3 shows for each subject the number of messages posted by all students who enrolled in the first year of the Bachelor of Health Science- Paramedic course together with the mean, standard deviation and range.

An average of two messages per student were posted by 35 students in each of the two subjects in semester 1 and an average of four messages per students were posted by 34 students enrolled in semester 2 (Table 5.3 below). Some students posted no messages for each subject and the range of messages posted indicates some students posted a large number of messages (up to 36 in one subject).

Table 5.3

Number of online messages posted by first year students

Subject	Number of students enrolled	Number of students who posted messages	Number of messages posted	Mean	Range	SD
PBPP1	35	13	78	2.2	0-13	3.8
IPHSD	35	18	71	2.0	0-12	3.0
PBPP2	34	22	154	4.5	0-36	8.53

Identical data for second year students is shown in Table 5.4.

Table 5.4

Number of online messages posted by second year students

Subject	Number of students enrolled	Number of student who posted messages	Number of message posted	Mean	Range	SD
PELI	34	27	132	3.9	0-16	4.1
RPP	35	27	139	4.0	0-19	4.1

An average of four messages per student were posted by the second year students in each of two subjects but some students posted no messages in either subject. Similar to the first year subjects the range indicates that a small number of students posted a high number of messages (up to 19) in each of the two subjects. In both first year and second year subjects the average number of messages posted was low.

The evidence showed that most students posted no or relatively few messages. In interview the teachers acknowledged that this was disappointing, though participation was higher than in the previous year. Amongst the suggestions made for increasing message posting were:

- discussion should be compulsory for several weeks (2 teachers)
- marks for discussion should be tried (3 teachers)

- more attention required for designing discussion tasks (2 teachers)

In relation to promoting interaction teacher C said:

> *There are lots of students who are not participating in online discussion. We have to say why? And beyond that what can we do to get more in, there are strategies we can implement to get people.*

The reasons given by the teachers for low level of interaction and the number of students posted messages were (i) the discussion is not compulsory for the students (teacher D) and (ii) small number of students had lack of knowledge of computers (teachers B and C).

The teachers gave reasons for non-participation. One of them viewed that the students who did not post messages observed other's messages and that covered everything that they wanted to say. One teacher felt that the students were not very comfortable using the *TopClass* because they lacked computer skills. Another argued that the students spent most time on their assignments and examinations towards the end of semester and eventually the message posting frequency dropped over the semester.

However, the teachers were happy with the quality of students' messages. They reported that most messages from students possessed high quality, in that they were self-explanatory and provided potential for the acquisition of knowledge by others.

Examples of messages from a student and the teacher are given from Research in Paramedic Practice (Figure 5.3) to show how the teacher acknowledged students' messages for their quality.

The examples of messages (Figure 5.3 below) were given from week 3 where the students were asked to review an article and to answer the tasks: (i) In what ways does the article reflect the strengths and weaknesses of the scientific method? (ii) What research strategies have been utilized? (iii) Do you think the sampling techniques are valid? (iv) Are there any issues of control, or internal and external validity that arise?

The teacher's response to the student shows that he appreciated the student's answer, valued the ideas, and praised its quality. The teacher's comments also indicate that the student understood the task.

Student 2031: According to Polgar and Thomas [1] the scientific method of research requires the systematic "justification of particular theories or practices" through experimentation and qualification which has been used by Dickson and Roberts [2] in the reviewed article. The strengths of the article supporting the scientific method include the selection of controlled randomised trials to ascertain the effectiveness of MAST and the measurable outcomes. Weaknesses include the population selected was broad in that all trauma patients, except extremity trauma was included in the selected trials. This did not allow for the identification of patients that may benefit from MAST, there was also the potential for bias. The sampling techniques while valid may have limited the extent of the available data, thereby reducing the accuracy of the information analysed. The authors resolved conflict as to the inclusion data through "discussion" which could hardly is seen as scientific.
There are a number of issues relating to the control and internal and external validity of the data, and final conclusion;
1. there was quantification of the results;
2. whilst the population to be studied was selected it is broad and may be influenced by a number of potential variables including injury severity which could have been different between the control and non control groups;
3. at least two Subgroups were identified blunt vs. penetrating trauma but these were not separated for the purpose of data analysis;
4. patients were randomly allocated to a control group;
5. dependent variables were used, in this case it was the application of the MAST;
6. independent variables included the outcome measurements of mortality, length of stay in hospital, and length of stay in Intensive Care;
7. the question of the validity of the original research also has to be questioned
8. there was the potential for bias in the methodology used.
1. Polgar S., Thomas SA., 1998. Introduction to Research in the Health Sciences. 3 ed. Churchill Livingstone: Melbourne.

Teacher to student 2031: An excellent response. I particularly liked your point about the breadth of the population confusing or excluding those who may have benefited from mast Your point on discussion as not scientific is valid, I feel in this instance. Thanks for the posting

Figure 5.3 Teacher's response to student's quality of message posted.

5.3.4 Summary

The common goals for four subjects was to enhance knowledge and understanding of students in their current professional practice, and to help them in the decision making process in all situations. In contrast, the goal for Research in Paramedic Practice was to develop students' ability to conduct research in their paramedic area. The view of teachers was that interaction between fellow students, and the quality of interaction promoted achievement of the course goals. Examples of students' messages presented show that the ideas presented helped students to acquire new knowledge and the teachers' messages acknowledged the quality of messages posted. They also claimed

that the number of messages posted was higher than in the previous year. However the teachers felt that some strategies might enhance message posting.

5.4 Conclusion

Several aspects have been illuminated from the data presented in this chapter viz. students' expectations to participate in posting messages in discussion, the teacher's role in designing the task set and supporting discussion and their view of achievement of the course goals. The results presented also raise questions for further research and a few unresolved issues to be discussed in the following chapters.

In designing the tasks set for students to respond to the teachers claimed that they tried to make it interesting, and easy for students, and relevant to paramedic practice to engage students in discussion. It is known that the overall message posting was low in each subject but the number of messages were posted in each week's discussion in relation to the task is not clear yet. It is also known that students were given several discussion tasks in every week in each subject but how many of the tasks were responded to by the students or how many messages were posted on a specific task is not clear yet. These issues will be discussed in chapter 6 and 7. The teachers differed in the way that they supported discussion. In four subjects teachers left the students to respond to the task and to their fellow students and they contributed support to the whole group in the class. This indicates that they encouraged students' message posting on the task and viewed the peer group as a resource for themselves. In one subject (Research in Paramedic Practice) the teacher responded to every student in the class. This shows that the teacher encouraged message posting but not with each other. He guided students to understand the topic. The way that teachers differed in their role of providing support online raises the question of why they differed in the way that they did. Another aspect of teachers' behavior in relation to the support in discussion was that the teachers did not post any messages or make clarifications of the tasks when the students posted no messages.

In relation to the achievement of the course goals the teachers claimed that the number of messages posted was higher than in the previous year. But no evidence was produced. They also claimed that (i) students responded to each other's messages, and that (ii) the quality of message posting also promoted the achievement of the course goals. The data of individual student message posting is yet to be presented.

Students had a range of expectation to post messages in online discussion. Very few were highly motivated to participate in online discussion. Some said that they were moderately likely to participate, some said that they were not likely to participate, and a few were not sure. As yet no data has been presented to show how many of them presented messages and what was the level of their message posting in relation to their willingness.

Chapter 6 will address some of the unresolved issues mentioned above. These include students' message posting in weekly discussion, the number of messages posted by the students, and a comparison between expectations of message posting and actual behavior in message posting.

CHAPTER 6
ONLINE PARTICIPATION AND ACADEMIC PERFORMANCE

In chapter 5 it was shown that the teachers provide weekly discussion tasks for the students to post messages about and that they differed in their role to support online discussion. This chapter will focus on the messages that students posted in response to the discussion tasks by the teachers in each subject. It will provide quantitative evidence to answer research questions RQ3 'how do participants individually respond to the task set in online discussion?' and RQ4 'how is students' online participation related to their academic performance?' The results of students' online participation are interpreted on the basis of group behavior in a class and across all classes. The results presented in this section will also address some of the unresolved issues raised in the previous chapter in relation to students' message posting, and students' expectations of message posting and the actual number of messages that they posted.

This chapter contains four sections. Section 1 includes the descriptive results of the frequency of online interactions in relation to the task set and the number of students who contributed to discussion. The frequency and pattern of online participation of individual students is included in section 2. This section also presents the data to compare students' expectation of message posting and their behavior in message posting. The pattern of study that the selected group students spent to perform online and offline academic activities (posting message, doing assignment and examination) and the relationship between weekly study hours and academic performance are shown in section 3. The last section concerns the relationship between online participation and academic performance. This section also presents the rank correlation between teachers' perceptions of students' online participation and academic performance.

6.1 Frequency of Messages Posted in Relation to Discussion Task

Students' message posting took place in the discussion list of the *TopClass*. The total number of messages posted by the students in each subject and the descriptive statistics

were presented in chapter 5. This section presents the frequency of messages posted each week and the number of students who contributed these messages.

The researcher monitored the students' online message posting in the discussion list in semesters 1 and 2 of year 2000. This included counting online messages, recording the number of messages posted by each student, and observing the pattern of their interactions. A 'message' was defined as any posting in the discussion list regardless of length, and content of message. The frequency of messages posted by students was listed against each student for each subject. First year students studied two subjects in semester 1 and one subject in semester 2. Second year students studied one subject in semester 1 and one subject in semester 2. The number of messages posted by the students in each week for a 13 week period in response to the discussion task for each subject was counted. The number of students who posted messages in each week for each subject was also counted. The *TopClass* system did not provide the frequency of messages in each week in each section automatically. The frequency of messages posted by the first year and second year students in response to the weekly discussion tasks, and the number of students involved is discussed below.

6.1.1 Frequency of Messages Posted by First Year Students

First year students studied Professional Basis of Paramedic Practice 1 (PBPP1) and Issues in Prehospital Health Service Delivery (IPHSD) in semester 1, and Professional Basis of Paramedic Practice 2 (PBPP2) in semester 2. The number of messages posted by the first year students in these three subjects in weekly discussion is shown in Tables 6.1, 6.2, and 6.3.

A total of 78 messages were posted for Professional Basis of Paramedic Practice 1, over the 13 week period (Table 6.1 below). Almost 2 in 3 of these messages were posted in the first four weeks of the class and one third in the rest of the semester. Table 6.1 shows that very few students posted messages in most weeks' discussion and no-one contributed in some weeks' discussion. The highest participation rate was 26.0% in week 1.

Table 6.1

Number and percentage of first year students in Professional Basis of Paramedic Practice 1 who posted a message each week

Week	Number of students (35) who posted a message	Percent (%) of all students enrolled	Number of messages posted by students	Percent of all messages
1	9	25.7	22	28.2
2	1	2.8	2	2.6
3	5	14.3	7	9.0
4	8	22.8	16	20.5
5	4	11.4	7	9.0
6	1	2.8	1	1.3
7	4	11.4	6	7.7
8	2	5.7	4	5.1
9	2	5.7	3	3.8
10	0	0	0	0
11	1	2.8	1	1.3
12	3	8.6	9	11.5
13	0	0	0	0
Total			78	100%

In Issues in Prehospital Health Service Delivery, a smaller number of messages were posted than for the other two subjects and the distribution was even more heavily weighted to the early part of the course (Table 6.2 below). In fact no messages were posted in the final six weeks of the semester. A higher proportion of students contributed in the first two weeks (57.0% and 31.0%) than for Professional Basis of Paramedic Practice 1. Students were not inclined to post messages in the following weeks.

Table 6.2

Number and percentage of first year students in Issues in Prehospital Health Service Delivery who posted a message each week

Week	Number of students (35) who posted a message	Percent (%) of all students enrolled	Number of messages posted by students	Percent of all messages
1	20	57.1	27	38.0
2	11	31.4	19	26.8
3	4	11.4	4	5.6
4	2	5.7	2	2.8
5	8	22.8	17	24.0
6	0	0	0	0
7	1	2.8	2	2.8
8	0	0	0	0
9	0	0	0	0
10	0	0	0	0
11	0	0	0	0
12	0	0	0	0
13	0	0	0	0
Total			71	100%

Among the three first year subjects the most messages (154 messages) was posted in Professional Basis of Paramedic Practice 2, and more than half of these were posted in only two weeks (week 4 and week 9) of the 13 weeks period (Table 6.3 below). A relatively large number of students (52.9% and 32.3%) participated in message posting in these two weeks. Students' participation was made compulsory for week 4 but was not assessed. Students posted no messages in response to the task in two weeks of the 13 weeks period.

Table 6.3

Number and percentage of first year students in Professional Basis of Paramedic Practice 2 who posted a message each week

Week	Number of students (34) who posted a message	Percent (%) of all students enrolled	Number of messages posted by students	Percent of all messages
1	7	20.6	21	13.6
2	8	23.5	20	13.0
3	5	14.7	7	4.5
4	18	52.9	40	26.0
5	3	8.8	3	1.9
6	4	11.8	10	6.6
7	2	5.9	4	2.6
8	2	5.9	3	1.9
9	11	32.3	42	27.4
10	2	5.9	03	1.9
11	1	2.9	1	0.6
12	0	0	0	0
13	0	0	0	0
Total			154	100%

In each of the three first year subjects most messages were posted in very few weeks of the course in response to the discussion task. Students' participation in message posting was relatively high in only a few weeks. A smaller number or no messages were posted in most weeks of both semesters. The data presented about message posting by the first year group in relation to the discussion tasks and the number of students who participated in weekly discussion indicates that the first year students made little use of the online message posting facilities available to them.

6.1.2 Frequency of Messages Posted by Second Year Students

The second year students studied Prehospital Ethical and Legal Issues (PELI) in semester 1 and Research in Paramedic Practice (RPP) in semester 2. The frequency of

messages posted in these two subjects in weekly online discussion is given in Tables 6.4 and 6.5.

Table 6.4

Number and percentage of second year students in Prehospital Ethical and Legal Issues who posted a message each week

Week	Number of students (34) who posted a message	Percent (%) of all students enrolled	Number of messages posted	Percent of all messages
1	19	55.9	34	24.8
2	12	35.3	18	13.9
3	10	29.4	17	12.4
4	10	29.4	20	16.8
5	11	32.3	18	13.9
6	6	17.6	11	8.0
7	2	5.9	2	1.5
8	4	11.8	0	0
9	3	8.8	7	5.1
10	1	2.9	4	2.9
11	1	2.9	1	0.7
12	0	0	0	0
13	0	0	0	0
Total			132	100%

A total of 132 messages were posted in Prehospital Ethical and Legal Issues. A substantial number of messages were posted by a relatively large number of students (30.0% to 56.0%) in the first five weeks of discussion while in most weeks' both the number of messages and proportion of students participating were very low.

A total of 139 messages were posted in Research in Paramedic Practice (Table 6.5 below). Similar to the other second year subject, a relatively large number of students

(31.4% to 57.1%) posted messages in the first five weeks of discussion while they contributed low levels in most weeks.

Table 6.5

Number and percentage of second year students in Research in Paramedic Practice who posted a message each week

Week	Number of students (35) who posted a message	Percent (%) of all students enrolled	Number of messages	Percent of all messages
1	20	57.1	23	16.6
2	17	48.6	19	13.7
3	12	34.3	13	9.3
4	11	31.4	14	10.1
5	17	48.6	27	19.4
6	10	28.6	13	9.3
7	8	22.8	12	8.6
8	1	2.8	1	0.7
9	4	11.4	4	2.9
10	2	5.7	3	2.2
11	6	17.1	9	6.5
12	1	2.8	1	0.7
13	0	0	0	0
Total			139	100%

The second year students posted almost the same number of messages in both subjects but they in many weeks they posted few messages on the discussion tasks. First year students posted a higher number of messages in Professional Basis of Paramedic Practice 2 compared to the other two subjects. The number of messages posted in different weeks and the number of students who participated in interaction were similar across the three first year and two second year subjects.

6.1.3 Summary

In both first year and second year subjects most messages were posted in a few weeks of both semesters. In these weeks relatively high proportions of students (the highest was 57.0%) engaged in message posting. A smaller number or no messages were posted in most weeks' discussions. Considering the number of messages posted by the students in relation to the weekly discussion tasks and the number of students involved in weekly discussion, it can be argued that the students make little use of online interaction facilities available to them. It should be noted that some of the students who participated in message posting in each subject did not complete the assignments and examinations and dropped out at different stages over these semesters. The dropout of students may explain some reduction in the number of messages, but no data were collected to show in which weeks these students withdrew.

6.2 Online Participation by Individual Students

In the previous section the frequency of messages posted by the students for the weekly discussion tasks of each subject and the number of students who contributed these messages in relation to the task set was presented. The section that follows will focus on how much the interaction opportunity is used by individual students in a particular class that is the number of messages posted by individual students in each class. This section will also show the number of messages posted by the individual student in a class to other participants (fellow students and teacher) and to the discussion task. These data will illustrate the pattern of interaction in each class.

6.2.1 Messages Posted by Students in Each Subject

At the end of each semester the total number of messages posted by every student in each subject was counted for each year level. The number of messages posted by individual students in each subject for first year and second year can be found in Appendix D.

In Professional Basis of Paramedic Practice 1, out of 35 students only 13 students (37.1%) posted a total of 78 messages but 22 students posted no messages. Five of the

students who posted messages were high contributors. These students posted most of the messages in the class. In this subject, five high contributors (code numbers 1028, 1025, 1016, 1014, and 1004) posted 53 (67.9%) of the messages in the class discussion. The highest contributors of messages were students 1014, and 1025 who posted 13 messages each, while the third highest contributor was student 1004 who posted 11 messages.

In Issue in Prehospital Health Service Delivery, out of 35 students just over half of the students (51.4%) posted a total of 71 messages while 17 students posted no messages. Once again some of these were high contributors. In this subject, six high contributors (code numbers 1031, 1017, 1016, 1014, 1009, and 1004) posted 45 (63.4%) of these messages in class discussion. The highest contributor (student 1016) posted 12 messages and the second highest contributor (student 1004) posted 10 messages.

A higher proportion of students posted messages in Professional Basis of Paramedic Practice 2. Out of 34 students, 22 (64.7%) posted a total of 154 messages while 12 students posted no messages. As for the other two first year subjects the messages were documented by a small number of high contributors. In this subject, five high contributors (code numbers 1048, 1043, 1039, 1038, and 1010) posted 112 (72.7%) of messages in class discussion. The highest contributor was student 1039 who posted 36 messages while the second highest was student1038 who posted 28 messages.

The above data of individual students' message posting show that some high contributors were common in more than one subject but others were not. An account of high contributors and low contributors between three first year subjects is given below.

The three first year students (code numbers 1016, 1014, and 1004) were high contributors in two subjects in semester 1. These high contributors did not enroll in another subject in semester 2. Among other high contributors (code numbers 11048, 1043, 1039, 1038, 1031, 1028, 1025, 1017,1010, and 1009) some of them were low contributors and some did not enroll in other subject(s).

Among the non-contributors in the three first year subjects, nine students posted no messages in two or three subjects where they enrolled. Eight students posted no messages in one or two subjects but they posted low levels of messages in another subject.

The number of messages posted by the second year students in Prehospital Ethical and Legal Issues and Research in Paramedic Practice is presented below.

In Prehospital Ethical and Legal Issues, out of 34 students 26 (76.5%) posted a total of 132 messages while seven posted no messages. In this subject, seven high contributors (code numbers 2011, 2012, 2016, 2020, 2021, 2024, and 2027) posted 74 (56.0%) of these messages in class discussion. The highest contributor was student 2020 who posted 16 messages and the second highest contributor was student 2012 who posted 12 messages.

In Research in Paramedic Practice, out of 35 students 27 (77.1%) posted a total of 139 messages while seven students posted no messages. The pattern of a small number of high contributors was also evident in this subject, though not to the same extent. In this subject, six high contributors (code numbers 2020, 2021, 2024, 2026, 2034, and 2038) posted 66 (47.70%) of these messages in class discussion. The highest contributor was student 2020 who posted 19 messages and the second highest contributor (student 2038) posted 12 messages.

In the second year group, three students (2024, 2021, and 2020) were high contributors in both subjects. Among other high contributors (code numbers 2038, 2034, 2027, 2026, 2016, 2012, and 2011) in these two subjects, some of them did not enroll in one of the two subjects and some posted relatively low levels of messages in another subject. Among the non-contributors in the second year group, four students posted no messages in one or two subjects where they enrolled. Five students posted no messages in one subject and relatively low messages in another subject.

Among the 23 high contributors in the whole group, only 6 were female and 17 were male. They had professional experience between 4 and 19 years and were aged between 27 and 40 years. Experience of all students varied between 3 and 19 years and age between 27 and 40 years. The mean professional experience of whole group and the high contributors was 8.6 years and 10.2 years respectively. The mean age for whole group was 32.4 years, and 32.9 years for the high contributors, which is very close. The average age of the whole group and the high contributors were almost the same but this was not the case for professional experience. On average high contributors had more professional experience but this difference was not large.

The data presented on messages posted by individual students in each class indicates that not all students contributed in online discussion and among those who did contribute a few were high contributors. Some high contributors maintained high contributions and some did not, and non-contributors were always non-contributors or low contributors.

6.2.2 Students' Expectations of Message Posting and Behavior in Message Posting

The data presented above indicates that the students' posted different levels of messages in each subject. Students' responses to SQ1 show that very few (nine respondents) were highly motivated to participate in online discussion. Twenty-two said that they were moderately likely to participate, 19 responded not likely to participate, and three were not sure. Amongst 53 respondents to SQ1, 27 were first year students and 26 were second year students. The following data will illustrate an overview of students' expectations of message posting and the number of message posted in each subject.

First year students' expectations of participation in message posting and the number of messages posted in three subjects at different levels are shown in Table 6.6. For the first year students the low level of message posting was considered as 0-1 message, moderate level as 2-6 messages, and high level as 7 or more. The high, moderate and low group students were selected on the basis of these levels of message posting.

Table 6.6

Expectations of message posting and actual messages posted in three first year subjects

Expectations of message posting	No of respondents	No of students who posted messages in PBPP1 between			No of students who posted messages in IPHSSD between			No of students who posted messages in PBPP2 between		
		0-1	2-6	7-13	0-1	2-6	7-12	0-1	2-6	7-14
Very likely	4	1	1	2	1	2	1	2	0	0
Moderately likely	10	5	3	2	5	2	3	3	2	
Not likely	11	8	3	0	9	2	0	5	2	1
Don't know	2	2	0	0	1	1	0	1	0	0
Total	27	16	7	4	15	7	4	11	4	1

In Professional Basis of Paramedic Practice 1 (PBPP1) the students who responded 'very likely' to post messages, were expected to post a high number of messages but one of them posted a moderate number and one posted a low number of messages. Among the students who expected to be 'moderately likely' to participate, half of them posted a low number of messages and the others posted either moderate or high level of messages. Among eleven students who expected 'not likely' to be participate, most of them posted a low number but a few posted a moderate number of messages. Message posting and expectation of message posting was consistent for two students who were not sure about their online contribution.

The frequency of messages posted was most consistent with expectations for the students who indicated that they were 'not likely' to post messages in online discussion. In general students who expected to participate (moderately likely and very likely), posted fewer messages than expected. This pattern is consistent for the other two first year subjects (Table 6.6) Issues in Prehospital Health Service Delivery (IPHSD) and Professional Basis of Paramedic Practice 2 (PBPP2).

Students' expectations of participation in message posting and the number of messages posted by second year students in two subjects at different levels are shown in Table 6.7.

Table 6.7

Expectations of message posting and actual messages posted in two second year subjects

Expectations of message posting	No of respondents	No of students who posted messages in PELI between			No of students who posted messages in RPP between		
		0-2	3-6	7-16	0-2	3-6	7-19
Very likely	5	2	1	2	0	1	2
Moderately likely	12	3	4	5	5	1	1
Not likely	8	7	1	0	2	4	0
Don't know	1	1	0	0	0	1	0
Total	26	13	6	7	7	7	3

In Prehospital Ethical and Legal Issues (PELI), among the students who were 'very likely' to post, less than half posted a high number of messages and others posted either a moderate or a low number of messages. The students who were 'moderately likely' to participate posted either a high or moderate number and a few posted a low number of messages. The eight students who did not expect to participate posted a low number and one student posted a moderate number of messages. The one student who was not sure about participation posted a low number of messages.

So in the second year subject Prehospital Ethical and Legal Issues some students posted messages at a level that might be expected. As for the first year subjects this was most consistent among students who did not expect to participate. For the Research in Paramedic Practice (RPP) (Table 6.7) there was low consistency between expectation to participate and the number of messages posted. Most students who were moderately likely to participate did not, whereas those who did expect to participate contributed at a moderate level.

6.2.3 Pattern of Online Interaction

This part of the discussion is focused on to whom the students addressed their messages in each class and how many times, and to what extent a particular class was interactive. The data presented will illustrate the pattern of students' interaction in this online situation.

It was mentioned earlier in this section that while observing students' online interaction the number of messages posted by individual students for each subject were counted. Simultaneously the number of messages posted by each individual student in response to other participants or the task set in each class was also counted. These data can be found in Appendix H. It was found that the students posted messages in response to:

- the discussion task,
- fellow students, or
- teacher.

These three patterns of message posting (online interaction) were the same for all three first year subjects and the two second year subjects. When the students posted messages on the task set normally they addressed other participants in the class, for example "Hi all". This indicates that in this electronic communication they thought other participants in the class were aware of their messages and were listening to them as in a face-to-face situation. When they responded to other participants they addressed that particular participant that is the student or the teacher.

The number of messages posted by the first year students in three classes in response to the discussion task, fellow students, and teachers are presented below. The total number of messages posted by first year students in response to the task set, the fellow student, and teacher in each class is shown in Table 6.8.

Table 6.8

Frequency of messages posted by first year students to the discussion task, fellow students, and teacher

Pattern of online interaction	PBPP1		IPHSD		PBPP2	
	N	%	N	%	N	%
Responding to discussion task	52	66.6	41	57.8	88	57.1
Responding to fellow student	21	27.0	25	35.2	61	39.6
Responding to teacher	5	6.4	5	7.0	5	3.3
Total	78	100	71	100	154	100

In the first year subjects interaction between fellow students was highest in Professional Basis of Paramedic Practice 2 and lowest in Professional Basis of Paramedic Practice 1. In each class students posted most messages in response to the task set while very few messages were posted in response to the teacher. It was shown in Chapter 5 that the teachers posted a relatively small number of messages in each of the three first year subjects. In these three first year subjects twenty-seven to forty percent of the interactions took place between students themselves indicating that they responded to each other's messages.

The number of messages posted by the second year students' in two classes in response to the discussion task, fellow students, and teachers are presented below (Table 6.9).

Table 6.9

Frequency of messages posted by second year students to the discussion task, fellow students, and teacher

Pattern of online interaction	PELI		RPP	
	N	%	N	%
Responding to discussion task	85	64.4	118	84.9
Responding to fellow student	39	29.5	15	10.8
Responding to teacher	8	6.1	6	4.3
Total	132	100	139	100

Table 6.9 shows that in Prehospital Ethical and Legal Issues more interactions (39 messages) occurred between fellow students than in Research in Paramedic Practice in which only a few (10 messages) interactions took place between fellow students compared with the messages posted in response to the discussion task. In both classes students posted only a small number of messages to their teachers. It was shown in chapter 5 that the teacher for Prehospital Ethical and Legal Issues posted 52 messages in class discussion and the teacher for Research in Paramedic Practice posted 141 messages in the class, which was almost equal to the number of messages posted by the students. While observing online interaction and counting messages it was found that the teacher responded to every student in Research in Paramedic Practice (Appendix B).

So in Prehospital Ethical and Legal Issues class, students responded to each other's messages at a similar rate to the first year subjects. However in the Research in Paramedic Practice students posted messages to the teacher's task and the teacher responded to them. The behavior of students in this subject, indicates that they did not value responding to other students for learning the research methods used in paramedic practice.

6.2.4 Summary

In each of the subjects in the course, there were a small number of students who posted the majority of messages. The students who expected to be high contributors were not consistent in their frequency of message posting across each of the subjects in which they were enrolled. The high number of non-contributing students was, however consistent in that they tended to not expect to participate and were non-contributors or low contributors in each of the subjects in which they were enrolled. The pattern of contribution for those who were high contributors in at least one subject indicates that students' messages posting was influenced by some other aspects viz. nature of the task, teachers' support and students' contribution in discussion during the semesters. Other factors may also have influenced the non-contributing students in terms of their expectations to contribute and their subsequent non-participation.

When posting messages students responded to the task set, their fellow students and the teacher. In three first year classes and one of the two second year subjects students posted about one-third of messages to their fellow students. In Research in Paramedic Practice students responded to the teacher's task and the teacher responded to them.

6.3 Study Hours and Relationship with Online Interaction and Academic Performance

In this section the hours spent by the students in the selected groups to perform online and offline academic activities as a whole viz. online message posting, assignment, and examination are presented. This section will also show the relationship between average weekly study hours and online participation and academic performance for the selected group students.

6.3.1 Hours of Study of Selected Students

Students were asked to record diary information from week 3 to week 13. All students recorded the diary information from week 4 to week 12. Some of them were not able to record for the week 3 and week 13. The average hours of study per week of individual student in the high, moderate, and low group and the group mean and standard deviation are shown in Table 6.10.

The average number of study hours for the high and moderate groups were higher than for the low group (Table 6.10 below). However, the standard deviation of study hours of low group indicated that there was a large variation in weekly study hours of low group members compared to the high and moderate groups. The group mean value of high and moderate group was very close but the standard deviation was higher for the high group indicating a larger variation in weekly study hours. The highest number of study hours (28.3) was spent by a high group student and second highest (27.0) by a low group student. The lowest number of hours was spent by a low group student in week 4 when he/she studied nothing and the second lowest hours was 8.0 spent by a high group student in week 5. The data of study hours indicates that the students spend different amount of time studying in different weeks.

Table 6.10

Weekly hours of study of selected group students and their group mean, SD, and range

Week	High group (student code)			Moderate group (student code)			Low group (student code)		
	2013	2020	2021	1008	1009	1010	2008	2009	2031
Week 3	21.0	20.0	-	-	-	-	15.0	-	-
Week 4	18.0	20.0	10.0	16.0	17.0	15.0	.0	10.3	11.0
Week 5	21.0	18.0	8.0	14.3	15.0	14.0	16.0	12.0	8.3
Week 6	18.3	24.0	14.0	18.0	12.0	15.0	12.0	11.3	7.3
Week 7	16.3	19.0	12.0	20.0	15.0	17.0	14.3	10.0	11.0
Week 8	20.3	21.0	15.0	18.3	15.3	16.0	22.0	11.0	8.0
Week 9	22.0	20.0	17.5	17.3	14.3	18.0	18.0	16.0	10.0
Week 10	21.0	23.0	18.0	19.0	15.0	20.0	20.0	18.5	11.0
Week 11	22.0	27.0	20.0	21.0	19.0	22.0	22.0	20.0	11.5
Week 12	25.0	28.3	21.0	24.0	20.0	25.0	23.0	23.0	13.0
Week 13	26.0	-	-	25.0	23.0	-	27.0	-	-
Maximum	**26.0**	**28.3**	**21.0**	**25.0**	**23.0**	**25.0**	**27.0**	**23.0**	**13.0**
Minimum	**16.3**	**18.0**	**8.0**	**14.3**	**12.0**	**14.0**	**0.0**	**10.0**	**8.0**
Mean	**21.0**	**22.0**	**15.0**	**19.3**	**16.6**	**18.0**	**17.2**	**14.6**	**10.1**
Group mean		**19.3**			**18.0**			**14.0**	
SD		**4.6**			**3.5**			**5.9**	
Range		**20.3**			**13.0**			**27.0**	

Note. Dashes indicate that the students did not complete diary for that week

6.3.2 Pattern of Study of High, Moderate, and Low Group

The three high group members were second year students. The study pattern of each individual student in the high group is shown in Figure 6.1. The code numbers given by the researcher indicates the three students.

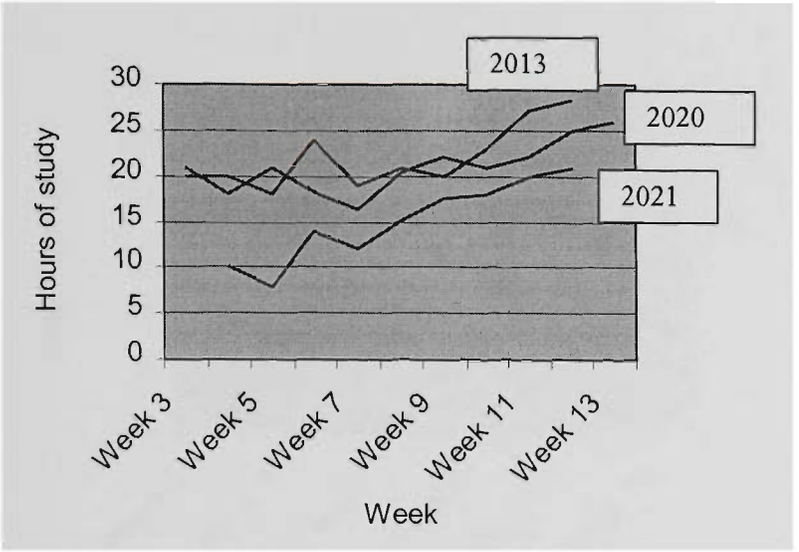

Figure 6.1 Study pattern of each individual in the high group.

Figure 6.1 shows that the three high group students had the similar patterns of study. Study hours of student '2013' were higher in the second half than in first half of the semester. Starting from week 3 the hours of study fluctuated until the week 9 and then continued increasing until the end of the semester. Student '2020' had a similar pattern of weekly hours and was very close to student '2013'. Student '2021' had a similar pattern of study but the weekly hours of study were lower than for the other two students in this group. The hours of study of this student (2021) fluctuated in the first half of the semester and then continued increasing steadily until the end of the semester.

The three moderate group members were first year students. The study pattern of each individual student in the moderate group is shown in Figure 6.2. The code numbers given by the researcher indicates the three students.

Figure 6.2 (below) shows that the three moderate group students also had similar patterns of study. Study hours of student '1008' were higher for the second half than for the first half of the semester. Student '1009' had a similar pattern of study but the weekly hours of study were higher at the beginning of the semester and lower at the end compared to the other two students in this group. Student '1010' followed a similar pattern. The number of weekly hours of study was very close to those of student '1008' especially in the weeks closer to the beginning and end of semester.

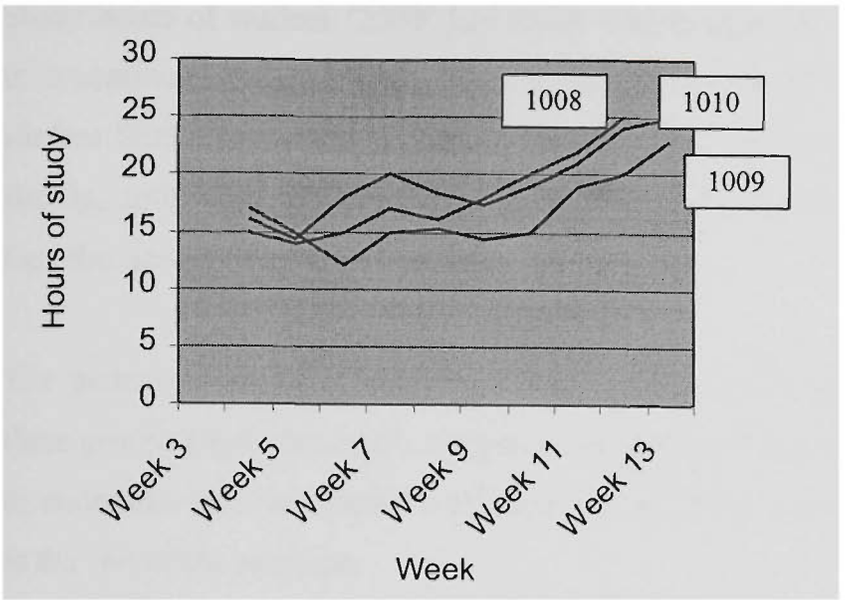

Figure 6.2 Study pattern of each individual in the moderate group.

The three low group members were second year students. The study pattern of each individual student in the low group is shown in Figure 6.3. The code numbers given by the researcher indicate the three students.

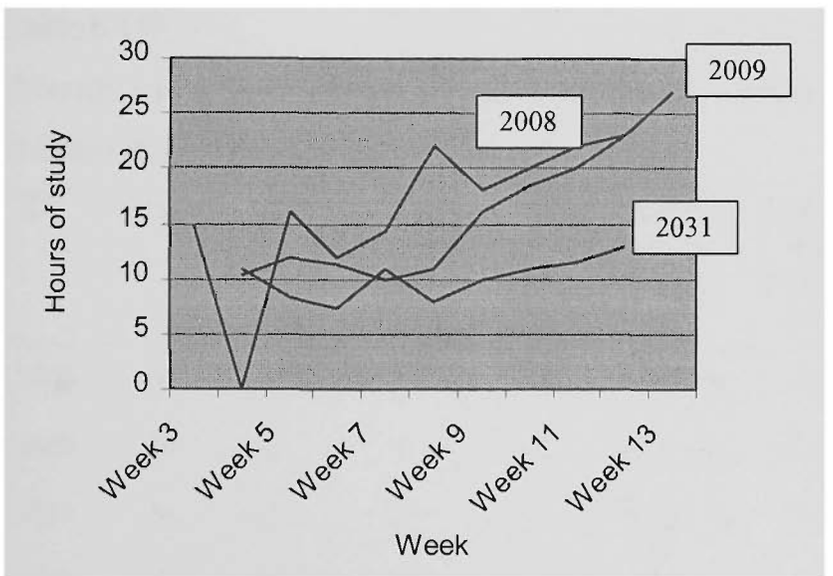

Figure 6.3 Study pattern of each individual in the low group.

Figure 6.3 shows that students in the low group had a similar pattern, that is, the number of hours spent was higher in the second half of the semester compared to the first half. However there were variations in the numbers of hours in different weeks between these three students. Study hours of student '2008' had a large variation from week to week.

Study hours of student '2009' had small variation in the first half of the semester and then continued increasing without a fall until week 12. Similarly, weekly study hours of student '2031' had small variation until week 9 and then continued increasing, but very slowly, until week 12. This increase in study hours for this student was not as great as for other students in this group and other groups.

The pattern of study of individual students in a particular selected group and across three groups (high, moderate and low) was similar. The students contributed most hours to undertake their academic work during assignment preparation and examination time at the end of the semester.

6.3.3 Study Hours, Online Interaction and Academic Performance

The average hours of study of selected students, number of messages posted by these students and their academic performance is shown in Table 6.11. Students' gender, age and experience, are also shown.

Table 6.11

Average study hours per week, online interaction and average academic performance of selected students

ID	Gender	Age	Experience (years)	Year of study	Selected group category	Average study hour per week	Online interaction	Academic performance (%)
1008	F	30	7	1	Moderate	19.3	10	85.0
1009	M	31	5	1	Moderate	16.6	7	72.0
1010	M	35	15	1	Moderate	18.0	16	81.0
2013	F	28	10	2	High	21.0	11	76.0
2020	M	40	19	2	High	22.0	35	76.0
2021	F	33	4	2	High	15.0	20	64.0
2008	M	40	5	2	Low	17.2	8	82.0
2009	F	33	9	2	Low	14.6	3	74.0
2031	M	40	18	2	Low	10.1	7	67.0

Among these nine students five were male and four were female. They had professional experience between 4 and 19 years and were aged between 28 and 40 years. Experience of all students varied between 3 and 19 years. They were aged between 28 and 40 years. The mean professional experience of whole group and the selected group was 8.5 years and 10.2 years, which is close. The mean age for whole group was 32.4 years, and 34.4 years for the selected group. The mean of overall academic performance of whole group was 67.6, and 75.2 for the selected group. So the students in the selected groups are reasonably typical of the whole group (first year and second year students).

The Pearson's correlation between average study hours and online interaction of students is positive but not significant ($r= 0.53$, $p= 0.06$). The correlation between average study hours and academic performance is positive and significant ($r= 0.60$, $p= 0.05$). The value of r signifies a stronger linear correlation between study hours and academic performance than between study hours and online interaction of students. Although the sample size is small, selected group students were almost typical of the whole group in terms of age, sex, and experience. So the result may indicate that the students' academic performance is likely to be related to their study hours. However, a positive relationship between study hours and online interaction may not be present for another sample of students or the whole group.

6.3.4 Summary

The students of the selected groups spent different amount of hours to perform their offline and online academic activities, assignments, and examinations. The students contributed most hours to perform their academic work in last few weeks of the semester. The result of correlation coefficient (r) between study hours and academic performance indicate that there is a tendency of linear positive association between these two variables. However, the correlation between study hours and online participation shows that the online participation may not be related to the study hours.

6.4 Relationship between Online Participation and Academic Performance

In this section correlation between students' online message posting and academic performance, and teachers' perceptions of students message posting are presented. This section will answer the research question 'How is online participation related to students' academic performance?'

6.4.1 Students Completion Rates and Results

The number of messages posted by first year in three subjects and second year students in two subjects and the marks obtained in each subject are shown in Appendix D. For each of the subjects in the current study, not all students completed the subject in which they enrolled. Therefore the sample size for this part of the data analysis was reduced.

For the three first year subjects, it was found that for Professional Basis of Paramedic Practice 1, only 25 students completed the subject. Of these 25 students eleven posted messages and 14 did not. In Issues in Prehospital Health Service Delivery, 24 students completed the subject but only 16 posted messages. In Professional Basis of Paramedic Practice 2, 21 students completed the subject but only 16 students posted messages.

In Prehospital Ethical and Legal Issues, 30 students completed the subject and only 25 students posted messages. In Research in Paramedic Practice, 22 students completed the subject. Only 16 students posted messages.

So in the subjects in the study, students were found to fall into one of the following categories:

1. Posted messages and completed all assessments
2. Completed all assessments but did not post messages
3. Posted messages but not undertake assessments

Data for students in the first and second categories were considered only for calculating correlations between online messages posted and academic performance. The third

group (dropout) was not considered for these analyses because they did not complete the subject.

The academic performance of first and second category of students in each subject is discussed. The academic performance of the first year students in three subjects is shown in Table 6.12.

Table 6.12

Academic performance of first year students in three subjects

First year	No of students enrolled	Completed of these enrolled	Grades obtained				
			HD	D	C	P	Fail
	N	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)
PBPP1	35	25 (71.4)	17 (48.6%)	7 (20.0%)	0 (0%)	0 (0%)	1 (2.8%)
IPHSD	35	24 (68.6)	1 (2.8%)	7 (20.0%)	8 (22.8%)	7 (20.0%)	1 (2.8%)
PBPP2	34	21 (61.8)	10 (29.4%)	2 (5.9%)	3 (8.8%)	4 (11.8%)	2 (5.9%)

In Professional Basis of Paramedic Practice 1, most of the students who completed the subject received the higher grades (HD and D) but no students received grades 'C' or 'P'. In Issues in Prehospital Health Service Delivery, among 24 students who completed the subject most of them obtained lower grades (C and P) and only one student obtained 'HD'. Among 21 students in Professional Basis of Paramedic Practice 2 who completed the subject, more than half of the students secured higher grades (HD and D). The fail rate was very low in all three subjects.

The academic performance of the second year students in two subjects is shown in Table 6.13.

In Prehospital Ethical and Legal Issues, most students received lower grades (C and P) and none of the student received 'HD' (Table 6.13 below). In Research in Paramedic Practice, almost the same number of students received either of the grades 'HD', 'D'

and 'C'. However none of them received grade 'P'. Two students failed in this subject and the rate is very low.

Table 6.13

Academic performance of second year students in two subjects

Second year	No of students enrolled	Completed of these enrolled	Grades obtained				
			HD	D	C	P	Fail
	N	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)
PELI	34	30 (88.2)	0 (0%)	5 (14.7%)	8 (23.5%)	17 (50.0%)	0 (0%)
RPP	35	22 (62.8)	6(17.1%)	7 (20.0%)	7 (20.0%)	0 (0%)	2 (5.7%)

The distribution of academic grades was skewed either to the higher grades or to the lower grades for all subjects except Research in Paramedic Practice.

6.4.2 Correlation between Online Messages Posted and Academic Performance

The value of the two variables, number of messages posted and marks obtained, were used to calculate correlation. Scatter diagrams for the two variables 'online message posting' (X-axis) and marks obtained (Y-axis) were produced for all first year and second year subjects. The scatter diagram indicates the degree and pattern (Aron & Aron E, 1999) of relationship of the two variables 'online message posting' and 'academic performance'. The scatter diagrams can be found in Appendix F. Pearson's Correlation Coefficients were calculated using SPSS for all first year and second year subjects.

The Pearson's correlation coefficients for the number of messages posted and marks obtained by the first year students in each of the three subjects are shown in Table 6.14.

Table 6.14

Correlation coefficients for messages posted and marks obtained by first year students in three subjects

Subject	Number of students enrolled	Number used for correlation coefficient	Correlation coefficient (r)	Probability (p)
PBPP1	35	25	.01	.46
IPHSD	35	24	.10	.32
PBPP2	34	21	.33	.06

No correlation was found between messages posted and marks obtained in Professional Basis of Paramedic Practice 1. In this subject, more than half of the students posted no messages yet they secured high marks. Correlation for the other two subjects was weak and positive. Correlation was weaker in Issues in Prehospital Health Service Delivery. In this subject, eight students posted no messages but obtained moderate levels of marks. In Professional Basis of Paramedic Practice 2, the five students who posted no messages obtained a variety of grades. None of the correlations were significant.

The Pearson's correlation coefficients for the number of messages posted and marks obtained by the second year students in two subjects are shown in Table 6.15.

Table 6.15

Correlation coefficients for messages posted and marks obtained by second year students in two subjects

Subject	Number of students enrolled	Number used for correlation coefficient	Correlation coefficient (r)	Probability (p)
PELI	34	30	.29	.06
RPP	35	22	.18	.20

The correlation between number of messages posted and marks obtained by the second year students in each of two subjects were weak and positive and not significant. The

correlation was weaker for Research in Paramedic Practice. In Prehospital Ethical and Legal Issues, five students posted no messages but only some of them obtained a lower level of marks. Among students who posted high levels of messages, some of them obtained higher grades. In Research in Paramedic Practice, six students posted no messages but obtained different levels of marks. The scatter diagram of number of messages posted and the marks obtained by the students can be found in Appendix F.

The correlation between online participation and academic performance was calculated for all five subjects. The intention was to understand the relationship between these two variables for the whole group in the current study. This correlation coefficient was found to be positive and significant ($N = 122$, $r = 0.21$, $p = 0.01$). This result indicates that there is a weak relationship between online participation and academic performance of students in the course.

6.4.3 Correlation between Teachers' Perceptions and Academic Performance

The teacher for each subject was interviewed at the beginning of the course and at the end of each semester. During the end of semester interview the teacher for each subject was asked about the frequency of online messages posted over the semester and their view of the quality and quantity of online contributions by the students. In this interview the teachers were also asked to rank students on the basis of their online contributions. The teachers gave their ranking of students on the number of messages posted and the quality of messages. So, the ranking of all students by a teacher was to some extent defined as a teacher's perception. The teachers did not rank the students who posted no messages. In order to rank students the teachers gave number 1 as the highest value, number 2 as the second highest, and so on. The teachers gave the same rank to some students in each subject. The teachers said that they gave emphasis to the quality, not only the quantity.

They defined the quality of a message as a message in which the ideas presented were relevant to the content of the task, reflected students' understanding of the task and contributed new knowledge in discussion.

For example in Professional Basis of Paramedic Practice 2 student 1037 who was ranked 4, posted four messages and another student (1036) who was also ranked 4, posted 6 messages (Appendix E). An example of a message from student 1037 that the teacher ranked as high quality is shown in figure 6.4. The students posted these messages in week 3 in the above subject on the task "Why is Ventricular Tachycardia (VT) sometimes a rhythm of cardiac arrest and sometimes a sustaining rhythm with an output?"

Student 1010: Okay, After much reading and asking of the educated I still have no idea what VENTRICULAR ACTIVATION TIME (VAT) is, nor can anyone seem to explain/define INTRINSICOID DEFLECTION. Any ideas as to their definition and importance would be most appreciated.

Student 1037 to student 1010:
I'll try and explain what VAT and intrinsicoid deflection is...as for its relevance clinically well I'll let you be the judge of that. Ventricular activation time refers to the time taken from the beginning of ventricular activation i.e. the start of the QRS to the point at which the impulse arrives at a particular electrode. The deflection produced by these impulses is called the intrinsicoid deflection.
Bundle branch blocks increase the ventricular activation time because the time it takes the impulse to travel through the ventricles is longer due to the block. They also change the intrinsicoid deflection. If you look at a normal V1 QRS you usually see a small r followed by an S wave so you get a rS complex. In a normal V6 QRS complex you get a small q wave followed by an R wave so you get a qR complex. The hallmark of RBBB is the late intrinsicoid R wave that is seen. This is because the right ventricle is activated later and by a slower mechanism when the RBBB is blocked. With LBBB the intrinsicoid deflection is shown as a broad positive complex in V6 with no q wave and no s wave.

Well I hope this sort of helps because after writing it I'm sort of confused myself but basically I think it is a lot of 'technical mumbo jumbo' for what you probably already know, that is, bundle branch blocks cause wide complexes (VAT), and the normal morphology (intrinsicoid deflection) of the QRS complexes in leads V1 and V6 are changed due to the altered course the impulse takes as it passes through the ventricles.
Good Luck!!!

Student 1010 to student 1037: Thanks.... I think.

Figure 6.4 Example of a message from student 1037 that teacher valued as high quality.

The message from student 1037 indicates that he/she responded to student 1010 who wanted to know more about the task. Student 1037 attempted to meet the fellow student's inquiry. In the third message student 1010 acknowledged the help provided by student 1037. Student 1037 explained the meaning of the task, and answered a request from his/her colleague in relation to the task that helped him/her to understand the content of the topic. The message reflects understanding of the topic.

Spearman Rank Correlation (Glass & Hopkins, 1984) was used to find the correlation between teachers' ranking and academic performance (marks) for each subject. As the teachers gave a rank to each student, the marks obtained by the students were also ranked according to Spearman Rank Correlation. These two variables (rank of both online interaction and marks obtained) were then entered into SPSS to calculate Spearman Rank Correlation. Teachers' ranking of students for each of five subjects and ranking of marks obtained by the students can be found in Appendix E.

The students who posted no messages and then dropped out from the course were excluded for these analyses. The reason was the teachers did not rank the students who posted no messages, and the dropped out students did not complete the subject. The Spearman rank correlation for each of three first year subjects are given in Table 6.16.

Table 6.16

Spearman rank correlation for teachers' perceptions and academic performance for the three first year subjects

Subject	Number of students enrolled	Number for correlation	Spearman rank correlation (r)	Probability (p)
PBPP1	35	11	0.54*	0.04
IPHSD	35	16	0.73**	0.00
PBPP2	34	16	0.52*	0.01

Significant at 5% level (*)
Significant at 1% level (**)

Table 6.16 shows that there was a positive relationship between teachers' ranking and academic performance of students in each of the three first year subjects. The highest correlation was in Issues in Prehospital Health Service Delivery. The value of r for all subjects indicates a strong linear relationship between teachers' perceptions of students' online participation and their academic performance.

The Spearman rank correlations for each of two second year subjects are shown in Table 6.17.

Table 6.17

Spearman rank correlation for teachers' perceptions and academic performance for second year students in two subjects

Subject	Number of students enrolled	Number for correlation	Spearman rank correlation (r)	Probability (p)
PELI	34	25	0.54**	.00
RPP	35	16	0.62**	.00

Significant at 1% level (**)

Table 6.17 shows that there was positive relationship between teachers' ranking and academic performance of students for both Prehospital Ethical and Legal Issues, and Research in Paramedic Practice. Similarly to the first year subjects, the value of r indicates strong positive correlation between teachers' perceptions of students' online participation and their academic performance.

6.4.4 Summary

The relationship between students' online interactions (messages posted) and academic performance in different subjects for the first year and second year group was weak positive and not significant. The overall online participation is low and there are few high contributors and many low contributors. Some of the high contributors have obtained higher grades while others have not. Among low contributors some have obtained higher grades but others have not. However, the relationship between online participation and academic performance for the group as a whole was weak positive and significant. These results suggest that there is a tendency for academic performance to reflect the level of student contribution to discussion and/or for the student's engagement in discussion to be influenced by their academic performance. However, care needs to be taken when interpreting this result since students who dropped out or who did not participate in online discussion were excluded from this analysis.

Spearman rank correlations between teachers' perception (ranking of students depending on online interactions) and academic performance in all first year subjects and second year subjects were positive and significant. This indicates that the teachers

valued the quality of students' messages and not just the quantity. However these findings only concerned the minority of students who contributed online and completed the subject.

6.5 Conclusion

The results in this chapter have illuminated students' engagement with the weekly discussion task, the level of online contributions of individual students, comparison between students' expectations of message posting and the actual number of messages posted, offline and online patterns of study, and the relationship between message posting and academic performance.

It was known from chapter 5 that the teachers designed the tasks to promote posting of messages and that overall message posting by the students was low in each subject. The results in this chapter show that the students posted most of the messages in a few weeks of the semesters and a very small number or no messages were posted in most weeks of the semesters. There is a need, therefore to examine the tasks for which students posted many messages, and few or no messages and the students' nature of responses to the tasks.

The results show that in each of the subjects in the course, there were a small number of students who posted the majority of messages. These high contributing students were not consistent in their pattern of participation across each of the subjects in which they were enrolled. The high number of non-contributing students was, however consistent in that they tended to not expect to participate and were non-contributors or low contributors in each of the subjects in which they were enrolled. The pattern of contribution for those who were high contributors in at least one subject indicates that students' message posting was influenced by some other aspects viz. nature of the task, teachers' support and students' contribution to discussion during the semester. The behavior of the non-contributors raises a question for further investigation about whether the non-contributors valued their fellow students' messages and the reasons for not responding to the tasks.

The results show a link between teachers' support in discussion and students' interactions. Students' posted many messages to their fellow students in four subjects where the teachers posted messages to support the whole class, and the students were not inclined to respond to each other's messages where the teacher posted messages to individual students. Relatively high proportion of students' responses to the task set indicates that the participation was influenced by the nature of the given tasks. Relatively low number of responses to teachers' messages indicated that the teachers were either not successful with prompting or were not doing much discussion mentoring.

Students' level of message posting in online discussion is likely to be related to the academic performance. But this relationship may be explained by study hours. The relationship between teachers' perception of messages posted by the students and their academic performance is positive. This indicates that there is a positive relation between online participation and academic performance in the course.

Chapter 7 will address the unresolved issue in relation to the weekly set tasks for which many messages were posted and the nature of the messages, and the tasks for which few or no messages were posted. Students' experience of studying online will also be discussed.

CHAPTER 7
THE NATURE OF DISCUSSION TASKS AND MESSAGES AND STUDENTS' PERCEPTIONS

Data presented in chapter 5 illustrated that the teachers created interaction opportunities by providing weekly discussion tasks for students to post messages about and supported online discussion by posting online messages to students. In chapter 6 it was found that the students posted most of the messages in a few weeks of the semesters and a low number or no messages in most weeks of the semester. These findings have raised several issues such as how many of the weekly tasks introduced by the teacher were addressed by the students, what was the nature of the tasks, how students responded to the task and to each other, and how students' viewed the usefulness of the tasks.

In this chapter the number of tasks introduced by the teacher, students' perceptions of the task and teachers' support, the number of tasks in each week and the number of messages posted by students for a specific subject, the qualitative analysis of the nature of the task and the nature of the messages posted in relation to the task are presented. An illustration of discussion between students on a specific task, and the frequency of categories of responses for one subject are presented. The categories of responses in the weeks where students posted most messages are also presented. The examples of the discussion tasks and the number of messages posted are from Professional Basis of Paramedic Practice 2. Of the five subjects in the current study, the highest number of messages was posted in this subject and the number of interactions between students was also highest. The data are analyzed in this chapter to explore further the following two research questions. How do teachers seek to use the peer group as a resource to promote interaction in the task that they assign participants (RQ1)? How do participants individually respond to the task set in online discussion (RQ3)?

This chapter contains two sections. Section 1 focuses on the task load, teachers' intentions in posting tasks, and students' perceptions of the tasks, peer group interactions and teachers' feedback. The nature of the discussion tasks, and the nature of

the messages posted by the students are presented in section 2. The pattern of student interaction is also presented in this section.

7.1 Discussion Tasks Introduced by Teachers and Students' Perceptions

7.1.1 Discussion Task Introduced by the Teacher

It is known from the data presented in chapters 5 and 6 that students posted few messages in each subject in response to the weekly discussion task. But what were the teachers' intentions in posting the task?

The teachers posted the weekly online lecture for each subject before commencement of the semesters. So the students had the opportunity to become familiar with the lecture and the tasks for each week, and their workload at the beginning of the semester. It was mentioned in chapter 5 that there were a number of discussion tasks for every week in each subject. The total number of tasks for 13 weeks' period for first year students in the first semester was 64 and in second semester was 58. The total number of tasks for second year students in first semester was 35 and in second semester was 42. Students responded to some of the tasks in each subject. It was shown in chapter 6 that the students did not respond to some weeks' discussion in each subject. Examples of the online lectures that included discussion tasks are given in Appendix A. The number of weekly discussion tasks for Professional Basis of Paramedic Practice 2 subject is presented later in this chapter.

In a particular week's online lecture, there were sub-topics and the discussion points were introduced at the end of each sub-topic. In the lecture there was also information about the articles that would help students to respond to the task set. In some cases they were asked to read specific articles before responding to the tasks. The data gathered through the teachers interviews showed that they tried to make the discussion task relevant to students' paramedic practice. Their aim was to involve more students in the discussion. They expected that the ideas introduced in the task would help students to respond to the task and their fellow students' messages. Recognizing students' paramedic practice backgrounds there were instructions in the course guidelines that the

learning strategies should be self-directed. The students were also encouraged to participate in discussion on the task and share their personal experiences, and provide feedback to each other's opinions. A quotation from course guidelines is given below.

> *Students enrolled in the course are all professionals who have achieved either an Associate Diploma or equivalent in Ambulance or Paramedic studies. Recognizing these backgrounds, the course has been designed around the concept that adults during their lives have had a variety of learning experiences and should be self directed and encouraged to share their personal experiences.*

There were no instructions for students for posting a certain number of messages in every week's discussion or responding to a certain number of tasks in a week. The students were expected to post messages on the tasks when a week began. Normally the week started on Mondays and finished on Sundays. The date and time of students' message posting showed that they continued message posting after a specific week finished. The teachers also responded to them. It was found that the students posted messages for more than one week's discussion at the same time. Normally the teachers did not close the weekly discussion. So students had an opportunity to post messages for a longer period. Students were given no limit about the length of the messages to be posted. They had the freedom to post any number of messages of any length.

It is time to see how students perceived the tasks introduced by the teachers and the messages students posted in response? Students' responses to SQ2 and the views of the selected group about the role played by the peer group are presented below.

7.1.2 Students' Perceptions

Students' perceptions of the tasks, fellow students' messages and teachers contribution in their learning online is given below. Some quantitative data of students' responses to SQ2 can be found in Appendix I.

Students' responses to SQ2 showed that most of them read every week's discussion task, some read most of the weeks' tasks, and a few read some of the weeks' tasks. Almost half of the respondents read every week's messages and the others did it occasionally (Table 7.1). Amongst 40 respondents, most students read the online

discussion to compare ideas and concepts with other students or enhance knowledge about the task. Some students also observed discussion to receive feedback from the teacher on the task.

Table 7.1

Reading online weekly lecture and online discussion

Response type	Reading online lecture		Reading online discussion	
	Respondent	Percent	Respondent	Percent
Every week	25	62.5	18	45.0
Most weeks	9	22.5	12	30.0
Some weeks	6	15.0	6	15.0
Rarely or never	0	0	4	10.0
Total	40	100.0	40	100

All respondents valued the usefulness of the discussion tasks to stimulate students to participate in discussion. Almost 1 in 4 students thought that the tasks were 'very useful' and others viewed them as 'quite useful' or 'useful' (Table 7.2 below).

Table 7.2

Usefulness of online interaction for understanding topic and usefulness of task set for stimulating students for interaction

Response type	Usefulness of interaction for understanding		Usefulness of task set for stimulating students for interaction	
	Respondents	Percent	Respondents	Percent
Very useful	9	22.5	9	23.0
Quite useful	13	32.5	15	38.5
Useful	16	40.0	15	38.5
Not useful	2	5.0	0	0
Total	40	100.0	39	100.0

Analysis showed that perceptions of the students who posted a high number of messages (high contributors) regarding the usefulness of the tasks were more positive than the moderate and low contributors (Appendix I). In relation to the relevance of the discussion task to students' professional needs, all students agreed that the discussion points were relevant to their professional needs to a certain degree. Almost one-third of students stated that most of the topics were relevant to their professional needs, half of the respondents indicated some of the topics were relevant and the remaining few students perceived that very few topics were relevant.

Students had similar positive perceptions about the online interaction. More than one third respondent said the online interaction was 'useful' and others said 'quite useful' and 'very useful'. Only two students reacted negatively (Table 7.2). Analysis also showed that the high contributors' perceptions of the usefulness of online interaction were more positive than the moderate and low contributors (Appendix I).

Students valued the teachers' feedback during online interaction. They acknowledged that the teachers' feedback in online interaction was useful. More than one-third of students perceived the teachers' feedback as 'very useful' (36.0%) and others answered 'quite useful' (31.0%) and 'useful' (33.0%). High contributors' perceptions of the teachers' feedback was more positive than the moderate and low contributors. Students' attitude towards the quality of the CD materials given to them and their usefulness in their learning was also positive.

The selected group students' perceptions of the role-played by the online peer group and the use of messages posted by them in students learning are presented below. These data were collected by conducting telephone interviews (SSTI) with the selected group students.

The students commented on the advantages of the online medium. All respondents reported two important advantages of this online medium. These were the flexibility of the learning environment, and online peer group interaction. With respect to flexibility, students were able to manage their own time accessing the course from home and work

place, and logging on and off at any time. They were able to respond to their fellow students' messages after taking time to consider and reflect on the task. All students thought that they had the opportunity to see fellow students' messages on the computer screen and exchange views with colleagues from different states of Australia and overseas countries.

These selected group students had a positive attitude about online interaction with their fellow students. All seven respondents found that the online interactions were very helpful for understanding the discussion task. According to these students the benefit of online interaction was sharing ideas and experiences through online discussion (7 respondents), stimulating students to interact in online discussion (7 respondents), and providing help by commenting positively and negatively on the messages posted (5 respondents). The students viewed that suggestions from fellow students helped in handling particular patient situations and contrary issues raised from the discussion provided a wider view of prehospital patient care, and relevant aspects concerning ethical and legal issues and the role of the paramedics in prehospital settings.

Students in each of the three groups reported similar views of peer group interaction. High group students emphasized that the variety of information from fellow students enhanced their knowledge and developed their insight of the given topic.

Students in the moderate group mentioned that the online learning situation was a "fantastic" medium because of interactions with students from both Australia and overseas giving their opinions on the discussion task relevant to pre-hospital and clinical guidelines from their own perspective.

The low group member who participated in the telephone interview also highlighted that students with different working experience explained the task from their own point of view, which provided a broader range of experience and understanding.

7.1.3 Summary

The teachers posted several discussion tasks for students in each week but students responded to only some of the tasks. Students' perceptions of the usefulness of the task set, online interaction of students, and teachers' feedback in discussion was positive. The high contributors experienced and valued these aspects more positively than the moderate and low contributors. The students read their fellow students messages to compare their ideas with fellow students or enhance knowledge about the task. Some of them also observed the online discussion to receive feedback from the teacher on the task.

Students in the three selected groups had similar positive perceptions of online interaction. They valued the messages posted by their peers that contained different ideas of their professional experiences and individual students' perspectives. These messages provided a broader understanding of the content of the task set, and fulfilled some of their inquiries relevant to paramedic practice.

So the above data show that most students were positive about the learning opportunities offered by the discussion list, but why were there so few messages posted? What were the actual task demands in terms of number of tasks to be responded to, and the nature of the tasks themselves?

7.2 Nature of the Discussion Task and Messages Posted by Students

7.2.1 Nature of the Discussion task

The number of discussion tasks posted by the teacher every week and the number of messages posted by the students in Professional Basis of Paramedic Practice 2 is shown in Table 7.3. The number of tasks that were responded to by the students in every week is also shown.

Table 7.3

Number of discussion tasks and the number of messages posted each week in Professional Basis of Paramedic Practice 2

Week	Professional Basis of Paramedic Practice 2		
	No of discussion tasks	No of task responded to by students	No of messages posted
1	6	5	21
2	8	5	20
3	7	3	7
4	5	4	40
5	3	2	3
6	3	2	10
7	3	2	4
8	4	1	3
9	7	5	42
10	2	1	03
11	5	1	1
12	2	0	0
13	3	0	0
Total	58	30	154

Table 7.3 shows that message posting did not occur on the basis of the number of tasks presented in a week. Students were given many discussion tasks for most weeks. They did not respond to at least one task in each week. The highest number of messages (42) was posted in week 9 when the teacher posted seven discussion tasks. The topic for the week was 'Introduction to Paramedic Pharmacology' that covered drug administration regimens, effects of drugs, and the language used to describe prescription medications.

The qualitative analysis of most discussion tasks for Professional Basis of Paramedic practice 2 was done (Appendix J). The number of messages posted by the students in response to the tasks was also shown in Appendix J. The nature of the discussion tasks and the number of messages posted by the students and the teacher in relation to the task is presented below for week 9 and week 10.

The discussion tasks posted in week 9 and the number of messages posted by the students and teacher in response to each task are given in Figure 7.1.

Task 1. A detailed understanding of pharmacology and specialist training is not required with well written "protocols" describing the appropriate course of action for a given set of circumstances. Hence Fire Brigade Members could fulfill the task of a Paramedic. Please comment on the above statement. ***Students posted 20 messages and the teacher posted three messages.***

Task 2. What is the clinical consequence of the variance in half-lives between narcotic agents and naloxone when tending to someone who has taken a narcotic overdose? ***Students posted seven messages and the teacher posted one message.***

Task 3. Narcotics drugs are invaluable in the prehospital management of a number of different conditions. The risk of serious adverse effects or overdosing a patient is minimal because of the availability of naloxone. Therefore, all paramedic personnel should be able to administer morphine, not only intensive-care paramedics. ***Students posted nine messages and the teacher posted no message.***

Task 4. A man drinks 3 x 285ml glasses of full strength beers and three 'nips' (30ml) of scotch over a period of three hours. At the end of the three hours, what would be his expected blood alcohol level? ***Students posted four messages and the teacher posted one message.***

Task 5. As an activity, categorise the effects of alcohol shown in the flow chart according to the rule of "D"s. ***No one posted a message.***

Task 6. The medical and social costs of alcohol on the community are immense. Indeed, from the paramedic perspective the consequences of alcohol consumption on the road, in the home, and in combination with legal and illicit drugs from (sic) a huge part of our work. The consequences of alcohol use are often as worse and certainly more widespread compared to that of heroin. At the very least, there should be a zero alcohol level when driving a car. What do you think? ***No one posted a message.***

Task 7. For each of the three drug groups (TCAs, SSRIs and NSRIs), state an example generic agent and its trade name. ***Students posted two messages and the teacher posted no message.***

Figure 7.1 Discussion tasks posted in week 9 and the messages posted by students and teacher.

In relation to task 1, students were given ideas about the different forms of drugs and the scope of using the drugs (Figure 7.1). The students were asked to read articles on drug administration rules to commence discussion on the task. The task was about paramedics' scope of drug administration in prehospital patient care and the students were asked to comment on a claim that another group of people (Fire Brigade Members) could perform the task of paramedics in special circumstances. The issue raised by the teacher is central to the main duties of paramedics. The task was open ended and controversial. It indicates that there was much scope for students to contribute and different points of view could strengthen the discussion. The intention of the teacher in designing this task is to fabricate a situation that challenges the need for professional knowledge among the paramedic students. The task seems to have stimulated students' interest to post messages. Of the 42 messages posted for the week, 20 messages were posted for the above task. The teacher posted three messages at different stages of the discussion.

Task 2 was relevant to the effect of neurological drugs in patient treatment. The students were given ideas about drugs such as naloxon and narcotic and asked to comment on the effect of these two drugs in a particular patient situation. The task was open ended and the content was relevant to students' main professional practice, which shows that there was scope to provide different opinions from their own experience and observation. Several ideas could enrich the discussion about how they did attempt to tackle that particular patient situation. Students posted 7 messages and the teacher contributed one message during students' discussion.

Task 3 was also about the use of a drug in patient treatment. The students were asked to comment on a claim that all paramedics should be able to administer Morphine for patient treatment. The task was open ended and the content indicates that the students were familiar with the topic and it was stimulating. It also created opportunity to present ideas from different points of view. This task was also designed to create controversy. Students posted 9 messages in response to this task and the teacher did not contribute to the discussion.

In task 4 the students were asked to provide an answer to a question regarding the effect of a drug in a particular situation. The task is a closed question and it indicates only one answer. So there was little scope to contribute. Still the task could have created curiosity among the students to know the answer since it is relevant to their duties and general life experiences. Three students posted 4 messages and the teacher posted one message.

Task 5 was a closed exercise for students that required the application of knowledge. This task did not provide a challenge or involve controversy. That no one responded to this task indicates it was too easy or too difficult for students, they did not have much time to do the exercise or they did not see the value of discussing the task.

In relation to task 6 students were asked for their opinion about the issue stated. Once again the issue was controversial. The task was open ended but the issue was a general one and not central to the major duties of paramedics. It indicates a limited scope of discussion. No one responded to the task.

Students were asked to give examples of trade names of three given drug groups for task 7. It indicates that there was only one correct answer and no scope for discussion. Two students posted two messages on the task. The teacher posted no messages.

Prior to discussing these tasks the rate of responses for further tasks from a week when very few messages were posted is presented for comparison. Another example of discussion tasks is given from week 10 where students posted very few messages. The tasks are given in Figure 7.2. The discussion tasks were on the topic 'Respiratory Pharmacology'.

In Figure 7.2 below, task 1 was an exercise for students that required applying knowledge and the students posted no messages. Task 2 was open-ended and involved a controversial issue but the issue of discussion was general not explicitly related to professional practice. Students posted only three messages and the teacher did not respond to the students' messages.

Task 1. Compare and contrast two compounds from the categories (Cough Suppressants, Expectorants, Decongestants, and Antihistamines), with reference to mechanism of action, duration of action, indications, adverse effects and trade names. ***No message was posted by students or the teacher.***

Task 2. Passive smoking adds a Hugh financial burden upon the healthcare system; therefore active smokers should pay higher Medicare levies. Comment on this statement and provide evidence (references) and discuss disease states where passive smoking has been implicated as a causal factor. ***Students posted three messages and the teacher posted no message.***

Figure 7.2 Discussion tasks posted in week 10 and the messages posted by students and teacher.

Of the nine tasks in two different weeks students responded to six tasks. However, they posted many messages to a few numbers of the tasks. Qualitative analysis of most of the tasks for eleven weeks can be found in Appendix J. Students were more likely to respond to tasks that presented a controversial issue that was directly related to their professional practice. These tasks provided scope for discussion from different points of view and were easy for students to contribute to. Students were not likely to respond to closed questions about the application of content knowledge. It appeared that the students did not consider that their professional knowledge and experience concerning controversial issues within the general community were part of the learning for this subject. Students responded to a few closed tasks (questions) where the ideas given was very much central to the paramedics duties. However most tasks that were closed questions did not generate discussion. There was no scope for argument that could promote message posting.

So although there were many tasks, only a few of them were responded to by the students. When they did respond, how did they respond? What categories of messages did they send in a specific subject? Let us look at the categories of messages posted by students in Professional Basis of Paramedic Practice 2.

7.2.2 Nature of Messages Posted on the Task

A content analysis of all 154 messages posted by the students in Professional Basis of Paramedic Practice 2 was done. A total of 33 codes generated from students' messages, were then sorted and classified into 15 categories. A letter of the alphabet indicates each category. The codes and allocation to the categories can be found in Appendix B. The

categories were also defined on the basis of the definition of codes within each category. These are given in Table 7.4.

Table 7.4

List of categories and definitions for student messages

Category Number	Category	Definition of category
A	Sharing experiences	Students explained the task using past professional experience providing examples or further clarifications.
B	Exchanging information	While discussing a topic the students share relevant information or opinions or sometimes make reflective comments on their peers' opinion.
C	Comparing ideas	Students present their own idea and seek others thoughts to confirm their own knowledge.
D	Justifying knowledge	Students justify their ideas and provide a rationale and logical argument.
E	Sharing resources	Students provide references from a book, journal, web site etc.
F	Seeking help	Students seek fellow students' help by asking questions, inviting others opinions or seeking further clarification, thoughts or ideas.
G	Helping peers	Students help each other by answering questions or responding to a particular enquiry.
H	Acknowledging peer help	Students thank or value peer's helpful contribution to their knowledge in various ways.
I	Seeking technical help	Students seek course leaders help for any technical problem that arises in the use of *TopClass* delivery system
J	Providing technical help	Fellow students help each other by giving suggestions for solving technical problems.
K	Providing support	Peers support each other's ideas or agree with each other's opinions.
L	Providing feedback	Students discuss fellow students' presentations and point out weaknesses for further improvement or understanding.
M	Arguing with peers	Members of the peer group argue with each other's opinions during discussion, and try to establish a common decision.
N	Supporting teacher	Students support or agree with teachers' ideas or messages.
O	Arguing with teacher	Students make comments on teachers' online lecture notes and argue with them.

Examples of these categories are given in Appendix G using the transcripts of students' messages.

There were many categories of students' responses to the task set and their fellow students in Professional Basis of Paramedic Practice 2. What do these categories show about the general pattern of the messages posted by students and their potential for learning through interaction? Now it is time to look at specific examples of students' responses to a task.

The students' messages that were posted in response to task 2 in week 9 (see figure 7.1) are presented below. The teacher's message posted during students' interaction is also given. The original transcripts of messages posted in response to task 2 are presented according to their (student and teacher) sequence of posting. The messages were copied from saved files. The messages may contain grammatical mistakes. There are some technical terms in the messages.

Message 1 from student 1043:

> *Given that the half life of naloxone is around 3 or 4 times shorter than that of a narcotic drug such as morphine or heroin, the clinical consequence would be that the antagonistic effect of naloxone would have an immediate result, followed by rapid reduction of effect in relation to the narcotic, potentially leaving the patient at risk of a secondary overdose. in a perfect world i would love to hang around and care for my patient and make sure that they are ok, however i have better things to do with my night shift than get told to F*&^ off, spat on and swung at. if i get called back, i get called back. Any one else's thoughts?*

Message 2 from student 1039:

> *Whilst I appreciate that the half life of naloxone is shorter than most/all narcotic drugs, in reality is there a significant risk of the patient re-narcotising to the point of being unconscious/apnoeic again? I personally have never had a case where I've been called back to a narcotic overdose who I've administered narcan to because they've re-narcotised. In researchig this topic the few studies that have been done also demonstrate the same results i.e. the number of*

patients requiring re-attendance following narcan administration never reached statistical significance (and in those who did there ws often good evidence that the patients actually re-used). I think this is one of those cases where theoretically it is the case, but in reality it rarely ever happens. But in having said this I realise each case needs to be taken on its individual merits. Obviously the person who has taken a massive narcotic OD in a suicide attempt warrants a very different approach to the regular IV heroin user who had a little too much or a little too pure shot. I am interested in hearing from others about how they/ their service approaches heroin ODs though.

Message 3 from student 1038 to student 1039:

Like (student 1039) I dont think I have ever had a callback to a renarcotised patient. Could this simply be die to the fact that herion is usually administered by IV injection and as a result plasma levels peak early and drop off reasonably quickly therefore the blocking provided by narcan is enough to get the patient over the effect peak which results in the respiatory depression. Also in Melbourne we tend to give Narcan IM with would be more slowly absorbed and metabolised than IV prolonging its effect somewhat. (there is not much in the way of literature I have found to support this but it seems logical to me anyway) Also giving it IM pts tend to wake a little slower, and as a result less hypoxic, therefore are less grumpy and don't tend to spew at me as much (always a good thing) Any thoughts?

Message 4 from teacher to student 1038:

Teacher to student 1038: you have made a good general point regarding route of administration and rate of absorption. Yes, with IV administration the onset of action is slightly quicker and the duration shorter relative to the same drug given by the IM route. This may well account for the behavioral and physiological differences you have observed. Cheers

Message 5 from student 1039 to student 1038:

Is narcan given in Victoria by all paramedics? And if so is it a requirement to give it IM? The point you make about patients waking up slower and therefore less hypoxic, less vomiting etc is a good one. I recently had a discussion with one of our emergency medicine specialists who believes we shouldn't be giving narcn IM because it is too unpredictable. In having said that most of the emergency departments here in QLD are against paramedics giving narcan fullstop. They would prefer us to transport with basic life support only. There two main argments for this are violent patients and poly overdoses. Since we started using narcan here (five years ago) with the option of IV or IMI (or

combination of these routes) I have only administered IV narcan on two occassions, the remaining times I have always administered it IM. On both occassions I gave it IV the patient vomited and woke up restless and a little aggressive (scared). No patient I have given IM narcan to has ever woken up agressive and I would conservatively estimate that this applies to about 150 patients. Like you I believe the reason for this is that with the slower onset with IM use the pateint has been well ventilated and therefore not hypoxic, and I think as importantly not hypercarbic when they wake up. If you talk to them as they are waking up and explain who you are and what is happening I have found them to wake up non violent, co-operative and whilst the occassional person vomits, my experience has been that most don't. Most other paramedics here also use the same method of waking up narcotic OD with the same results. The only thing I regret is that we never did a prospective trial on the use of IV versus IM narcan to assess patient side effects with each group. I believe that patients who wake up violent do so because they are hypocic, hypercarbic or scared. Imagine the last thing you remember is having a hit and then next thing you wake up with all these people standing over you, someone holding a mask on your face etc and think how you'd feel. So your flight or fight response kicks in and you try and get away, but suddenly everyone starts holding you down and they all start screaming at you to stay still, calm down etc etc. But you can't make any sense of four people all yelling at you at once. No wonder these people are aggressive, they think they're been mugged. It will take a lot of convincing for me to believe that IM narcan is unpredictable, quite the contrary it is very predictable. Likewise it would take a lot of convincing for me to ever give narcan IV ever again.

Message 6 from student 1038 to student 1039:

Yes all victorian ambos give Narcan, MICA paramedics have the option of IV Narcan otherwise it is given IM. Having said that I have only seen it given IV on one occasion in the last few years and that was on a fellow who had dropped in a farm shed with a concrete floor in the middle of a cold winters night, so consequently was a little hypothermic and IM wasnt doing much as his circulation to absorb the drug was not the best. Protocol is essentially, 1.6mg Narcan IMI, and a further 0.8mg can be given if no response after 10mins. My feeling is if pt hasnt responded to 2.4mg, in the absence of a reason such as hypothermia they most likely have something more than heroin aboard. Consequently IV administration doesnt happen much

Message 7 from student 1048 to student 1038:

The clinical consequence of narcotic OD's v naloxone obviously comes from the comparative half-life of each drug. With narcotics having up to 4 hours in the body against the 65minutes for naloxone, the risk of secondary collapse is

present at least in theory. In my brief personal experience, the phenomena of "after drop" is not common. This maybe that while the residual narcotic may still have an effect say an hour later, it may not be as strong as the body has reduced it to a (?) safer level. I was interested to read what the protocol was from the other states with dosage of nalaxone. In SA, ALS Officers can give 400 to 800 mcg IMI. The aim of treatment is to try and get the pt to the stage of being able to protect their own airway but sedated to the level where they will not refuse transport. This is done in the belief that by getting them to hospital, they may be able to be influenced by support services that they would not ordinarily encounter. It may also be that they have other things on board and these may have played a role in the collapse. The theory sounds fine but the problem may be that the receiving hospital or individual MO may have a different view on how to handle the situation and may wake them with a bolus dose so they leave. I agree with (student 1039) in that it is important that these people are ventilated first so they do not wake up hypoxic. But ventilation alone can often bring about an increase in GCS and subsequent refusal. The use of IMI is of greater use than IVI due to the slower uptake and prolonged release. I suppose that from an ethical point of view, by not waking the patient, we may be chemically restraining them. We are able to reverse the effects of the narcotic but choose not to. Non-maleficence has taken precedence over beneficence but what weight has autonomy and veracity in this situation! Any thoughts?

Message 8 from student 1017 to others:

Student 1017 to others: In SA the trend has most definately changed in the prehospital arena in the last 4 years or so, to giving the smallest amount of narcan possible (normally 400mcg for ease of drawing up) IM consistent with return of spontaneous resps and a gag reflex, and then to transport possibly still under assisted ventilation to hospital. There has been a large push for this line of treatment by our Medical Advisory Committee and Medical Director, a push not often supported by the emerg departments or the IV drug user support groups. The theory behind it to give the patient access to rehab and support services as well in part to the possibility of polypharmaceutical overdose or renarcing. It can be frustrating however to take an overdose patient into the emerg department only to see within 5 minutes a Dr administer a further 800mcg IM of narcan, wake the patient up and wait for them to discharge themselves, and then make loud comments about how they don't have time to babysit someone on a trip. The IV drug user support groups are not openly discouraging this form of management however are concerned that users will be reluctant to call an ambulance if they think that their mate will have to hospital and then be stuck with a $500 bill at the end of it. It is like most things in this job, its a judgment call depending on the circumstances. I would hazard a guess and say that the largest proportion of our narcotic overdoses still never see the back of an ambulance.

Five students participated in discussion in response to the task 2. They posted seven messages and the teacher contributed one message. The category of the messages posted by the students in above discussion on the task 2 (week 9) is shown in figure 7.3 to illustrate pattern of students' interaction in this subject.

Message	Student 1043 (category)	Student 1039 (category)	Student 1038 (category)	Student 1048 (category)	Student 1017
Message 1	**(To the task)** Sharing experience & Seeking help				
Message 2		**(To student 1043)** Supporting peer & Sharing experience			
Message 3			**(To student 1039)** Arguing with peer & Sharing experience		
Message 4	**From teacher to student 1038**				
Message 5		**(To student 1038)** Seeking help & sharing experience			
Message 6			**(To student 1039)** Helping peer & Sharing experience		
Message 7				**(To student 1038)** Sharing information & Seeking help	
Message 8					**(To fellow students)** Exchanging information

Figure 7.3 Pattern of interaction in Professional Basis of Paramedic Practice 2.

While participating in discussion on task 2 the students presented ideas from their own experiences and readings, and attempted to find an answer to the task in the first three messages but they could not reach the state of providing an acceptable solution. At that stage of discussion, the teacher's support helped them to explain the task in an

appropriate way. In these messages the students engaged in sharing experience, sought help, provided help and argued with their peers.

After the teacher's intervention, the last four messages of students were self-explanatory along the direction that the teacher indicated. These messages addressed the central issue of the task. Finally no issue remained unresolved for discussion. In these messages students presented their ideas from their own perspectives that covered protocols of administering the particular drug or the way of treating the patient in different states in Australia that enriched their discussion.

Figure 7.3 shows that discussion occurred between fellow students where they responded to each other's message. Student 1043 initiated discussion by responding to the task. Another fellow student responded to him/her and then discussion continued between them. In these interactions students engaged in sharing experience, seeking help, helping peers, arguing with peers, supporting peers, and sharing information on the task. The students completed discussion on the task through interacting with each other. This was a typical pattern of student interaction in Professional Basis of Paramedic Practice 2. Successive messages of students in every week and the codes of responses can be found in Appendix B.

So the students responded to each other in discussion in relation to the task. Now let us look at the frequency of the category of responses in different weeks in Professional Basis of Paramedic Practice 2.

The frequency of a category is the total number of different codes under the same category. Table 7.5 presents the list of categories and the number of times it appears in all messages of students in Professional Basis of Paramedic Practice 2 and in the weekly discussion of the tasks. The frequency of categories is shown only for four weeks during the semester. The four weeks with highest number of messages are included. Students posted the highest number of messages (42) in week 9, and the second highest (40) messages in week 4. They posted 21 messages in week 1, and 20 in week 2.

Table 7.5

Frequency of categories of students' online interactions in Professional Basis of Paramedic Practice 2

Category	Category description	Total frequency of category	Frequency of category in weekly discussion			
		N (%)	Week 1 N (%)	Week 2 N (%)	Week 4 N (%)	Week 9 N (%)
A	Sharing experience	85 (55.2)	7 (33.3)	12 (60.0)	33 (82.5)	17 (40.5)
B	Exchanging information	23 (14.9)	1 (4.8)	0	0	14 (33.3)
C	Comparing ideas	2 (1.3)	1 (4.8)	0	0	0
D	Justifying knowledge	20 (13.0)	0	0	17 (42.5)	1 (2.4)
E	Sharing resources	17 (11.0)	4 (19.0)	3 (15.0)	6 (15.0)	1 (2.4)
F	Seeking help	40 (26.0)	5 (23.8)	6 (30.0)	8 (20.0)	10 (23.8)
G	Helping peers	24 (15.6)	8 (38.0)	7 (35.0)	2 (5.0)	2 (4.8)
H	Acknowledging peer help	9 (5.8)	1 (4.8)	2 (10.0)	1 (2.5)	0
I	Seeking technical help	5 (3.8)	0	0	0	2 (4.8)
J	Providing technical help	2 (1.3)	0	0	0	0
K	Providing support	17 (11.0)	2 (9.6)	3 (15.0)	6 (15.0)	8 (19.0)
L	Providing feedback	7 (4.5)	1 (4.8)	1 (5.0)	0	4 (9.5)
M	Arguing with peers	5 (3.2)	0	1 (5.0)	1 (2.5)	2 (4.8)
N	Supporting teacher	4 (2.6)	0	0	1 (2.5)	1 (2.4)
O	Arguing with teacher	3 (1.9)	2 (9.6)	0	1 (2.5)	0

Note. Total number of messages posted by the first year students in Professional Basis of Paramedic Practice 2 was 154. Percent (%) was calculated from the total number of messages posted in the subject in weekly discussion. So the percent for categories in each column do not sum to 100.

The total number of categories in the class or in the weekly discussion was more than the total number of messages posted by students since most messages of students

comprised more than one category. The most frequent categories of students' responses were sharing experience, exchanging information, justifying knowledge, seeking help, helping peers, supporting peers and sharing resources.

Some of the most frequent categories were common in each of the four weeks discussion but the frequencies varied in different weeks. These were sharing experience, sharing resources, seeking help, helping peers, and providing support. Some categories were absent in a number of week's discussion. The proportions of a category also varied in different weeks, for example, exchanging information was absent in weeks 2 and 4 but it was highest in week 9.

So the pattern of interaction on a specific task presented earlier in this section illustrates how the students interacted with each other in response to the discussion tasks. The data concerning the frequencies of categories for the nature of messages posted illustrates that the example given was typical of discussions in which a high number of messages were posted.

7.2.3 Summary

Each week there were several discussion tasks but students responded only to some of the tasks. Students' responses depended on the nature of the tasks. The teacher supported students' discussion by posting one or more messages but did not comment on the tasks for which students posted no messages. When students responded to each other they mainly engaged in sharing experience, exchanging information, seeking help, helping peers, arguing with peers and supporting peers. Sharing experience was the most frequent category.

7.3 Conclusion

The results presented in this chapter have illuminated the study load on the students in relation to the number of weekly tasks, the nature of the tasks, the pattern of students' interaction in response to one task, and the qualitative nature of student interactions.

Students' perceptions of the usefulness of the task, interaction of fellow students, and teachers' contribution in discussion were also presented.

The results indicate that students' responses to the task depended on the nature of the tasks. Students were more likely to respond to the tasks that presented a controversial issue that was directly related to their professional practice. These tasks provided scope for discussion from different points of view. Not all tasks contained these features. Students were not likely to respond to closed questions about the application of content knowledge. Students were not likely to respond to the closed tasks (questions) that created no scope for argument. The variation and level of student engagement in online discussion was therefore partly explained by the nature of the task.

Students' pattern of interactions and the qualitative analysis of messages posted indicate that they responded and supported each other in discussion to complete discussion and acquire knowledge on the task. During online discussion students mainly engaged in sharing experience, exchanging information, seeking help, helping peers, arguing with peers and supporting peers. Simultaneously teachers' support influenced the message posting and enriched discussion.

The students valued the usefulness of the task, fellow students' contributions in discussions, and teacher's feedback to their understanding. Students observed the online discussion to compare their ideas with the fellow students and enhance their knowledge about the task. Most students perceived that at least some of the discussion tasks were relevant to their professional duties.

The final chapter will summarize and interpret the results provided in three chapters and provide a conclusion for this study.

CHAPTER 8
DISCUSSION OF FINDINGS AND CONCLUSION

The goals for this study were to investigate the teacher's role in promoting peer group interaction and providing support in discussion in an online course, to explore the extent to which students participate in online discussion on the task, and to examine the relationship between students' online participation and academic performance. Online learning tools have become more available and accessible to learners and teachers. Simultaneously the use of this Internet based computer technology has increased enormously in the past few years because of its asynchronous communication feature.

Previous research on online learning indicated that interactions occur between students and the teacher and between the student group to share information and discuss ideas on a given topic (Ahern and Repman, 1994; Graham and Scarborough, 1999; Dawson et al, 1999). Many authors have noted that the interaction between students is important for their learning and staff have given importance to organizing students' online activities (Makrakis, 1998; Jonassen et al, 1999). There is little evidence in the literature about students' behavior in online discussion and the extent to which the level of participation is linked to students' academic performance or the role that the teacher plays in structuring and promoting interaction in an online environment. Therefore, the current study sought to understand: (i) How do teachers seek to use the peer group as a resource in the task that they assign participants? (ii) How does the peer group interaction enable achievement of the course goals? (iii) How do participants individually respond to the task set in online discussion? and (iv) How is online participation related to students' academic performance?

The current study observed the online interaction of 95 students over two semesters in an undergraduate paramedic course. The students were drawn from five countries and either 34 or 35 students were enrolled in each of the five subjects of the study. Using a mixed method approach, an embedded case study design comprised multiple units of analysis. An ethnographic observation technique was adopted for observing

participants' online interactions. The interaction behavior of students in each class and the teachers' contribution in interaction was observed through the messages posted by all participants. On the basis of the number of messages posted in semester 1 three subgroups of students (high, moderate, and low) were selected to collect more information about their perception of the role played by the peer group in online discussion and the hours spent by individuals in study on the course. Student diaries and interviews were used to collect these data. Two questionnaires were sent to all students, one at the beginning of the year (SQ1) the other at the end (SQ2) and the teachers were interviewed on three different occasions. Qualitative and quantitative techniques were used to analyze the data. Quantitative analysis of online participation was done to show the frequency of message posting in weekly discussion in each subject, levels of students' participation, relationship between online participation and academic performance, teachers' perceptions of quality and quantity of messages posted by students and relationship with academic performance, and students' study patterns. Qualitative analysis of the nature of students' message posting in relation to the task set and the nature of the task was conducted. The data from questionnaires, interviews, and student diaries were analyzed to report teachers' perceptions of students' interactions and students' experience of studying the online course.

In this chapter the findings are discussed. The summary of the findings arising for each research question and their meaning in relation to the literature on online learning is included in the first four sections. The findings of these research questions are presented in a difference sequence in order to build an argument. A theoretical model of online message posting derived from the reported findings is presented in section five. Discussion of the implications for practice and research respectively, is included in sections six and seven. Finally a conclusion is presented.

8.1 Teachers' Role

The first research question asked: 'How do teachers seek to use the peer group as a resource for promoting interaction in the tasks that they assign participants?' Based on the data gathered by analysis of online course materials, observation of online message

posting and interview of teachers this study has reported findings on two aspects of teacher's behavior. The first is the importance attached to message posting by the teachers, and the ways that the teachers sought to elicit messages from students and interaction between them. The second is the role the teacher played in responding to a students' message and to 'student silence'.

Documentation for the paramedic course indicates that promoting message posting and interaction between students was an important goal for the course. In addition, teachers had discussed the pattern of low levels of message posting in previous years, and they were conscious of the need to try to improve on this aspect of course delivery. Teachers were thus sensitized to the issue. In the year studied low levels of message posting persisted. The highest rate of participation in weekly discussion varied between 26.0% and 57.0% of students across the five subjects.

8.1.1 Teachers' Role - Design of Discussion Task

In interview the course coordinator and all five teachers in the course told the researcher that they attached high importance to message posting by students (see chapter 5, section 5.2). Their sole strategy for promoting message posting and interaction between students, however, was by setting discussion tasks that were optional for the students to respond to. All teachers on the course, irrespective of the subject, set such discussion tasks for each week that their subject was offered. The teachers posted the weekly lectures that included the discussion tasks at the beginning of each semester. So they had no opportunity to adjust the discussion task during the course or from week to week. There was no preliminary discussion by the teacher at the outset of each subject, or at its conclusion, of issues to do with the course.

In interview the teachers claimed that they designed and selected these tasks to maximize their relevance to students' paramedic practice. They believed that as professionals the students had already some experience of various aspects of their paramedic practice. They believed that through interacting with each other the students were able to enhance their existing knowledge in relation to the discussion task.

Analysis of the lectures in each subject showed that the number of tasks that the teacher set differed in different weeks varying from two to eight and in different subjects varying from 30 to 58 (see chapter 7, sections 7.1 and 7.2). The total number of tasks set in all subjects over the course was 122 for first year students and 77 for second year students. The average number of tasks that a first year student was expected to respond to each week in Semester 1 was five, and in Semester 2 was four, while the corresponding figures for a second year student was three in both semesters. In Chapter 7 a detailed account was provided of all the tasks set in Professional Basis of Paramedic Practice 2. This showed that many of these tasks were related to such professional issues as assessment of a patient, interpretation of a patient situation and use of drugs in prehospital and clinical care of patients. Analysis showed that there were open ended and closed, applications of knowledge, and some controversial discussion tasks (see chapter 7, section 7.2).

In the present research study the students chose to respond, or not, to tasks regarded as professionally relevant for students. In some weeks it was made clear that all students should post a message in response to a specific task, but in fact there was no sanction on those students who did not do so. Crucially in this study messages posted in relation to tasks were not assessed. The evidence on message posting by students in Professional Basis of Paramedic Practice 2 discussed below (see section 8.2) indicates that this strategy has limited success in that 28 tasks elicited no response at all from students, while the productive tasks, the tasks that students did respond to, that is over fifty percent of the total number set, still only elicited responses from a minority of students each week. In some weeks no students respond to any tasks. This was similar for the four other subjects.

The data indicated that the tasks which were controversial and open ended created broader scope for presenting different opinions and were more likely to elicit many messages. The content also needed to be central to paramedic practices. On the other hand, closed questions and tasks concerning application of knowledge created limited or no scope for discussion. These tasks that required students to present the correct answer elicited few messages even though the content was central to paramedic practice. Since

the content of the four subjects were relevant to paramedic practice, there is an assumption that this finding may apply to the other subjects in the course except perhaps for Research in Paramedic Practice. It is unclear whether these findings would also apply to this subject because the discussion tasks involved were relevant to the research methods and techniques used in paramedic practice.

The nature of the tasks and students' responses indicates that the teachers were aware of creating scope for discussion but practically, it happened only for a limited number of tasks. Most students took the view that the discussion tasks were useful for stimulating them to post messages to some extent. They perceived that at least some of the discussion tasks were relevant to their professional needs.

With regard to online message posting the researchers (Graham and Scarborough, 1999; Tabrin and Trevitt, 2001; Gunawardena, Plass, and Salisbury, 2001) gave emphasis to promoting message posting on a given discussion topic every week but they reported an initial low level of messages. In each of these studies the students were expected to participate in discussion but practically it did not happen. In relation to the teachers support, scaffolding in an online environment is a way of structuring interaction and collaboration, maintaining an orientation towards relevant goals of the task, demonstrating how to achieve those goals and helping to control frustration (Salmon, 2001a). Salmon (2000) gave emphasis to using insightful discussion questions and giving participants time to reflect and respond. Salmon did not define insightful, give examples, nor show how scaffolding was related to the number of messages posted. Adopting some additional strategies Tabrin and Trevitt (2001) have reported higher message posting in the second phase of delivery. In their study students' online message posting was made compulsory and assessed as part of the final grade obtained by students. This was regarded as a successful strategy. Some of the teachers in the current study suggested making discussion compulsory for some weeks and giving reward, that is marks, for participation in discussion. Moreover staff increased on-campus facilities to access laboratory computers and technical support to maximize message posting. Again this strategy was not relevant for the current study as the students were distance learners.

So it appears that the discussion task alone was not enough to motivate students to participate in discussion, which is consistent with the current research. There was a need for additional strategies to stimulate students' willingness to engage in message posting. Moreover, the online behavior of 'silent student' indicates that they did not consider message posting as an obligatory aspect to study on this course or to pass the assessment process.

8.1.2 Teachers' Role - Supporting Online Discussion

How then did teachers respond to the situation stated above? Clearly they could take account of one of two factors. The first is student non-response or 'silence' in relation to a task or tasks posted; the second is the nature of the responses by students where a task did elicit a message or messages. With regard to the first – student silence, the evidence from this study is that no staff ever responded to student silence on a task. In other words, if a task elicited no response from any student the teacher would not comment on this fact, or indicate why the task had been set, or explain what the task was about, or chide students for not attempting it. For example, in total 28 tasks were met with 'silence' from students and a corresponding silence from the teacher in Professional Basis of Paramedic Practice 2. The teachers also maintained their response to 'silence' over the entire subject. They did not comment on weeks when no student responded to any task, or even when over a series of weeks there were no messages posted by students. They did not comment more at the beginning of the subject and less at the end or on other patterns to try to stimulate student message posting. This finding applies to other subjects, as the teachers maintained their silence in the weeks where the students posted no messages.

Teachers, then, defined their role as being to comment on student messages, rather than on student silence. As shown in Chapter 5 section 5.2 all five teachers, irrespective of the subject, made some response to student messages posted for every week that this happened. However, there were some individual differences between teachers in the way that they responded to student messages. As shown in Chapter 5, section 5.2, the pattern for four teachers in the four subjects was to allow an online discussion to develop between one or two, or in some cases several students, before the staff member

posted a message. The messages of these teachers had the following purposes: (a) providing guidance to discussion on the content of the task; (b) providing feedback on the message posed; (c) encouraging students; and (d) summarizing discussion. One teacher, however, took a different approach in the one subject that person was responsible for. That person's approach was to comment on almost every message as soon as it was posted. The purpose of these comments was to develop research skills relevant to students' paramedic practice.

These differing patterns may reflect the teachers' different conceptions of their online role, or they may reflect the nature of the subject matter being taught. The staff member who provided near-instantaneous individualized feedback was teaching an introductory research subject while other teachers were teaching different aspects relevant to students' paramedic practice. This teacher's online interaction behavior shows that he performed a role similar to a supervisor by interacting with every student. Perhaps this behavior was influenced by the content of the subject - research methods. However in that online situation other students had the opportunity to follow the teacher's feedback.

Thorpe (2000) argued that the teacher needs to take the responsibility for the process of interacting online. In the current study the teachers' role in four subjects indicates that the teachers guided students to generate their own ideas when responding to the tasks and exchanging messages with each other (Makrakis, 1998). Makrakis (1998) used the terms "facilitator" and " scaffolder" to describe this role. This pattern of the teachers' role indicates a process of helping students to construct their understanding through interacting with each other (Jonassen et al, 1999). On the other hand the pattern of teacher's support in Research in Paramedic Practice shows that the teacher encouraged students to post messages, and guided every student to construct their own knowledge and understanding from experience (Jonassen et al, 1999).

The findings from this study with respect to the teachers' role were (a) the importance that all teachers attached to online message posting and peer group interaction to promote their knowledge in the subjects; (b) the use of a one-shot strategy, that is, communicating almost exclusively with students on the basis of tasks set for discussion

on a voluntary basis, had very limited success in promoting message posting; (c) consistent non-responsiveness of teachers to student silence on tasks set; and (d) the two different patterns of response to students' messages, that is supporting all the students collectively or the students individually. In spite of the importance that the teachers placed on using the peer group as a resource for promoting interaction on the task, it would appear that the teachers had very limited strategies for so doing. Further they also had quite limited success in persuading participants to post messages online.

8.2 Online Participation in Discussion

The third research question was: 'How do participants individually respond to the tasks set in online discussion?' The current study has reported students message posting from various points of view. These were: (a) overall messages posted in each subject and in different weeks; (b) messages posted by the task set; (c) individual differences between students in the number of messages that they posted; (d) a comparison between expectation of message posting and actual message posting; (e) type of interaction; and (f) the nature of messages posted.

The pattern and frequency of messages posted was similar for all five subjects. Students' posted a low number of messages in each subject (see chapter 5, section 5.3). The highest number of messages (154) were posted in Professional Basis of Paramedic Practice 2, that is an average of 4.5 messages per student for the subject. The lowest number of messages (71) was in Issues in Prehospital Health Service Delivery, that is average of 2.0 messages per student posted for the subject. In fact some students who enrolled in a subject did not contribute any messages. The number of non-contributors was higher in the three first year subjects. The highest proportion of students who posted at least one message was in Research in Paramedic Practice (77.0%) and the lowest was in Professional Basis of Paramedic Practice 1 (37.0%). Students posted most messages in a few weeks (65.0% to 85.0% in 2 to 4 weeks for each subject). No one posted messages in some weeks in each of the five subjects. This varied from 1 to 7 weeks. This indicates that the students were not inclined to respond to most weeks' discussion.

The data from teachers' interviews suggested a number of reasons for the low number of messages: the lack of computer knowledge of some students, and students' heavy engagement with the assessment tasks. The results of the selected group students' pattern of study showed that the students spent most hours studying during their assignment preparation time, that is closer to the end of semester, in each subject when the number of messages was relatively low or nil. The students were paramedic professionals and they were busy with their work and had family commitments. So managing time for posting messages may be one of the reasons for non-participation. The content analysis of messages posted in a specific subject showed that the students sought technical help and provided technical help and indicates that very few students encountered difficulty with the course delivery system.

This study also focused on how many tasks were given in a subject and how many of them were responded to by the students, and also the number of messages posted for specific tasks for one subject. The results suggested that the nature of the task has an effect on students' message posting. It was mentioned earlier in this chapter that the number of tasks varied from two to eight in different weeks in each subject. Not all tasks were responded to by the students (See chapter 6, section 6.1; chapter 7, section 7.1). The evidence on the number of tasks each week and the number responded to by students in Professional Basis of Paramedic Practice 2 (PBPP2) showed that students responded to just over fifty percent of the tasks. Among these tasks students' responses varied from one to 20 for a specific task. Very few tasks evoked many messages. In chapter 7 the nature of the tasks and the number of messages posted for each task was presented for PBPP2. The data indicated that the tasks, which were central to paramedic practices, controversial, and open ended, created broader scope for presenting different opinions, and were more likely to elicit many messages.

Most students took the view that the discussion tasks were useful for stimulating them to post messages to some extent. They perceived that at least some of the discussion tasks were relevant to their professional needs.

With regard to the individual differences between students in message posting the data showed that the students differed in the number of times that they responded. The pattern of students' message posting in all five subjects was the same. In each subject most students posted a small number or no messages and only very few students (14.0% to 20.0%) were highly motivated to post messages. These few students posted most messages (50.0% to 73.0%) in each subject. High contributors in one subject were not necessarily high contributor in the other subjects in which they were enrolled. Most non-contributors were consistent in their message posting behavior for different subjects in which they were enrolled. The reasons for the non-contributors lack of response to the tasks were not clear. However, the data from student questionnaire (SQ2) shows that the students who did not respond read most of the messages posted and considered them. In a very few cases, non-contributors never read the messages.

The data of students' expectations of message posting at the beginning of the course and the actual behavior in message posting showed that the students who wanted to be high contributing students were not consistent in their frequency of message posting across each of the subjects in which they were enrolled (see chapter 6, section 6.2). The high numbers of non-contributing students however, were consistent in that they tended to not expect to participate and were non-contributors or low contributors in each of the subjects in which they were enrolled. The pattern of contribution for those who were high contributors in at least one subject indicates that students' willingness to post messages was influenced by some other aspects viz. nature of the task, teachers' support and students' contribution in discussion during the course.

The current study has also reported data about to whom the students addressed the messages that they posted. Analysis showed that the students who did respond reacted first to the task, and some also responded to their fellow students or to the teacher (see chapter 6, section 6.2). This pattern of interaction is aligned with the theoretical assertion of Moore and Kearsley (1996) that three types of interaction, learner-content, learner-learner and learner-teacher, take place in online discussion. In chapter 6, section 6.2 the number of messages posted in response to the task set, fellow students, and the teacher in each of the five subjects is shown. Although the total number of messages

were low, there is evidence that at least around one-third of the interactions occurred between fellow students in each of these four subjects: Professional Basis of Paramedic Practice 1 and 2, Issues in Prehospital Health Service Delivery, and Prehospital Ethical and Legal Issues. This finding supports the previous findings of the researchers Ahern and Repman (1994) that more than one-third of messages (38%) occurred between students.

Moreover, the number of messages posted for fellow students varied between 27.0% and 40.0%, and to the tasks (57.0- 64.0%) in the above four subjects indicates that students' sole purpose was to present their ideas on the tasks and also to their peers. When students initiated discussion on the task they also addressed the whole group and invited others' thoughts. This pattern of interaction in the four subjects indicates that the students' helped each other's to understand the meaning of the topic and construct knowledge through conversation. This finding supports Crosta's (2002) experience of studying online. Previous researchers (Elias and Merriam, 1980; Knowles, 1980; Hiemstra, 1996; Houtkoop and Oosterbeek, 1997) have shown that adult learners are motivated, participate in interaction and directed by their own interests towards professional and personal development. It also suggests that they were self-directed learners to some extent. A different pattern of students' responses to the tasks was found in Research in Paramedic Practice where the students answered the teacher's task to get feedback from the teacher. In this subject the teacher responded to every student on the messages posted. The method adopted by Liu (2002) in teaching Research Methods in Education showed how a constructive design of an online course could create an opportunity for interaction between students.

This study also reported on how the students responded to their fellow students in relation to the task set and to other participants. In chapter 7, categories of students' messages, the pattern of interaction between students, and distribution of categories in different weeks were shown for Professional Basis of Paramedic Practice 2 (PBPP2). A typical pattern of interaction in this subject suggested that the students initiated discussion on the task and completed discussion by responding to each other. While responding to the task as well as their fellow students, they frequently engaged in

sharing experience, seeking help, helping peers, providing support, and sharing resources (see chapter 7, section 7.2). These categories were consistent in almost all weeks where students posted messages.

The quantitative data about the exchange of messages between five high contributors in PBPP2 indicates that they were highly motivated to help each other in their learning. There is evidence that the students responded to each other's messages or requests 61 times in PBPP2 (see chapter 6, section 6.2). The exchange of messages between the five high contributors varied from 5 to 18 times. So the pattern of interaction and the frequent categories of their messages (above) indicate that the student group may act as a peer group and a resource for their learning online. Since the students helped each other to build their knowledge and understanding on the content of the task, the construction of their own knowledge was embedded in the process of online interaction (Jonassen et al, 1999). This approach of learning supports the social constructivism theory (Vygotsky, 1978). These findings also indicate that the students may recognize themselves as a member of the peer group where the members take the responsibilities for their own learning in this online situation. In interview students in the high, moderate and low groups defined their role as a member of the peer group where they provided help to each other using professional experiences that enhanced their knowledge and understanding of the subject.

The findings concerning students' message posting were (a) overall message posting was low and the students were reluctant to post messages in discussions; (b) there were individual differences between students in posting messages since they differed in the number of messages posted; (c) students who posted messages responded to the discussion task, fellow students and the teacher; (d) the nature of the tasks is likely to be related to the level of message posted; (e) students' willingness to contribute messages in online discussion may have been influenced by the nature of the task, teachers' support or other students' messages; and (f) students may function as a supportive peer group in online interaction.

8.3 Online Participation and Academic Performance

Here are the findings of the fourth research question 'how is online participation related to students' academic performance?' The current study observed online participation of students in five subjects. There were 35 or 34 students in each subject but some did not complete the subject. This number varied from four to 13 among five subjects. These students were excluded from the analyses of the relationship between frequency of online message posting and academic performance. As a result, the sample size was reduced. The distribution of grades received by the students who completed assessments in these five subjects was skewed toward either higher grades (HD and D) or lower grades (C and P). In chapter 6, section 6.4 it was shown that the academic performances of first year students were skewed to the higher grades in Professional Basis of Paramedic Practice 1 and 2, and to the lower grades in Issues in Prehospital Health Service Delivery. Similarly the academic performance of second year students was skewed to the higher grades in Research in Paramedic Practice and to the lower grades in Prehospital Ethical and Legal Issues. So the grades obtained by the students were not normally distributed.

The Pearson's correlation between students' online participation and academic performance was calculated for each subject separately. The results showed a positive but weak relationship for each subject (see chapter 6, section 6.4). However, since the correlations were not significant these results are not reliable. The reduced sample size, and the skewed distribution of academic performance and message posting may have affected the results. Analysis showed that some high contributors have obtained higher grades but others have not. Similarly, some of the low contributors or non-contributors have received higher grades but others have not.

The Pearson's correlation between online participation and academic performance for all five subjects combined was done to overcome the problem of non-normally distributed academic results. This result was a weak positive and significant correlation ($N=122$, $r=0.21$, $p=0.01$). Since the result is positive and significant for a bigger sample it is appropriate for generalization. This result shows that the participation in message

posting is likely to be related weakly to students' academic performance. However, no particular cause and effect relationship can be interpreted. The results suggest that there is a tendency for academic performance to reflect the level of student contribution to discussion. Also a student's engagement in discussion may be influenced by their academic performance. This result is partially consistent with the findings reported by Graham and Scarborough (1999) that there was a positive effect of online participation on students' academic performance, and those of Jung et al (2000) who reported a strong relationship. The methods used in the Jung et al study were different from those used in the current study. Using a one-way ANOVA with post-hoc comparison Jung et al have shown that the academic achievement of the treatment groups was higher than the control group where the treatment groups posted more messages than the control group. In their study the control group was allowed to interact with the instructor only for content related matters while two treatment groups were allowed to interact online for either social or collaborative purposes. Graham and Scarborough reported that most students who participated in interaction received higher grades, but they did not report correlation with the academic performance.

The current study also has shown a relationship between teachers' perceptions of students' message posting and academic performance in each subject. Teachers' perceptions involved ranking of students who posted messages. In doing so they gave more emphasis on the quality of messages than to the quantity since their ranking did not correspond exactly to the frequency of messages posted by the students (see chapter 6, section 6.4). This indicates that the teachers valued the quality of the messages that were posted. They viewed that the quality of messages reflected students' understanding and that the ideas presented were relevant to the content of the topic and contributed new knowledge in discussion.

The relationship between teachers' perceptions of students' messages and their academic performance was calculated for each of the five subjects separately. The sample size was reduced further because the students who completed a subject but posted no messages were not considered for ranking. However the correlation was positive for each of the five subjects. The results of teachers' perception and academic

performance then confirm the interpretation that the online participation is likely to be related to students' academic performance. Teachers may have been influenced when grading assessment tasks by the perceptions of a student's online participation.

The findings from the current study show that there is some evidence of an association between students' academic performance and two aspects of message posting: the quantity and quality.

8.4 Peer Group Interactions and Achievement of Course Goals

The second research question asked 'how does the peer group interaction enable achievement of the course goals?' The common goals that the teachers wanted to achieve through the course were promoting students' acquisition of knowledge and learning in relation to each subject, and developing problem solving techniques in the planning and implementation of prehospital emergency care (see chapter 5, section 5.3).

Feedback from the students in the questionnaire found that their goals were to develop themselves professionally and personally and to enhance knowledge, skills, and experience in the area of paramedic practice. These goals were similar to the course goals.

In interview the teachers reported that they sought to achieve the course goals through the online messages posted by the students and interaction between them. They claimed that there were more messages posted than in the previous year and that most messages were of high quality. With regard to the interaction between students they claimed that the messages reflected sharing professional experience from different perspectives that enhanced knowledge on the task. The students were from different countries and performed various types of duties of paramedic practice and so brought a diversity of experiences to the course. The findings reported here show that the course goals were achieved since: (a) students' messages reflected positive understanding of the task and the teachers commented on the high quality of messages in online contributions; (b) teachers ranked students' messages on the basis of quality rather than quantity; (c) the

pattern of interaction and the categories of messages posted indicated construction of knowledge by the students; and (d) the positive perceptions of students about the messages posted by the peer group.

Teachers explained that a high quality message was as a message that was self-explanatory in relation to the content of the task, students' understanding of the task, and that it contributed new knowledge in discussion. Examples of students' messages showed that the ideas presented were relevant to the content and reflected understanding of the task and provided potential for the acquisition of knowledge by others (see chapter 5, section 5.3). Students posted messages in response to the task and to messages of other students. In chapter 5, section 5.3 the example of a teacher's message in an interaction showed that the teacher acknowledged the quality of the student's message for the above characteristics. These facts may indicate a deep approach to learning as the students had the opportunity to integrate new ideas from discussion with their existing cognitive structures in relation to the content (Laurilard, 1997; Falcikov, 2001). Again the overall goals for the course were to enhance students' knowledge and understanding of the duties of the paramedics and to research techniques used in that area. So the quality of messages indicates that they promoted achievement of some course goals.

Moreover, teachers' ranking of students' message posting showed that they valued the quality of messages. There is evidence on how the teachers rank individual students in each subject on the basis of their message posting where they emphasized the quality of messages (see section 8.3 above). Teachers' rankings of students' messages were positively related to students' academic performance.

The teachers claimed that interaction between students promoted achievement of the course goals. The results showed that the students posted at least one-third of the total messages to their fellow student in four subjects (see findings in section 8.2 above). All teachers claimed that the students, in posting messages mainly used their professional experiences which coming from different perspectives helped students to enhance knowledge, develop skills for solving problems in prehospital setting or do research on

that area. The common and frequent categories of students' messages in weekly discussion in PBPP2 (presented above) were sharing experiences, seeking help, helping peers, supporting peers, and sharing resources. These behaviors of interaction indicate that the messages developed students' understanding of the tasks. Research in Paramedic Practice was an exception. There was a different pattern of interaction that took place between individual students and the teacher rather than between students.

Finally, irrespective of the level of participation in message posting (high, moderate, low or not at all) the students reported that the messages enhanced their understanding and provided a broader understanding of the paramedic practice in relation to the task. The data from student questionnaire (SQ2) suggested most of the 'silent' students read the online messages regularly to compare their ideas and enhance their knowledge on the task. This indicates that they acquired some knowledge through reading online messages.

There was some evidence that some course goals concerning developing knowledge in paramedic practice and research techniques used in that area were addressed through message posting. The teachers' ratings of students' messages indicated that some students were achieving these goals. Furthermore these ratings were related to academic performance. From the students' perspective they valued the messages posted by the other students for their usefulness in enhancing knowledge and understanding.

In the study by Tarbin and Trevitt (2001) the teachers' aim was to promote students' message posting for their learning and they claimed that they were successful due to the increased number of messages. Dawson et al (1999) and Herrmann et al (1999) observed that teachers valued the quality of students' messages as they shared experience and collaboration. In the current study the teachers' aims were to promote message posting as well as the interaction between students to achieve the course goals. The findings of the second research question have shown four aspects that promote the achievement of the goals in an online course that is, the number of messages, the nature of interaction between students, the quality of messages that reflect cognitive

development of students, and the success of students in the course. The achievement of course goals means the success of a course and the success of a teacher.

8.5 Theoretical Model of Online Message Posting

The findings suggest that the teachers attempted to promote message posting and interaction through posting accessible discussion tasks and providing feedback to students in discussion. These strategies appeared to be insufficient and their effort had a limited success since the number of messages posted was low and there was 'silent' behavior from some students in responding to the task in each subject. The results show that the nature of the discussion task has an effect on the number of message posted. There was some evidence that suggests students' willingness to post messages may be influenced by teachers' support, students' interactions, and the task set. There were also individual differences between students in posting messages with respect to the frequency and nature of interaction.

Hence three aspects may explain students' message posting: (i) the discussion task; (ii) teachers' support; and (iii) students' characteristics and their online interaction behavior. A single factor cannot explain message posting completely. The above three aspects the discussion task, teachers' support, and students' characteristics and online interaction behavior are interrelated. The findings suggest that message posting enhances students' knowledge and promotes achievement of the course goals. Figure 8.1 illustrates these relationships.

First of all, the nature of the discussion task (Box 1, Figure 8.1) appears to be very important. The relevance of the content to paramedic practice and scope to contribute messages in discussion are important in the design of the task. For the professional group of students in the current study, if the content of the discussion task was central to their professional duties, controversial, and open ended it evoked more messages. These characteristics of a task may stimulate students to contribute or influence their willingness to contribute. Hence these characteristics of the tasks define tasks as accessible for the students. The relevance of the task with respect to students'

professional practices, combined with the controversial issue, create the opportunity for sharing new knowledge from experiences to enhance their existing ideas. Therefore these characteristics indicate the cognitive demand of the task.

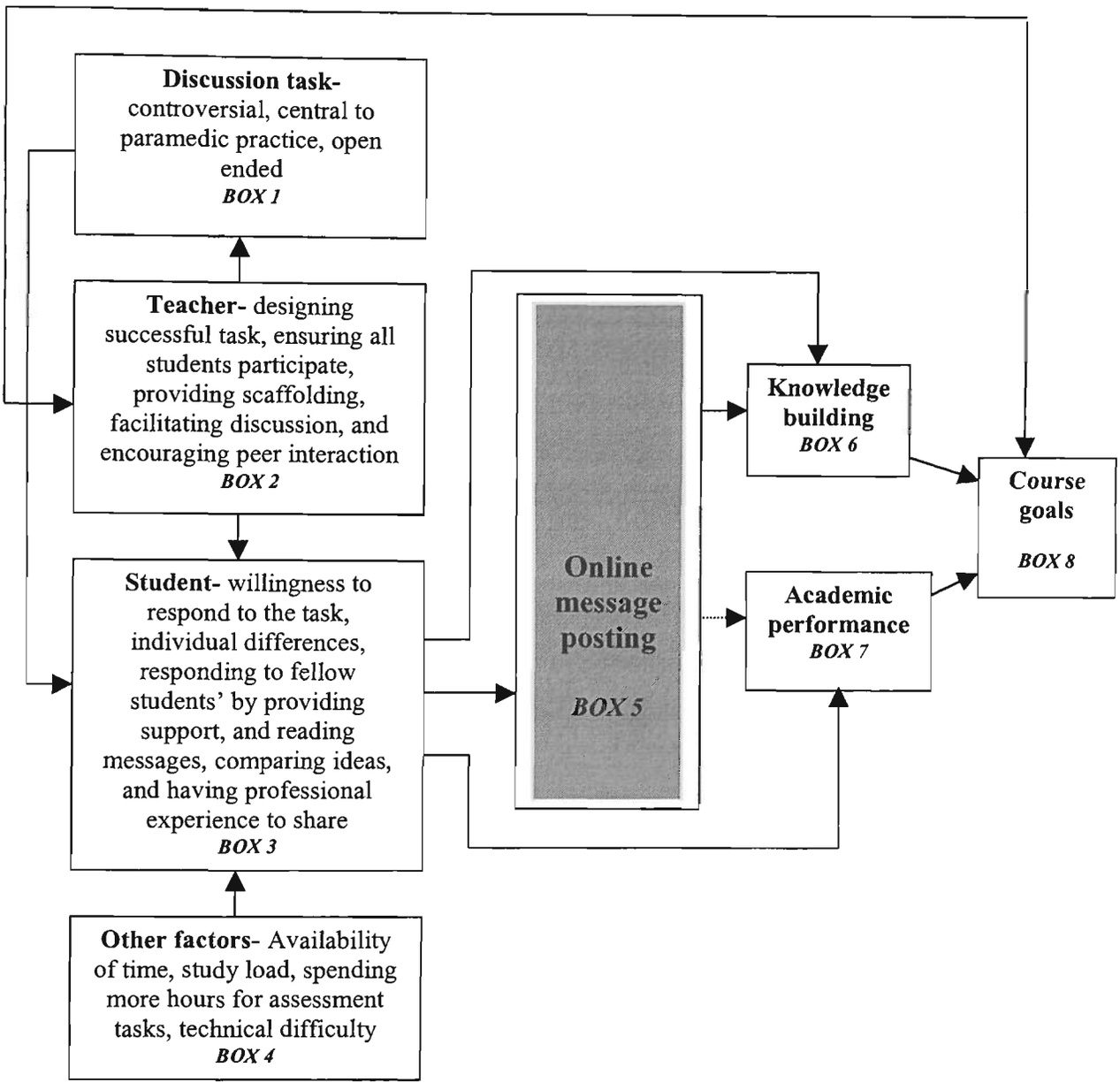

Figure 8.1 Theoretical model of online message posting.

Secondly, the teachers' strategies are required to design the task and contribute to online discussion (Box 2, Figure 8.1). Teachers provided scaffolding and facilitated online discussion. They contributed messages to stimulate and guide students to acquire knowledge on the content of the discussion task through their messages. In doing so

most teachers responded to and guided collectively all students in the class, thus encouraged peer group interaction. However one of the teachers guided individually in which case interactions between peers were sporadic. Teachers also need to encourage and stimulate all students to participate including the non-contributors (silent students) by adopting additional strategies, and imposing value on message posting so that the students can understand the importance of message posting. In the first instance, however, the findings of the study suggest that the teachers' strategies need to include designing a successful discussion task for students.

The third important aspect is the students' individual differences in posting messages, their willingness, and their online interaction behavior. The students had a goal to enhance their professional knowledge through sharing experiences. Most students had an expectation to participate in discussion with their fellow students and there were individual differences between students. The findings suggest that the messages of the fellow students and the teachers' support may have influenced students' willingness. Through interaction they gained knowledge and understanding on the content of the task. Moreover the students valued the peer group interaction and the roles played by some students that showed sharing of professional experiences, helping peers, and supporting peers. This peer group interaction helped them in understanding the task as perceived by the students. There is evidence that the students who did not post messages read others' messages to compare their ideas and acquire new knowledge from discussion.

Other factors concerning students may also affect (by increasing and decreasing) student message posting (Box 4, Figure 8.1). These were availability of time to access the course to view others' message and react on them, the study load including engagement with the assessment work, and difficulty with the course delivery system. The findings show that study hours increased during the assessment period and online participation fell.

The next stage (Box 6, Figure 8.1) indicates the outcome of the message posting and peer interaction. There is evidence that some messages were of high quality and that the

teachers also acknowledged this and the nature of the peer group interaction helped to construct knowledge. The results also suggest that the online message posting is likely to be related to students' academic performance (Box 7, Figure 8.1). It remain to be shown whether the imposed of compulsory message posting would strengthen the relationship between quantity of messages posted and academic performance as assumed by some researchers (Tabrin and Trevitt, 2001). Students' goals were to enhance their knowledge. Many students were low or non-contributors, yet they acquired knowledge as passive participants in the course and achieved successful grades.

Finally, the teachers' intention was to enhance students' overall knowledge in relation to the content of the subjects and give a grade to students (academic performance). These two aspects indicate their common course goals. The teachers were influenced by the course goals and sought to achieve these goals through designing discussion tasks, and facilitating online message posting and interaction between students, in order to be successful.

Hence the theory for online message posting for the online teaching and learning environment of the course studied may be stated as:

> Student message posting in online learning situations is likely to be related to the cognitive demand and accessibility of discussion tasks that staff design and to the quality of teacher facilitation of discussion. These factors are likely to influence students' willingness to participate in online discussion and to encourage interaction with peers, although situational and personal differences between students are also factors affecting participation. Online message posting is perceived by staff and students to contribute to knowledge building among students and may be associated with improved academic performance, thus enabling achievement of course goals and indicating an aspect of successful teaching.

8.6 Implications for Online Teaching Practice

This research has many implications with regard to Bangladesh and Australian contexts and other similar contexts. This researcher's experience of teaching and learning activities in Bangladesh for both face-to-face and distance education settings were presented in chapter 1. It was stated that in Bangladesh the teacher created very little or no opportunity of interaction between students. The teacher played the main role of delivering the lecture materials and instructions. However a kind of teacher-student interaction occurred in a limited way but very few students took that opportunity. So for the students listening, reading and remembering the facts became a culture in that education environment.

So for the Bangladesh context, the outcome of the current study gives better insight into teacher's responsibilities in planning the course, designing lecture materials, structuring and planning the interaction between students, and the benefits of interaction to students' learning. The outcome of this study would develop insight of the educational policy makers in Bangladesh to think about the teachers' responsibilities in a different manner for establishing a new environment in the classroom where the teachers would be able to plan student interaction and facilitate it rather than giving only a lecture to deliver relevant information on the topic. The teachers need to understand the benefit of student interaction in the class and take the initiative of changing the existing traditional method of teaching. These activities of the teachers would ensure students' rights in the classroom, meet the interaction need of students, create the opportunity of sharing ideas with their fellows and making relationships with each other as knowledge sharing partners.

The findings indicate that there are several important strategies for designing successful discussion tasks that can promote student interaction in an online course, since the findings provide ideas on both the teachers' online behavior and students' online activities. So the Open University staff need to think about these aspects in designing their future online courses that they are planning. Specifically, teaching staff should be

able to develop lecture materials and discussion tasks integrating several relevant ideas, adopt a reasonable study load for students and adopt strategies which will create an interaction opportunities for students. They also need to realize that interaction is a valuable asset to students' learning. In short they should plan the online courses in ways that promote interaction between students. With regard to providing support in discussion the teachers should be able to guide students in the way that encourages peer group interaction and enhances knowledge acquisition on the subject. The teachers should also be aware that achieving a high level of online interaction is very challenging and they will need to address more attention to this aspect of students' learning.

In Australia, distance learning using the online technology has been increasing rapidly in recent years (DEST, 2002a). At present the main target of the educational policy makers and universities is to enhance the quality of teaching and learning to become more successful and get maximum benefit from using this computer mediated communication technology (DEST, 2002b). This research provides clear direction of a teacher's responsibilities as a whole in relation to organizational and instructional aspects of an online course.

The teachers need to be more innovative in designing discussion tasks that create more scope for interaction and integrate cognitive demand. The findings indicate that there are some passive (silent) students who do not participate in interaction. So the teachers should think about involving these students in discussion by encouraging and stimulating or by adopting other strategies that can promote message posting and interaction. For example the online course designers may provide opportunities for students to discuss their assignments and provide feedback to each other's work within the structure of discussion tasks. These activities would provide students with a better understanding of their entire subject.

Another important aspect is compulsory discussion and giving reward for message posting. If the students see that their participation in discussion has got no value in terms of academic reward rather than the knowledge gaining they may be less willing to

participate. So the teachers need to consider this aspect and think about how message posting can be a part of the assessment process.

The findings illustrated two different types of teachers' online support: (i) the teachers who respond to all students in the class collectively to encourage peer group interaction; and (ii) the teacher who responded to students to provide individualized feedback. The findings also give an idea of an online peer group and its benefit to students' learning and how the students value peer interaction. Online teachers need to bring their attention to these aspects and implement them to become more successful in teaching their online courses.

The course studied was delivered through *TopClass* system. It is no longer being used for this course or others at the university that was the site for the current study. More recent software tools have the capability of assisting staff and students in monitoring their participation. These software tools provide other facilities for communication such as chat rooms, establishing small discussion groups, and students working together on their presentations. The managing teachers should be able to encourage the students to gain the benefit of these new interaction facilities.

8.7 Implications for Further Research

The current study identified some issues about the teachers' role and students' online interaction that should be considered for further investigation.

One aspect of teachers' behavior that needs to be investigated is why the teachers behave differently in providing support online. Teachers' online support in discussion was not the same for all five subjects. The findings show that in three first year subjects, and one of the two second year subjects the teachers did not respond to every student but mainly contributed to the group as a class. However, in the second year subject Research in Paramedic Practice, the teacher responded to every student in the class who posted a message. While the teachers' role in an online situation appears to be important for designing lecture material and promoting interaction, it would be valuable to understand more about the teachers' role in online interaction. Further research would

identify the reasons behind the two patterns of teachers' behavior in online discussion. It also is important to understand how the teacher can become successful in engaging students in discussion between themselves in a subject like Research in Paramedic Practice that appears to have little opportunity for sharing experience related to the content of the subject.

A second aspect for further study would be to gain a rich understanding of how the nature of the task influences students' messages posting. The findings of this study show that few students responded to the task each week and in some weeks no one responded. The findings also indicate that there was a link between the nature of the tasks and the number of messages posted for the one subject that was investigated in a limited way. The extent to which the nature of the task influences online participation for the other subjects and courses needs further research. A longitudinal study that comprised more than one phase would be helpful. For example the first phase would identify the nature of the tasks that is the characteristics of a successful or unsuccessful task. A second phase would review the effect of the new tasks on message posting and further criteria of successful tasks.

The third aspect is to study how the non-contributors valued their fellow students' messages and what factors were barriers to them posting messages. In the current study, a relatively large number of students enrolled in the subject but posted no messages. Most of these non-contributors completed the subject and received different grades. The non-contributors were beyond the screen. Limited data were collected from this group about their perceptions of the others messages and the reasons for their silence. So it is worth understanding why they did not contribute online and how they viewed fellow students' messages; was it useful or not useful and how did the students' messages help them to understand the subject.

The fourth aspect to examine more deeply is what factors influenced students to respond to each other in online discussion. The findings suggest that although the overall participation was low, students posted at least one-third of their messages in response to the others' messages. In one subject (Research in Paramedic Practice) they posted very

few messages to their fellow students. Since the interaction between students is the basis of knowledge building and promoting interaction is an issue in online course, it is important to identify the aspects that stimulate students to post messages to their fellow students in online discussion.

Finally, an important aspect to examine is how do the students develop a peer group relationship between themselves in online interaction. While responding to the weekly discussion task students posted messages to their fellow students in three first year subjects and one of the two second year subjects. The qualitative analysis of students' messages for one of these subjects and the pattern of interaction showed that the students helped each other in their messages to fellow students. The frequency of the category of their responses was higher for sharing experience, exchanging information, seeking help, helping peers, and providing support. Since interaction occurred between students in an online class discussion, how did the students with different levels of interaction respond to their peers in a specific subject and across all subjects and what was the pattern of exchanges between students. These are important aspects to examine in order to illustrate and understand the nature of peer group formation in online discussion.

8.8 Conclusion

In online learning most research effort has been to engage students in posting textual messages in discussion and to increase interaction between them. The intentions were to maximize the quality of teaching and learning using this pioneering electronic medium and to find out how well the idea of interaction that exists in a face-to-face situation translates to an online classroom. Some researchers have reported low message posting by the students and have tried to find a solution about how student message posting could be increased. The previous research however, focused on a single aspect of the online environment either the student or the staff activities. The research to date has not provided a clear picture of online teaching and learning behavior in a particular course.

The current study observed the teaching and learning behavior of teacher and students in online discussion and gathered the views taken by them about their behavior. In particular, this study covered teachers' efforts to enhance students' engagement with the discussion tasks, the strategies that they adopted to promote interaction and the online message posting behavior of students. The teachers' views of their success about promoting learning and the students' experience of online interaction and how it helped them to acquire knowledge and understanding were also gathered.

The results illustrated phenomena of teachers' responsibilities in designing the discussion task, and supporting discussion; students' message posting behavior and its relationship to their academic performance. The highest priority for teachers was to design discussion tasks that were relevant to students' professional practice. It was found that the nature of the tasks affected the message posting. The task that was central to the paramedic practice, open ended and controversial elicited more messages. Secondly they provided support in discussion to promote interaction in two different ways. Most teachers guided discussion to encourage interaction between fellow students' to acquire knowledge while one of them guided every student to enhance individual's understanding on the subject. The teachers' effort had a limited success because of the low number of messages and the low participation rate. Many students were not inclined to post messages. Interestingly, a few students in each subject were highly motivated to post messages, interacted with fellow students to share experience, helped peers and supported them enabling understanding of the task. The results indicated that students' willingness to post messages might have been influenced by the teachers' support or the nature of the discussion task or the content of the messages of fellow students in discussion.

The researcher was aware that the overall message posting was low and interpretations on the basis of that may reduce the reliability of the findings. However this research attempted to explain online message posting from different perspectives by gathering data through observation and from teacher and students through questionnaires and interviews. During data collection for this study the researcher was not aware that the nature of the discussion task might influence message posting and hence more probing

questions about these aspects of their work were not included in the interview questions. The teachers' opinion on this aspect would strengthen the reliability of the results. The limitations in relation to students' were the smaller sample of selected groups than in the original design, and the reduced sample for calculating correlation between online participation and academic performance due to those students who did not complete the subjects. Moreover this study did not explore further the factors that contributed to students' expectation and willingness to participate in discussion.

In spite of these limitations in the study, the findings of the study provided further understanding of the online message posting and interaction and attempted to explain the factors that affected message posting. This research illustrates the phenomena of online message posting; three variables are associated with message posting - the teachers' support, nature of the discussion tasks, and students' willingness to contribute. A single variable cannot explain message posting completely. It is argued that: student message posting in online learning situations is likely to be related to the cognitive demand and accessibility of discussion tasks that staff design and to the quality of teacher facilitation of discussion. These factors are likely to influence students' willingness to participate in online discussion and to encourage interaction with peers, although situational and personal differences between students are also factors affecting participation. Online message posting is perceived by staff and students to contribute to knowledge building among students and may be associated with improved academic performance, thus enabling achievement of course goals and indicating an aspect of successful teaching.

Further research should examine more widely the reasons for different patterns of teacher's support, the factors that contributed to silent students' behavior, the existence and development of a peer group in online discussion, and the nature of the discussion task.

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APPENDIX A
EXAMPLES OF WEEKLY ONLINE LECTURES

Contents:

1. Professional Basis of Paramedic Practice 1

TOPIC

INTRODUCTION TO HEALTH ASSESSMENT. (Week 1)

ABSTRACT

The assessment of a patient's medical condition or complaint is a task performed daily by paramedics. It is a
skill based on knowledge and it is generally one that paramedics are credited with doing well. Paramedic judgement has been cited in a number of studies into pre hospital care, and although it remains indefinable, it is
credited with increasing the predictive capabilities of trauma scoring systems and aiding higher accuracy in
making provisional diagnosis.
The paramedics use of health assessment skills is not extensive. Many of the primary assessment skills performed in hospital or a doctor's surgery have not been taught to paramedics. With the role of the paramedic
expanding to include treatment without transport, involvement in industrial, community and remote practice, and
more advanced medical interventions, the need to make accurate and wider patient assessment both in isolation and in consultation with doctors is growing.
Introduction to Health Assessment gives a basic overview of the assessment skills and equipment that will be
utilised in assessing the various body systems.

KEY TERMS

Inspection.
Auscultation
Palpation.
Primary Survey
Vital sign Survey
Percussion.

READINGS

Seidel, H., Ball, J. E., Dains. J. E., & Benedict. G. W. (1999). Mosby's Guide to Physical Examination (4th Ed.),
St Louis: Mosby.

Chapter 1: The History and Interviewing Process. pp. 1-36.

Chapter 2: Cultural awareness. pp. 36-46.

Chapter 3. Examination techniques and equipment. pp. 47-58, 60-62, 71-72.

Appendix A: Assessment of Pain pp. 907 - 911.

LEARNING GUIDELINES

Upon the completion of this subject you will be able to:

Construct a patient history utilising effective communication skills and a systematic approach to obtain a clinical history.

Identify and name the various forms of examination techniques, and the equipment used.

Demonstrate and explain the basic technique involved in the different forms of examination.

Assess and explain the possible findings when utilising examination techniques.

Assess and explain the use of pain assessment.

LECTURE NOTES

INTRODUCTION.

Why are paramedics performing health assessments? The role of Paramedics has changed dramatically over
the past 25 years and paramedics now practice beyond of the "traditional" ambulance scope of practice. Paramedics are performing procedures that were once considered to be a 'doctor's job', using drugs and advanced life support techniques. Without accurate assessment, a paramedic cannot effectively manage a patient.

If paramedics are going to continue to develop as a profession - an improved knowledge base and an understanding of health and physical assessment is essential.

INTRODUCTION TO HEALTH AND PHYSICAL EXAMINATION

Specific Approach:

Look:
At the environment, patient etc.
Listen:
To bystanders, family, patient.
Feel:
Examine the patient.

Examination: Five specific techniques:

1. Inspection - Looking
2. Auscultation - Listening
3. Palpation - Feeling
4. Percussion - Tapping
5. Olfaction - Smelling

EXAMINATION TECHNIQUES.

The examination procedure involving Inspection, Auscultation, Percussion and Palpation introduces a variety of
signs and symptoms that pertain to abdominal problems which are usually only vaguely familiar to Paramedics.
These are well presented by Wright (1997) in "Seven abdominal assessment signs every emergency nurse

should know", (pp.446-450). The range of signs able to be utilised is illustrated in part when considering appendicitis.

Inspection: This is generally dealt with in the texts:

Seidel et. al., (1999), pp. 51-52.

Bledsoe et. al., (1997), p. 177.

For specific techniques, ie. Inspection of the Abdomen, refer to:

Seidel et. al., (1999), pp. 524-529 etc.

Palpation: This is generally dealt with in the texts:

Seidel et. al., (1999), p. 52.

Bledsoe et. al., (1997), p. 177.

For specific techniques, ie. Inspection of the Abdomen, refer to:

Seidel et. al., (1999), p. 534 etc.

Percussion: This is generally dealt with in the texts:

Seidel et. al., (1999), pp. 53-55.

Bledsoe et. al., (1997), p. 178.

For specific techniques, ie. Inspection of the Abdomen, refer to:

Seidel et. al., (1999), pp. 530-533 etc.

Auscultation: This is generally dealt with in the texts:

Seidel et. al., (1999), p. 55.

Bledsoe et. al., (1997), pp. 177-178.

For specific techniques, ie. Inspection of the Abdomen, refer to:

Seidel et. al., (1999), pp. 529-530 etc.

Olfactory: This is generally dealt with in the texts:

Seidel et. al., (1999), pp. 51, 851.

SO WHERE TO NOW?

The rest of the Health Assessment sessions will concentrate on applying the basic skills of assessment to the
various systems of the body. As a practicing paramedic you will already be quite adept at applying some assessment skills to your everyday patient management such as:

Inspection - we assess not only patient signs of illness but also the

patient's environment. But are there more abnormal physical features in our patients that may assist us to make a "better call"?

Palpation - primarily musculoskeletal (deformity, tenderness). What about the abdomen? We tend to be limited to assessing pain response, distension and rigidity. Is there more? We know there is more; you only have to jump into a cubicle at the Emergency Department to see that an abdominal assessment can be quite revealing (and not just because the tummy is bare).

Auscultation - an absolute must on any SOB patient. The more drugs you are allowed to "squirt" into your patient, the more critical should be your assessment. But what of those SOB patients who do not have clear-cut wheezes or crackles? Should you treat, transport to the ED or refer them on to their local medical practitioner? Auscultation doesn't begin and finish with respiratory assessment. What of the abdominal or cardiovascular systems?

Percussion - a rarely used assessment skill in pre-hospital by paramedics.

Olfactory - a sense we occasionally would like to switch off. Allows near instantaneous diagnosis of hyperglycaemic patients. Also warns us about where not to put our hands when an incontinent patient is "detected".

DISCUSSION POINT

Our health assessment skills are by no means complete. One only has to watch a doctor comprehensively assess an unconscious patient in the ED to be made only too aware of our limited skills in that area.

Is the expansion of our current repertoire of assessment skills necessary? Why bother with a thorough patient
assessment when in most cases transport to the ED is the end result irregardless of whether or not treatment
has been administered?

Pre-hospital care is becoming more complex: We are being "armed" with more treatment protocols that rely on
an accurate assessment.

Specialisation of hospitals and patient's request for a particular hospital means that the "right patient should get
to the right hospital".

Ambulance systems are expanding into multi-care:

> Treat and leave at home.

> Treat and transport to the Emergency Department.

> Transport to a medical centre, (not ED).

> Refer to medical treatment via secondary transport (taxi, relatives).

> Organise local medical practitioner to attend.

>
Refer to local practitioner for appointment.
>
Paramedic practitioners are increasingly dominating the role of health and acute medical care in remote working sites and communities. Patient care by paramedics utilising distance medical consultation saves corporations and communities a lot of money (and lives).

For paramedics to successfully operate in the above-mentioned areas, accurate and comprehensive health assessment is of critical importance. A AAA patient with back pain sent to a chiropractor is not going to get
better after a manipulation, 200mg of Frusemide into a pneumonia patient does little for their SOB (but heaps
for their kidneys), a $5,000 aeromedical evacuation you have arranged for your appendicitis patient won't look
so good when at the receiving hospital, a laxative does the trick!

Where, when and how you use health assessment skills depends on many factors. Having them at your disposal allows YOU to make the choice.

Health assessment sessions are not just about reading ... they most importantly must include DOING. Grab
your partner, kids, colleagues and get to know them a bit better!

Health assessment is a "hands on" skill intricately associated with a high level of clinical and anatomical knowledge.

Please comment on how Health Assessment may impact / improve your practice.

FURTHER READINGS

Bledsoe, B.E., Porter, R.S., & Shade, B.R. (1997) (3rd ed.). Paramedic Emergency Care. Saddle River, Prentice Hall - Brady. Chapter 10: pp.164-203.

Wright, J.A. (1997). Seven abdominal assessment signs every emergency nurse should know. Journal of Emergency Nursing, 24, (5). 446 – 450.

http://www.medstudents.com.br/english.htm or http://archinternmed.com/

http://www.medscape.com/misc/formMedline.html

http://www1.mosby.com/scripts/om.dll/serve?action

http://library.kumc.edu/journals/onlinejnls.asp

http://www.vnh.org/Providers.html

2. Professional Basis of Paramedic Practice 2

TOPIC: Dysrhythmias - Atrial (Week 2)

ABSTRACT:

During this unit students should review and/or discover the basis of atrial dysrhythmias including:

- dysrhythmias originating in the sinus node

- dysrhythmias originating in the atria
- dysrhythmias of re-entry phenomena

KEY TERMS:

Sinus Node
Sinus Bradycardia
Sinus Tachycardia
Sinus Arrhythmia

Sinus Arrest
Atrial Pacemaker
Atrial Ectopic
Premature Atrial Complex
Atrial Flutter
Atrial Fibrillation
SVT (PSVT)
Irregularly Irregular
Atrial Tachycardia
Paroxysmal Atrial Tachy

READINGS:

Grauer, K. (1998). A practical guide to ECG interpretation (2nd ed.). St. Louis: Mosby. pp. 43-58, 60-63, 77-91,
and/or
Huszar, R. J. (1994). Basic dysrhythmias : interpretation and management. St. Louis: Mosby. Pp 13 - 16,
121 -152.

LEARNING GUIDELINES:

As Grauer points out, rhythms originating from the atria comprise the majority of all rhythms that we will encounter in our clinical practice. Hence it is important that we are confident in their identification and interpretation.

Once again it must be stressed that only by knowing what is "normal" can we begin to understand the variations
from the norm that we will encounter in our practice. Hence it is imperative that all the norms are as familiar to
us as the PQRS! Normal rates, intervals and nomenclature are essential knowledge that should be readily recalled at any time.

Ensure you have completed your Unit objectives before you commence working through the lecture notes.

LECTURE NOTES:

Dysrhythmias such as sinus bradycardia, sinus tachycardia and sinus arrhythmia are usually benign reflections of the body's
normal physiological response to stimuli (or lack of). Therefore it is important to always remember that the ECG is only one
tool in assessing the clinical picture the patient may present. A sinus tachycardia or bradycardia in an otherwise healthy

asymptomatic patient may be a quite normal finding, whereas in the patient displaying signs and symptoms of distress it may
indicate or represent a clinical problem.

It is important to develop your own method for determining the regularity or otherwise of an ECG. Some people choose to use
callipers while others elect to use a piece of paper and a pencil to mark off the relevant waveforms. Whatever method you use
it is important to be able to distinguish when a complex or waveform is part of a regular pattern, regularly irregular pattern or
indeed an irregularly irregular pattern. These techniques may also assist you to determine the rate of a rhythm.

Note that the terminology supraventricular tachycardia can mean any tachycardia originating above the ventricles. That is,
technically, atrial fibrillation and atrial flutter are both supra-ventricular tachycardia, however because we can distinguish
more accurately their aetiology we can more accurately label them. Similarly terms such as paroxysmal atrial tachycardia and
paroxysmal junctional tachycardia are falling out of use because they imply that we can accurately determine the activity that is
occurring. Both of these dysrhythmias are now more commonly referred to as SVT's (Grauer pp57). As a corollary, it is of
interest to note that the term paroxysmal supra-ventricular tachycardia (PSVT) is often used for an SVT that has a sudden
onset (and often a sudden cessation).

A basic understanding of re-entry and circus phenomena will be helpful when interpreting rapid dysrhythmias. Binns (1996)
provides a good outline/ summary of re-entry mechanisms (this article is available on the VU CD).

DISCUSSION POINT

If a rhythm is "irregularly irregular" is it always AF?

Atrial flutter can be difficult to diagnose, especially if the rate of ventricular response is not 150. What drugs
might affect the rate of an atrial flutter.

Digoxin is a common drug for the treatment of AF, what are the ECG characteristics of digoxin toxicity? What
are some of the common reasons why AF patients are at risk of digoxin toxicity. (Hint, think of the cohort of
patients we are dealing with.)

FURTHER READING AND WEB LINKS

Conover, M. B. (1996). Understanding electrocardiography. St. Louis:Mosby.

pp. 61-122, 132-154.

Huff, J. (1997). ECG workout: exercises in arrhythmia interpretation. Philadelphia: Lippincott. (3rd ed.) pp 49-132

ECG Tutorial

http://medstat.med.utah.edu/kw/ecg/ecg_outline/index.html

Atrial Dysthymias

http://medstat.med.utah.edu/kw/ecg/ecg_outline/Lesson5/index.html
http://www.mei.com/resource/arrhythm/list.cgi

Atlas of 12 lead ECG's
http://www.kumc.edu/instruction/medicine/cont-ed/infotech/car-ekg.htm

ECG Library
http://www.heartinfo.org/physician/ecg/index.htm
http://homepages.enterprise.net/djenkins/ecghome.html

A good article on CCU care of AF

http://www.springnet.com/ce/p902b.htm

3. Issues in Prehospital Health Service Delivery

TOPIC

Paramedic as a Profession (Week 3)

KEY TERMS

Models
Professionalism
Registration

READINGS

Field, J. Professional Qualifications for Ambulance Officers: a case study.

Wyatt, A. towards Professionalism - An analysis of Ambulance Practice.

Paramedics ~ Should we be developing a new profession?

McDonell, A. Registration and Professionalism of Ambulance Practitioners.

McDonell, A. A new clinical approach; the paramedic care model.

Williams, T, Paramedic

LECTURE NOTES

Preston (1992) defines the features of professionalism as

> Formal professional education (in university) involving a particular body of knowledge;
>
> Individual and collective professional identification (representative professional organisations);
>
> Control of entry to practice by the profession (or significantly by the

profession);

Workplace autonomy, control over working conditions;

High social status, social power and influence.
(From, McDonell, A H, 1994, Registration and professionalism of ambulance practitioner, Ambulance World, Autumn: 34 - 35)

Are Paramedics Professional?

Look at each point presented by Preston (1992)

Ask yourself do paramedics meet the criteria to become a professional group?

Paramedic Literature

During my readings, I found no paramedic literature that supports the concept that paramedics are professionals. In fact, most literature suggested paramedics are not professions.

Medicine and nursing use models to demonstrate their professionalism. They are also using newer flexible
models such as evidence based practice.

Do a search of the web or other resources how many paramedic evidence based practice sites, articles did you find?

Are Paramedics Professional

Let's see what some of our colleagues think?

Australia (Grantham 1994)

" .the medical profession provides clinical leadership to ambulance services at an organisational level. Treatment protocols used by ambulance officers are devised and authorised by medical practitioners. Thus at
conceptual level, the medical practitioner is performing the role of team leader.

Australia; (Grantham 1994)

The paramedic is an interesting phenomenon. The paramedic is not providing definitive treatment but is addressing the immediate life threatening problems. To the GP this means that the paramedic is likely to have
a good understanding of emergency treatment and a wise GP would be grateful to have one on the team. Despite these extra skills, they are still responsible to the doctor at the scene."

United States of America; (Bledsoe, 1997)

"As members of an allied health profession, paramedics must recognise a responsibility not only to their patients, but also to society, to other health professionals, and to themselves. Allied health term used to describe ancillary health care professionals."

Caroline; (1987)

"Perhaps the most unique aspect of the paramedic's role, however, derives from the special relationship with
the doctor in charge of the service. For the paramedic is no more or less than the eyes, ears and hands of the
medical director."

New Zealand Ambulance Board (1995):

"The aim of the NZAB Paramedic level is to minimise prehospital deaths and morbidity and to transport the
patient in the best possible condition it is not carrying out medical treatment as an end in itself. A medical practitioner on the scene or in communication with an ambulance officer has ultimate responsibility for patient
care, but may delegate to the paramedic."

So:

How relevant are models, and professionalism to our practice?

DISCUSSION POINT

Work through each of Preston's criteria of professionalism and on the discussion page list:

1. Does your practice as a paramedic meet the criteria to become labeled as a professional.

2. Justify your answer by example.

3. Read and comment on at least two other students' discussion.

4. Prehospital Ethical and Legal Issues

Week 5 – Negligence

Negligence and Vicarious Liability
Learning Guidelines

When reading Wallace, note the headings "Duty of Care" at page 119, and "Standard of Care" at page 132. It is important
that you have a very good understanding of these terms.

Chapter 5 of Eburn

Eburn pp.15-17 on Vicarious Liability (I have asked you to read this once more so that you will gain a greater understanding in
light of your readings on Negligence.

The cases of:

M'Alister [or Donoghue] v Stevenson, (usually known simply as Donoghue v Stevenson [1932] AC 562;

Rogers v Whitaker (1992) 109 ALR 625; and
Woods v Lowns (1996) Aust Torts Reports

on your resources CD.

Key Terms

Duty of Care

Standard of Care

Proximity

Vicarious Liability

and the key terms as set out on p.118 of Wallace.

OBJECTIVES

To understand the legal responsibility to take care and to avoid injuring "our neighbours";
To understand the level or "standard" of care to be taken;
Be able to Identify when behaviour could regarded as "negligent";
Understand the concept of Vicarious Liability, and circumstances where an employee must accept responsibility for the actions of an employee.

Recall the classifications of law, discussed in week 1.

You will recall also that we found that two main themes emerge from the objectives of an ambulance service as stated in the
Ambulance Services Act (Victoria):

Transport and Specialized Medical Skills

Having examined the Transport aspect, we now turn to the second of these themes:

Specialized Medical Skills

First, recall the fact that the community regards ambulance officers as experts, with skills and abilities beyond those of other
members of the community, including doctors.

Recall also the definition of specialize.

Two conclusions can be drawn at this stage:

1. Much is expected of the average professional ambulance officer; and
2. The professional/specialist status of an ambulance officer carries with it much responsibility.

Remember too, that the specialist skills attributed to ambulance officers include:

Transport Skills - Ability to safely secure a patient in a vehicle, and to manage that vehicle in emergency
circumstances; and
Medical Skills - Ability to provide medical services of a specialized type (i.e. in emergency circumstances).

Thinking as a Victim

To commence our examination of the law of negligence, let's first put ourselves in the position of a victim of negligence.

When you purchase take-away food you feel entitled to make certain assumptions about the food:

You expect that the people who prepared it selected appropriate, fresh ingredients; and
You expect that the people who prepared it know about, and follow, certain hygiene procedures.

Basically, you expect that the people who prepared the food understands that you are depending on them to ensure that the

food is fresh and safe to eat. And you expect that the people who prepared the food will take particular care to ensure that the
trust you have put in them is not betrayed.

If your trust is betrayed, and you are served food consisting of ingredients other than those described on the container, or the
food is adulterated because of poor hygiene on the part of the people who handled it, should you be entitled to ask the food
manufacturer to contribute to the medical bills incurred as a result?

What if you purchased a bottle of drink from a café, drank most of it, then discovered the decomposed remains of a snail at the
bottom of the bottle, and became violently ill as a result? (You will find out about this when you read the case of Donoghue v
Stevenson as part of your set reading.)

Standard of Care

How do we (the court) determine the actual standard of care required of an individual in a given situation?

An analogy:

Remember the coliseum, where the gladiators would look to the crowd before finishing off an opponent, asking for a "Yes" or
"No" (thumbs up or thumbs down)?

Imagine you are in your uniform, bearing badges of rank and insignia of qualification, and you are appealing to a crowd of
ambulance officers wearing the same uniform, with the same level of rank, qualification and experience.

Having told them what you did in a particular situation, you now ask whether they concur with your actions. Will they give a
collective thumbs up, or a thumbs down?

The court goes through this process by training the jury to the necessary level of expertise. How? Remember the detail of
discussion about the collision scene in Wahleim's case; you as reader became familiar with the most minute details of the
incident, down to measurement of distances and timings. After receiving the details of the incident you became sufficiently
confident to be able to say whether or not the parties were responsible.
Through this same process the court "educates" a jury as to what an ambulance officer with a certain level of training, and a
certain number of years' experience, would be expected to do when confronted by a given situation.

Vicarious Liability

If, as an employer, you decide to save costs by not giving setting any rules or giving any training to your employees, can you
avoid responsibility for a dangerous product by telling the consumer that her illness is the result of your employee's
incompetence? Or do you have a duty to ensure that your employees are competent?

You will gain an understanding of the extent to which an ambulance officer can be personally liable in negligence and the extent
to which the Ambulance Service must accept responsibility. The importance of establishing protocols becomes apparent here,
as does the vexing question of varying qualifications between different States' ambulance services.

Discussion Page

There is some controversy at the moment over laws in Australia's Northern Territory regarded as having been poorly thought through. At page 47 Eburn notes that it is a criminal offence to fail to rescue a person in certain circumstances.

Given what you now know about the legal process, is it possible to think of a situation where this law could be enforced? How often do people callously disregard others?

Following on from the above question, while it may be regarded as immoral or unethical for one human being to "callously" disregard another, should the criminal law reach this far into human relationships?

On the discussion page, put forward some examples of situations which would give rise to a duty of care; not the obvious everyday situations, but those not ordinarily considered. For example, an off duty ambulance officer who offers assistance at the scene of a traffic collision does not have back-up, communications or equipment available to him or her. No-one at the scene calls for an ambulance because this officer is there. Foreseeable harm?

Consider the following situation:

An over-weight, ruddy faced 58 year old gentleman has been suffering from severe chest pains, and his family has called for an ambulance. Upon arrival at the scene the gentleman tells the ambulance officers that the pains, although quite severe, have now subsided. He apologises for having wasted the time of the ambulance officers, and suggests they leave immediately, and help others whose needs are greater than his. The ambulance officers know that the situation may be more serious that the patient realises.

Is there a duty to inform the patient that his symptoms may be a precursor to a heart attack? If there is a duty, what steps would the ambulance officers have to take in order to discharge that duty to the requisite standard of care?

Discuss with other students on the discussion page.

5. Research in Paramedic Practice

Research in Paramedic Practice/Lectures/Week 3

The Scientific Approach

Abstract

This week we will look at the scientific method. We will look at what constitutes a scientific method and some of the elements that have influenced its development. This will lead into your tutorial work which expands on some of the elements that make up the scientific approach.

Objectives

1) Understand that the Scientific approach has developed and changed over time.

2) Be able to state the key elements of the Scientific approach.

3) Develop a list of key words that will act as a reference to understanding the scientific approach.

4) Build a knowledge of sampling techniques and internal and external validity.

Key Words

- Positivism
- Scientific approach
- Paradigm
- Falsibility
- Hypotheses
- Induction and deduction

A POTTED HISTORY OF THE SCIENTIFIC APPROACH TO RESEARCH

Positivism

Coined in the 1820's by Auguste Comte who sought to apply the principles of the Scientific Revolution to practical social purposes. The foundation of this doctrine was based on the idea that "positive' attempts to explain the world in terms of scientific truth are the highest level of thought (Grinnell 1993 p 39). Over the years a philosophy of science known as logical positivism emerged which as James B Taylor (1977 cited Grinnell 1993 p 39) notes includes a belief that

1. There is only one true scientific method and from this method comes certain knowledge.

2. All science is the search for natural laws and for the explanation of these laws.

3. Explanations require a deductive theory. A good theory is one that fully explains all relevant phenonoma and from which further hypotheses can be deduced.

4. Good explanations focus on mechanisms not on functions.

5. The purpose of research studies is to test hypotheses that are deduced from theory.

6. All abstract concepts should ultimately be reducible to observable operations.

7. Everything that exists is present in some quantity and hence can be measured.

The idea that research studies are strictly a matter of testing propositions or hypotheses derived from established theory is well

accepted in hard sciences such as Physics and Maths but does not contain a broad enough definition for qualitative researchers.
Positivists tend to be very opposed to things that can neither be seen nor heard. So when theorists like Watson and Skinner
proposed things like beliefs, feelings and introspection in human behaviour they were not well received, as these concepts cannot
be seen (Burns 1997 p 8).

Falseifiability

Popper proposed that theories should be falsifiable. Falsibility is what Popper felt distinguished Science from psuedo science, and
is the doctrine that hypotheses should be submitted to rigorous testing in an attempt to show that they are wrong. Thus science
and scientific research moves on by refuting hypotheses. Therefore scientific research cannot study propositions that cannot be
tested.
Induction and deduction

Science is based on the form of logic known as deduction. The basic
syllogism is

All P's are Q

This is an P

Therefore this is a Q

If the premises are true then the conclusion must be true. The problem is that the universal generalisation that all p's are q is
difficult to prove. While it may be difficult to prove that all Liberal voters voted Liberal at the last election the generalisation is
probably good enough. Karl Popper proposed that if a generalisation is good enough then we treat it as a hypothesis and then
predict the conclusion that follows from it. If our prediction is congruent with what we learn then the hypothesis is confirmed.

In induction individual facts are pulled together in clusters, which are manageable sets of generalisations that act as theories. The
flaw with this approach is the impossibility of unbiased observation of the basic observation and facts. Each observer perceives
and interprets what they see as subtly different due to past experience, expectation and personality (Burns 1996 p 9). Some
authors argue that even deductive approaches are biased. It is claimed it is impossible to place oneself outside the box, that is the
experiment, and some interference or bias must occur. This means even watching an experiment interferes with the results.

Characteristics of the Scientific Approach

Control: Enables the researcher to identify the causes of his or her observations.

Operational Definitions: Terms are defined by the steps or operations used to measure them. Eliminates confusion in
meaning and communications.

Replication: To be replicable the data obtained in an experiment must be reliable, this means the same result must be

found if the study is repeated.

Hypothesis Testing: The layperson uses theories in a loose fashion, often accepting ludicrous explanations for human behaviour. For example, he or she will not be a good paramedic because they are an academic and this is a 'trades persons' job.
The layperson tests a hypothesis in a selective fashion by choosing evidence to fit the hypotheses. Scientific research is 'public' method where a similar of the same subject should give the same result.

Strengths of the Scientific Approach

The main strengths lie in precision and control. Control is achieved through the sampling design, precision through quantitative and reliable measurement. In addition experimentation leads to statements about causation, (see Polgar & Thomas p55 for a full explanation of causality) since the systematic manipulation of a variable can be shown to have been eliminated or controlled.
Hypotheses are tested through a deductive approach, and the use of quantitative data permits statistical analyses (Burns 1997 p 9).

Limitations of the Scientific Approach

Human beings are far more complex than the inert matter that is studied in the physical sciences. The human is acted upon by not only a plethora of environmental forces but can interpret and respond to these forces in an active way. Many researchers are concerned that the scientific quantitative approach denigrates the human ability to think. Its mechanistic ethos tends to exclude notions of freedom, choice and moral responsibility. Quantification can become an end in itself (Burns 1997 p 10).

So where does that leave the paramedic?

It is undeniable that the western scientific approach has achieved great outcomes in science and therefore in medicine. As paramedics we practice medicine that is theoretically based on the results of this science. The truth is many of the practices that have been undertaken were not based on good science but medical folklore or bad or inconclusive science. Examples of these include the debates over Medical anti shock trousers (MAST or PASG), high volume fluid resuscitation and the use of Adrenalin in cardiac arrest.

Paramedic care is not simply about the physical needs of our patients. There is also the human element of patient care and the social dynamic of being part of an organisation. When utilising the scientific research model it is important to go back and ask what am I researching and why? Then ask 'is this the best research model for this research question?' While you may find that the scientific or quantitative approach is most appropriate, you may also find elements of qualitative approaches will help improve your research.

Further Reading

If you have an interest in the History and Philosophy of Science you may (this is not compulsory) whish to read the following

Riggs P 1992 Whys & Ways of Science Melbourne University Press

Chalmers A: 1982 What is this thing called Science? University of Queensland Press

References

Burns R: 1997 Introduction to Research Methods Melbourne Aust
Depoy E & Gitlin L: 1994 Introduction To Research Mosby
Grinnell R: 1994 Social Work Research and Evaluation (4th edition) Peackock Publishers

This Weeks Work

1) Read Chapters 3- 5 in Polgar and Thomas and attempt as many of the study questions as you can.

2) From your readings develop a list of key words such as

- Internal and External Validity
- Causality
- Control

3) Go to www.naumsp.org/sw/Resouces/PASG.html This is an article on the PASG/MAST. Review this article in the light of your readings. Ask yourself the following questions

i. In what way does this article reflect the strengths and weaknesses of the scientific method?

ii. What research strategies have been utilised?

iii. Do you think the sampling techniques are valid?

iv. Are there any issues of control, or internal and external validity that arise?

Post your ideas in Topclass and I will get back you.

I hope you find this useful

APPENDIX B
SEQUENCE OF MESSAGES POSTED AND CODING AND CATEGORIZING OF ONLINE MESSAGES OF STUDENTS

Contents:

Table B1. Sequence of messages posted by students and teacher in Professional Basis of Paramedic Practice 2, and codes of students' messages

Week	Participants	Codes of the messages
Week 1	Student 1010	1. Presented ideas 2. Invited others thought
	Students 1043 to student 1010	3. Responded peer 4. Agreed with peer 5. Sought clarification
	Students 1039 to student 1010	3. Responded peer 6. Discussed confidently
	Student 1039 to student 1043	3. Responded peer 4. Agreed with peer 7. Explained further
	Student 1038	8. Made comments and discussed
	Student 1038	9. Made comments on weekly lecture 10. Disagree with course leader
	Student 1048	1. Presented ideas 11. Asked question
	Student 1043	1.Presented ideas
	Student 1010	11. Asked question 12. Discussed and sought help
	Student 1010	13. Gave references
	Student 1038 to student 1010	3. Responded peer 14. Fulfilled peer's inquiry
	Teacher	-
	Student 1039	7. Explain further 2.Invited others thought
	Teacher to Student 1039	-
	Student 1039 to Teacher	1. Presented ideas
	Student 1010 to	15. Acknowledged

Week	Participants	Codes of the messages
	student 1039	peer's contribution
	Student 1043	16. Discussed with reference
	Student 1026	3. Responded to peer 16. Discussed with reference
	Student 1049	3. Responded to peer 7. Explained further 13. Gave references
	Student 1043	3. Responded to peer 7. Explained further
Week 2	Teacher	-
	Student 1036	1. Presented ideas 11. Asked question
	Student 1039 to student 7	3.Responded peer 17. Disagreed with peer 7. Explained further
	Student 1038	1. Presented ideas
	Student 1036 to student 1039 and student 1038	15.Acknowledged peer's contribution
	Student 1043 to student 1036 and student 1039	15. Acknowledge peer's contribution 11. Asked question
	Student 1039 to student 1043	3.Responded peer 14. Fulfilled peer's inquiry
	Student 1049	1.Presented ideas 13. Gave references 18. Asked for suggestion
	Student 1039	1.Presented ideas 14. Fulfilled peer's inquiry
	Student 1049	11. Asked question
	Student 1043	8. Made comments and discussed
	Student 1039 to student 1043	4.Agreed with peer

Week	Participants	Codes of the messages
	Teacher	-
	Student1048	7. Explained further 13. Gave references
	Student 1043	1. Presented ideas 13. Gave references
	Student 1039	1. Presented ideas 2. Invited others' thought
	Student 1008 to student 1039	3. Responded peer 19. Supported peer
	Student 1039	1. Presented ideas 2. Invited others' thought
	Student 1046 to student 1039	3. Responded peer 1. Presented ideas
	Student 1039 to student 1046	3. Responded peer 8. Explained further
	Student 1048 to 1039	1. Presented ideas 4. Agreed with peer
Week 3	Student 1010	20. Sought for ideas
	Students 1039 to student 1010	3. Responded to peer 1. Presented ideas 14. Fulfilled peer's inquiry
	Student 1010 to 1039	15. Acknowledged peer's contribution
	Students 1038	12. Discussed and sought help
	Student 1010 to student 1038	17. Disagreed with peer 7.Explained further
	Student 1039 to student 1010	3. Responded to peers 1. Presented ideas 16. Discussed with reference
	Student 1047	21. Discussed with examples
	Student 1039 to student 1047	7. Explained further 3. Responded to peer

Week	Participants	Codes of the messages
	Student 1038 to student 1047	15. Acknowledged peer's contribution
	Teacher to student 1047	-
	Student 1037 to student 1047	15. Acknowledged peer's contribution
Week 4	Teacher	-
	Teacher	-
	Student 1039	1. Presented ideas 11. Asked question
	Student 1043	1. Presented own ideas
	Student 108 to student 1043	1. Presented ideas 17. Disagreed with peer
	Student 1039	1. Presented ideas 22. Discussed logically
	Student 1038 to student 108	4.Agreed with peer 7. Explained further
	Student 1038 to student 1039	23. Appreciated peer 7. Explained further
	Student 1037	13. Gave references
	Student 1038 to 1037	15. Acknowledged peer's contribution
	Student 1021 to 1038	4. Agreed with peer
	Student 1039 to student 1038	13. Gave references
	Student 1038	16. Discussed with references 2. Invited others' thought
	Student 1039	1. Presented ideas
	Student 1043	24. Provided rational
	Student 1036	1. Presented ideas 24. Provided rational
	Student 1043 to student 1039	1. Presented ideas 24. Provided rational
	Student 1039 to	11. Asked question

Week	Participants	Codes of the messages
	student 1043	25. Answered peer 8. Explained further
	Student 1039	7. Explained further
	Student 1038	11. Asked question 13. Gave references 7. Explained further
	Student 1039	25.Answered peer 8. Explained further
	Student 1038	1. Presented ideas 24. Provided rational 13. Gave references
	Student 1043 to student 1038	4. Agreed with peer 7. Explained further 2. Invited others thought
	Teacher to student 1038	-
	Student 1038	26. Agreed with teacher 8. Explained further
	Student 1043 to student 1038	19. Supported peer 8. Explained further 4. Agreed with peer 7. Explained further
	Student 1038 to student 1043	2. Invited thought 8. Explained further
	Student 1039	2. Invited others' thought
	Student 1042	1. Presented ideas 24. Provided rational
	Teacher	-
	Student 1010	1. Presented ideas 24. Provided rational
	Teacher	-
	Student 1026	1. Presented ideas 24. Provided rational
	Teacher	-
	Teacher to the group	-
	Student 1037	1. Presented ideas

Week	Participants	Codes of the messages
	Student 1009	1. Presented ideas 24. Provided rational
	Student 1017	1. Presented ideas 24. Provided rational
	Student 1031	1. Presented ideas 24. Provided rational
	Student 1003 Student 1008 Student 1043	1. Presented ideas 24. Provided rational 1. Presented ideas 24. Provided rational 11.Asked question
	Teacher to the group	-
	Student 1038	27. Commented on teacher's answer/posting
	Student 1046	1. Presented ideas
	Student 1033	1. Presented ideas 24. Provided rational
	Student 1044	1. Presented ideas 24. Provided rational
	Student 1047	1. Presented ideas 24. Provided rational 13. Gave references
	Student 1008	1. Presented ideas 24. Provided rational

Week	Participants	Codes of the messages
Week 5	Student 1038	1. Presented ideas 11. Asked question
	Teacher to student 1038	-
	Student 1043	1. Presented ideas
	Student 1010	1. Presented ideas
Week 6	Teacher	-
	Teacher	-
	Student 1043	28. Sought technical help
	Student 1026 to student 1043	29. Provided technical help
	Student 1037	28. Sought technical help
	Teacher	-
	Student 1046	28. Sought technical help
	Teacher to student 1046	-
	Teacher to student 1043	-
	Teacher	-
Week 7	Student 1043	28. Sought technical help
	Teacher to student 1043	-
	Teacher	-
	Student 1043	1. Presented ideas 2. Invited others thought
	Student 1038 to student 1043	7. Explained further
	Teacher	-

Week	Participants	Codes of the messages
Week 8	Student 1038	1.Presented own ideas 2. Invited others thought 11. Asked question
	Student 1039 to student 1038	30. Gave more information 14. Fulfilled peer's inquiry
	Student 1039	1. Presented ideas
Week 9	Teacher	-
	Students 1050 to Teacher	31. Gave opinion
	Student 1038	31. Gave opinion 6. Discussed confidently 11. Asked question
	Student 1036	31. Gave opinion 2. Invited others' thought
	Student 1010	31. Gave opinion 8. Made comments and discussed
	Student 1038	4. Agreed with peer
	Student 108 to student 1036	8. Made comments and discussed 4. Agreed with peer
	Student 1043	2. Invited others thought 8. Made comments and discussed
	Student 1039	8. Made comments and discussed
	Student 1025	7. Explained further
	Student 1039	1. Presented ideas 13. Gave references
	Student 1039	31. Gave opinion
	Student 1010	1. Presented ideas
	Teacher to student 1010	-

Week	Participants	Codes of the messages
	Student 1010	28. Sought technical help
	Student 1017	28. Sought technical help
	Teacher	-
	Student 1048	30. Gave more information
	Student 1046	31. Gave opinion
	Student 1021	31. Gave opinion
	Student 1043	1. Presented own ideas 2. Invited others thought
	Student 1039	6. Discussed confidently 2. Invited others thought
	Student 1038 to 1039	17. Disagreed with peer 7. Explained further 2. Invited others' thought
	Teacher to student 1038	-
	Student 1039	11. Asked question 7. Explained further
	Student 1038 to student 1039	13. Fulfilled peer's inquiry 7. Explained further
	Student 1048 to student 1038	7. Explained further 4. Agreed with peer
	Student 1017	7. Explained further
	Student 1043	1. Presented own ideas 2. Invited others thought
	Student 1010 to student 1043	4. Agreed with peer
	Teacher to Student 1010 & 1043	-
	Student 1043	26. Agreed with teacher
	Student 1048 to student 1010	4. Agreed with peer
	Student 1043 to	4. Agreed with peer

Week	Participants	Codes of the messages
	student 1048	
	Student 1038 Student 1038 Student 1039 to student 1038 Student 1039 to student 1038 Student 1043 to student 1039 Student 1048 Student 1048 Student 1021	1. Presented ideas 7. Explained further 2. Invited others thought 32. Gave different opinion 24. Provided rational 7. Explained further 4.Agreed with peer 4. Agreed with peer 1. Presented ideas 30. Gave more information 7. Explained further 30. Gave more information 30. Gave more information
	Student 1038 Student 1039 to student 1038	11. Asked question 13. Fulfilled peer's inquiry 30. Gave more information
	Student 1048	1. Presented own ideas
	Student 1010	1. Presented own ideas
Week 10	Student 1038	16. Discussed with references 11. Asked question
	Student 1039 Student 1038 to student 1039	33. Gave personal opinion 23. Appreciated peer
Week 11	Student 1039	1. Presented ideas

Table B2. Coding of messages posted in week 1 by another researcher for Professional Basis of Paramedic Practice 2

Week	Participants	Codes of the messages (given by the researcher)	Codes of messages (given by another researcher)
Week 1			
	Student 1010	1. Presented ideas 2. Invited others thought	1. Presented idea 2. Sought others thought
	Students 1043 to student 1010	3. Responded peer 4. Agreed with peer 5. Sought clarification	4. Agreed with peer 5. Sought clarification
	Students 1039 to student 1010	3. Responded peer 6. Discussed confidently	3. Responded peer 6. Discussed confidently
	Student 1039 to student 1043	3. Responded peer 4. Agreed with peer 7. Explained further	4. Agreed with peer 7. Explained further
	Student 1038	8. Made comments and discussed	8. Made comments
	Student 1038	9. Made comments on weekly lecture 10. Disagree with teacher	9. Mage comments on the content of the lecture 10. Disagreed with teacher
	Student 1048	1. Presented ideas 11. Asked question	1. Presented ideas 11. Asked question
	Student 1043	1.Presented ideas	1. Presented ideas
	Student 1010	11. Asked question 12. Discussed and sought help	11. Asked question 12. Discussed and sought help
	Student 1010	13. Gave references	13. Gave references
	Student 1038 to student 1010	3. Responded peer 14. Fulfilled peer's inquiry	3. Responded peer 14. Fulfilled peer's inquiry
	Teacher	-	
	Student 1039	7. Explain further 2.Invited others thought	7. Explained further 2. Invited others thought
	Teacher to Student 1039	-	
	Student 1039 to Teacher	1. Presented ideas	1. Presented ideas

Week	Participants	Codes of the messages (given by the researcher)	Codes of messages (given by another researcher)
	Student 1010 to student 1039	15. Acknowledged peer's contribution	15. Acknowledges fellow student's contribution
	Student 1043	16. Discussed with reference	16. Discussed with reference
	Student 1026	3. Responded to peer 16. Discussed with reference	3. Responded to peer 16. Discussed with reference
	Student 1049	3. Responded to peer 7. Explained further 13. Gave references	3. Responded to peer 7. Explained further 13. Gave references
	Student 1043	3. Responded to peer 7. Explained further	3. Responded to peer 7. Explained further

Table B3. List of codes of students' messages in Professional Basis of Paramedic Practice 2

No	Codes	Definitions
1	Presented ideas	Explained discussion task using past experience
2	Invited others thought	Asked for fellow students thought
3	Responded peer	Answered fellow student
4	Agreed with peer	Agreed with the opinion of fellow student
5	Sought clarification	Sought further explanation from colleague
6	Discussed confidently	Discussed and provided information to fellow student confidently
7	Explained further	Clarified again the topic for fellow student
8	Made comments and discussed	Students made comments positively and negatively on previous discussion of fellow students
9	Made comments on weekly lecture	Students discussed the content of online lecture note and made negative comments
10	Disagree with teacher	Presented different opinion on teacher's idea in the lecture note
11	Asked question	Student asked direct question to the group
12	Discussed and sought help	Student explained his/her view of a particular topic and sought others help to justify knowledge
13	Gave references	Gave references relevant of the topic being discussed
14	Fulfilled peer's inquiry	Discussed fellow students inquiry

No	Codes	Definitions
15	Acknowledged peer's contribution	Thanked fellow student for helpful contribution
16	Discussed with reference	Explained discussion task with reference from book or journal
17	Disagreed with peer	Gave different opinion or inclined to agree with fellow student
18	Asked for suggestion	Sought fellow students' suggestion for a particular situation
19	Supported peer	Supported fellow student's answer and discussed
20	Sought for ideas	Asked for help/ ideas due to lack of ideas on the task
21	Discussed with examples	Explained discussion task with practical examples
22	Discussed logically	Discussed the topic logically from various points of view
23	Appreciated peer	Appreciated fellow student's discussion as it was interesting and new
24	Provided rational	Student provided rational of answers
25	Answered peer	Answered peer's question of previous posting
26	Agreed with teacher	Student agreed with the feedback by the teacher
27	Commented on teacher's answer/posting	Student commented on teacher's answers and discussed
28	Sought technical help	Students sought technical assistance for down loading resource materials
29	Provided technical help	Helped colleague in solving technical problem
30	Gave more information	Student gave more information and opinion on previous discussion
31	Gave opinion	Student gave opinion on the situation discussed by the teacher
32	Gave different opinion	Gave different opinion about patient care
33	Gave personal opinion	Student presented personal opinion on a discussion task

Table B4. List of categories of online messages and definitions of categories in Professional Basis of Paramedic Practice 2

Codes	Definitions	Categories	Definitions of categories
1. Presented ideas 21. Discussed with examples 7. Explained further	Explained discussion task using past experience Explained discussion task with practical examples Clarified again the topic	A. Sharing experience	Students explained the task using past professional experience providing examples or further clarifications.

Codes	Definitions	Categories	Definitions of categories
	for fellow student		
6. Discussed confidently 30. Gave more information 31. Gave opinion 33. Gave personal opinion	Discussed and provided information to fellow student confidently Student gave more information and opinion on previous discussion Student gave opinion on the situation discussed by the teacher Student presented personal opinion on a discussion task	B. Exchanging/ Sharing information	While discussing a topic the students share relevant information or opinions or sometimes make reflective comments on their peers' opinion.
12. Discussed and sought help	Student explained his/her view of a particular topic and sought others help to justify knowledge	C. Comparing ideas	Students present their own idea and seek others thoughts to confirm their own knowledge.
22. Discussed logically 24. Providing rational	Discussed the topic logically from various points of view Student provided rational of answers	D. Justifying knowledge	Students justify their ideas and provide a rationale and logical argument.
16. Discussed with references 13. Gave references	Explain discussion task with references from book or journal Gave reference relevant of the topic being discussed	E. Sharing resources	Students provide references from a book, journal, web site etc.
2. Invited others thought 5. Sought clarification 11. Asked question 18.Asked for suggestion 20. Sought for ideas	Asked for fellow students thought Sought further explanation from colleague Student asked direct question to the group Sought fellow students' suggestion for a particular situation Asked for help/ ideas due to lack of ideas on the task	F. Seeking help	Students seek fellow students' help by asking questions, inviting others opinions or seeking further clarification, thoughts or ideas.
3. Responded peer	Answered fellow student Answered peer's question	G. Helping peer	Students help each other by answering questions or responding to a

Codes	Definitions	Categories	Definitions of categories
25. Answered peer 14. Fulfilled peers inquiry	of previous posting Discussed fellow students inquiry		particular enquiry.
15. Acknowledged peer's contribution 23. Appreciated peer	Thanked fellow student for helpful contribution Appreciated fellow student's discussion as it was interesting and new	H. Acknowledging peer help	Students thank or value peer's helpful contribution to their knowledge in various ways.
28. Sought technical help	Students sought assistance for down loading resource materials	I. Seeking technical help	Students seek course leaders help for any technical problem that arises in the use of *TopClass* delivery system
29. Provided technical help	Helped colleague in solving technical problem	J. Providing technical help	Fellow students help each other by giving suggestions for solving technical problems.
4. Agreed with peer 19. Supported peer	Agreed with the opinion of fellow student Supported fellow student's answer and discussed	K. Providing support	Peers support each other's ideas or agree with each other's opinions.
8. Made comments and discussed	Students made comments positively and negatively on previous discussion of fellow students	L. Provided feedback	Students discuss fellow student's presentations and point out weaknesses for further improvement or understanding.
17. Disagree with peer 32. Gave different opinion	Gave different opinion or inclined to agree with fellow student Gave different opinion for about patient care	M. Arguing with peer	Members of the peer group argue with each others' opinions during discussion, and try to establish a common decision.
26. Agreed with teacher	Student agreed with the feedback by the teacher	N. Supporting teacher	Students support or agree with teachers' ideas or messages.
9. Made comments on weekly lecture 10. Disagree with teacher 27. Commented on	Students discussed the content of online lecture note and made negative comments Presented different opinion about teacher's idea in the lecture note Student commented on	O. Arguing with teacher	Students make comments on teachers' online lecture notes and argue with them.

Codes	Definitions	Categories	Definitions of categories
teacher's posting	course teacher's answers and discussed		

Table B5. Sequence of messages posted by students and teacher in Research in Paramedic Practice

Week	Participants
Week 1	Student 2025 Teacher to student 2025
	Student 2042 Teacher to student 2042
	Student 2031 Teacher to student 2031
	Student 2007 Teacher to student 2007
	Student 2026 Teacher to student 2026 Student 2011 to Student 2026
	Student 2027 Teacher to student 2022
	Student 2038 Teacher to student 2038
	Student 2008 Teacher to student 2008
	Student 2020 Teacher to student 2020 Student 2020
	Student 2027 Teacher to student 2027
	Student 2021 Teacher to student 2021 Student 2020 to student 2021
	Student 2003 Teacher to student 2003

Week	Participants
	Student 2036 to student 2003 Teacher to student 2036
	Student 2024 Teacher to student 2024
	Student 2013 Teacher to student 2013
	Student 2040 Teacher to student 2025
	Student 2005 Teacher to student 2005
	Student 2034 Teacher to student 2034
	Student 2037 Teacher to student 2037
	Student 2009 Teacher to student 2009
Week 2	Student 2025 Teacher to student 2025
	Student 2036 Teacher to student 2036
	Student 2038 Teacher to student 2038
	Student 2031 Teacher to student 2031
	Student 2026 Teacher to student 2026
	Student 2039 Teacher to student 2039 Student 2039 Teacher to student 2039
	Student 2027 Teacher to student 2027
	Student 2020 Teacher to student 2020

Week	Participants
	Student 2003 Teacher to student 2003
	Student 2027 to student 2003
	Student 2008 Teacher to student 2008
	Student 2021 Teacher to student 2021
	Student 2004 Teacher to student 2004
	Student 2021 Teacher to student 2021
	Student 2034 Teacher to student 2034
	Student 2013 Teacher to student 2013
	Student 2009
	Student 2024 Teacher to student 2024
Week 3	Teacher
	Student 2039 Teacher to student 2039
	Student 2026 Teacher to student 2026
	Student 2029 Teacher to student 2029
	Student 2020 Teacher to student 2020
	Student 2020 Teacher to student 2020
	Student 2038 Teacher to student 2038
	Student 2031 Teacher to student 2031
	Student 2003 Teacher to student 2003

Week	Participants
	Student 2021 Teacher to student 2021
	Student 2034 Teacher to student 2025
	Student 2024 Teacher to student 2024
	Student 2027 Teacher to student 2027
	Student 2042 Teacher to student 2042
Week 4	Student 2038 Teacher to student 2038
	Student 2021 Student 2020 to Student 2021 Student 2036 to 2021 Teacher to student 2021
	Student 2026 Teacher to student 2026
	Student 2020 Teacher to student 2020
	Student 2029 Teacher to student 2029
	Student 2034 Teacher to student 2034
	Student 2024 Teacher to student 2024 Student 2036 student 2024 Student 2024 student 2036
	Student 2003 Teacher to student 2003
	Student 2031 Teacher to student 2031
	Student 2008 Teacher to student 2008

Week	Participants
Week 5	Student 2025 Teacher to student 2025
	Student 2021 Teacher to student 2021
	Student 2026 Teacher to student 2026
	Student 2036 Teacher to student 2036
	Student 2041 Teacher to student 2041
	Student 2020 Teacher to student 2020
	Student 2004 Teacher to student 2004
	Student 2038 Teacher to student 2038
	Student 2029 Teacher to student 2029
	Student 2020 Teacher to student 2020
	Student 2003 Teacher to student 2003
	Student 2018 Student 2027 to 2018 Student 2020 to student 2018 Student 2020 to student 2027 Teacher to student 2018
	Student 2039 Student 2029 to student 2039 Student 2039 to student 2029 Teacher to student 2039
	Student 2020 Teacher to student 2020
	Student 2003

Week	Participants
	Teacher to student 2003
	Student 2011 Student 2027 to 2011 Student 2020 to 2011 Teacher to student 2020 Teacher to student 2011 Teacher to student 2027
	Student 2039 Student 2029 to student 2039 Student 2039 to student 2029 Teacher to student 2039 Teacher to student 2029
	Teacher to all students Teacher to all students
	Student 2005 Teacher to student 2005
	Student 2043 Teacher to student 2043
	Student 2034 Teacher to student 2034 Student 2034 Teacher to student 2034 Student 2031 Teacher to student 2031
Week 6	Student 2038 Teacher to student 2038
	Student 2005 Teacher to student 2005
	Student 2034 Student 2024

Week	Participants
	Teacher to student 2024
	Student 2041 Student 2034 to Teacher Teacher to student 2034
	Student 2020 Teacher to student 2020
	Student 2034 Teacher to student 2034
	Student 2039 Teacher to student 2039
	Student 2026 Student 2034 Teacher to student 2034
	Student 2019 Teacher to student 2019 Student 2019 Teacher to student 2019
	Teacher to student 2041
	Student 2031 Teacher to student 2031
Week 7	Student 2038 Teacher to student 2038
	Teacher to all students
	Student 2042 Teacher to student 2042
	Student 2021 Teacher to student 2021 Student 2021 Teacher to student 2021
	Student 2008 Teacher to student 2008 Student 2008

Week	Participants
	Teacher to student 2008
	Student 2020 Teacher to student 2020 Student 2020 Teacher to student 2020
	Student 2019 Teacher to student 2019
	Student 2043 Teacher to student 2043 Student 2043 Teacher to student 2043
Week 8	Student 2038 Teacher to student 2038
Week 9	Student 2038 Teacher to student 2038
	Student 2025 Teacher to student 2025
	Student 2026
	Student 2020 Teacher to student 2020
Week 10	Student 2020 Teacher to student 2020
	Student 2038 Teacher to student 2038
	Student 2020 Teacher to student 2020

Week	Participants
Week 11	Student 2020 Teacher to student 2020 Teacher to 2020 Student 2020 Teacher to student 2020 Student 2020 Teacher to student 2020
	Student 2008 Teacher to student 2008
	Student 2029 Teacher to student 2029
	Student 2038 Teacher to student 2038 Teacher to student 2038
	Student 2021 Teacher to student 2021
	Student 2024 Teacher to student 2024
Week 12	Student 2038 Teacher to student 2038

APPENDIX C

QUESTIONNAIRES, DIARY, AND INTERVIEW QUESTIONS

Contents:

SQ1: Initial Questionnaire

Dear Participant,

I would like to request you to complete this questionnaire, and return by email to: MdKabirul.Islam@students.vu.edu.au

All information that you give me will be treated in confidence and is purely for the purpose of my research. No person other than my supervisors will have access to the information and it will not advantage or disadvantage you in any way in regards of completing the course.

Instructions: To fill in the questionnaire, click on 'Reply' button. If you have any difficulty in getting the text appended to the reply portion of the message, copy the questionnaire and then paste it to reply section. Please complete the demographic information and insert 'X' in the bracket [ ] where ever applicable.

ID:
Gender:
Country:
State (for Australian students):
Year of study (first yr/second yr):
Enrolment status (part time/ full-time):

1. How long have you been working as a paramedic or its equivalent (paramedic ambulance officer, EMT, EMA)?

2. Describe briefly your current duties in your job as a paramedic or its equivalent.

3. Were you familiar with online teaching-learning before enrolling in this course?

Yes [ ] No [ ]

If yes, please specify.

4a. What are the important factors that motivated you to undertake this online course?

i.

ii.

iii.

iv.

4b. Which of those listed above in 4a are the most important?

5. How likely is it that you will finish the course?

a. Very likely. [ ]

b. Moderately likely. [ ]

c. Not likely. [ ]

d. Don't know. [ ]

6. What academic support do you expect from the teaching staff for this course?

7. How do you expect to learn while completing this course?

8. How likely is it that you will post messages in response to discussion questions posted each week?

a. Highly likely [ ]

b. Moderately likely [ ]

c. Not likely [ ]

d. Don't know [ ]

9. How many hours per week do you expect to spend studying in this course?

a. 0-5 hours [ ]

b. 6-10 hours [ ]

c. 11-15 hours [ ]

d. More than 15 hours [ ]

10a. What factors do you think will influence your decision to read online discussions?

i.
ii.
iii.
iv.

10b. Which of these is the most important?

Thanks for completing this questionnaire.

SQ2: End of year questionnaire

Dear Participants,

I acknowledge the assistance you have provided for my research during the year 2000. Your support at different stages of this research is highly appreciated and before I conclude my investigation, I would like to request you to complete and return the following End of Year Questionnaire. I assure you that this is the final questionnaire and I will not ask any further information. You may return this questionnaire by email to: MdKabirul.Islam@students.vu.edu.au

The information you provide will be treated in strict confidence and will be used for research purposes only. Identifying information will not be disclosed to academic staff involved in the course, no person other than my supervisors will have access to identifying information, and completion and return of questionnaire is not expected to advantage or disadvantage you in any way.

Instructions: To complete the questionnaire, click on 'Reply' button in your email program. If you have any difficulty in getting the text appended to the reply portion of the message, copy the questionnaire and then paste it to the reply section.

Please complete the demographic information below:

Gender:
Age:
State/Territory (for Australian students only):
Country:
Year of study (1^{st} year/2^{nd} year):
Enrolment Status (Part time/Full time):

Please answer the following questions by inserting an 'X' in the bracket [ ] where ever applicable.

1. How often did you read online weekly lecture material posted by the course staff?

a. I read every week's online lecture [ ]

b. I read most of the week's online lecture [ ]

c. I read some of the week's online lecture [ ]

d. I never read online weekly lectures [ ]

2. In studying this course, how often did you **read** online discussion list in response to the discussion questions posed by lecturers?

a. I read online discussions every week [ ]

b. I read online discussions most weeks [ ]

c. I read online discussions some weeks [ ]

d. I read online discussions rarely or never [ ]

3(i). Can you please indicate the **factor(s)** that influenced your decision to read online discussions?

a. To compare my ideas and concepts with other colleagues [ ]

b. To enhance knowledge about discussion topic [ ]

c. To see relevance of discussion and variety of information [ ]

d. To get feed back from teacher about the topic[ ]

3(ii). Which one of that list in 3(i) is the most important?

(If you have answered 3(i) & 3(ii), please go to Q. 5)

4.Please indicate the factors that influenced your decision **not to read** online discussions.

a. Participation is not assessed [ ]

b. Irrelevance to topic [ ]

c. Busy with work and don't have enough time [ ]

d. Most of the time Top Class system was slow [ ]

5. Have you ever been the first person to respond a discussion question in any week?
Yes [ ] No [ ]

i. If yes, Please explain why you did respond first to it?

a. The discussion question was relevant to my professional practices [ ]
b. The discussion question was contradictory [ ]
c. Discussion area is an interesting topic [ ]
d. To stimulate others colleagues to interact on the topic [ ]

ii. If not, please explain why not?

a. I didn't have chance to read the topics in time [ ]
b. I am interested to see others comment [ ]
c. Topics were not clear to me at the beginning [ ]
d. I couldn't read the relevant material to respond first [ ]

6. How helpful were the 'discussion point' items posed by the staff to stimulate online participation?

a .Very useful [ ]

b. Quite useful [ ]

c. Useful [ ]

d .Not useful [ ]

7. How helpful was the teachers' feedback in clarifying your concept of the 'discussion topic' during online discussion?

a. Very useful [ ]

b. Quite useful [ ]

c. Useful [ ]

d. Not useful [ ]

8. In what other ways, if any, did staff contribute to your learning online?

a. By providing suggestions to prepare assignments [ ]

b. By posting different academic and general information on the Top Class [ ]

c. By replying to your email and telephone inquiries [ ]

d. By providing help to overcome technological problem [ ]

9. How useful were the online contributions for your learning about the topic being discussed in the course?

a. Very useful [ ]

b. Quite useful [ ]

c. Useful [ ]

d. Not useful [ ]

10. Did online discussions assist you to understand any of the topics that you regarded as difficult?

Yes [ ] No [ ]

11. How many of the weekly discussion topics were relevant to your professional needs?

a .Most of the topics [ ]

b. Some of the topics [ ]

c. Very few topics [ ]

d. None of the topics [ ]

12. How useful was the CD material provided by course staff to participate in online discussion?

a. Very useful [ ]

b. Quite useful [ ]

c. Useful [ ]

d. Not useful [ ]

13. Did you meet face-to-face with other students in this course?

Yes [ ] No [ ]

If yes, did you discuss any topic of the course with other students?

Yes [ ] No [ ]

14. Did you discuss any topic/issues related to the course with paramedic colleagues who are not taking the course?

Yes [ ] No [ ]

If yes,

i. Please explain briefly what you discussed?

ii. How did the discussion arise?

a. Paramedic colleague(s) was interested to know about the course [ ]
b. I asked paramedic colleague(s) about his/her experience of a situation [ ]
c. We were discussing an incident relevant to our profession [ ]
d. Other(s) (**please specify**).....

iii. How did the discussions contribute to your learning about the topic?
a. The discussion enhanced my knowledge about the subject [ ]
b. It stimulated my thoughts on the topic [ ]
c. The feedback helped me to clarify a situation being discussed[ ]
d. It helped me to think more about the topic/situation [ ]

15. Did you encounter any difficulty studying this course?

Yes [ ] No [ ]

If '**yes**', please indicate the difficulties you have encountered:

a. Top Class delays [ ]
b. Replies to email and phone inquiries didn't arrive within the expected time [ ]
c. Instructions on how to use CD were not clear [ ]
d. Others (please specify).....

Thank you very much for your time!

D1: Student Diary

Name:

Note: The Diary template is created with the Microsoft Word and you can adjust the width of the columns as per your requirements. Please send the weekly dairy entries at the end of every week (Sunday) by email.

Instruction: To send weekly Diary entries, please save the word file and send it as an attachment to your message. If you have any trouble in sending, please let me know.

Week:

Day	Date	Time (for example, 2pm to 5pm)
Monday		
Tuesday		
Wednesday		
Thursday		
Friday		
Saturday		
Sunday		

Thanks for completing the Diary entries

SI1: Questions for telephone interview

1. Can you please mention your ides about advantages of online learning that you have gathered in studying on this course?

2. What activities you do each tome when log onto the *TopClass* system?

3. In what ways do you response to the discussion task and your fellow students?

4. In what ways online messages posted by other students enhance your knowledge about the topic?

5. Do you think that the messages posted by other students stimulate you to post further message?

6. In what other ways do you contact personally with other students to get academic help?

7. What role do your teacher play to promote interaction in the discussion list about a topic?

TI1: Questions for teacher interview 1

1. What do you understand to be the goals of the course?

2. What are the goals for teaching online paramedic course?

3. As a teacher what methods have you adapted for teaching?

4. How do these methods promote students learning in an online situation?

5. Can you mention the goals you have identified for your students learning?

6. In what ways do you seek to exploit the potential of the students' Peer group as learning resources for achieving objectives for the course?

7. In what ways have you observed the online Peer group act as a learning resource for the students?

8. Have you found any difficulty raised by the students in studying on this course?

9. What are the patterns of participation on this course?

10. What do they learn from each other?

TI2 & TI3: Questions for teacher interview 2 and 3

1. Can you please comment on the number of messages posted in different weeks?

2. Can you please comment on the overall messages posted by the students in the subject?

3. Can you please comment on the messages posted by individual student in your subject?

4. What was the nature of student interaction?

5. How can you engage all students in discussion?

6. Can you please rank students' online message posting in your subject?

APPENDIX D

STUDENTS' DEMOGRAPHIC INFORMATION, NUMBER OF MESSAGES POSTED, AND ACADEMIC PERFORMANCE

Contents:

Table D1. Demographic information of first year students, messages posted and their academic performance in three subjects

				Professional Basis of Paramedic Practice		Issues in Prehospital Health Service Delivery		Professional Basis of Paramedic Practice 2		Total messages
Student ID	Gender	Age (years)	Experience (years)	Messages posted	Marks (%)	Messages posted	Marks (%)	Messages posted	Marks (%)	
1001	M	30	4	2	81.0	0	NC	X	X	2
1002	M	31	10	0	73.0	1	54.0	0	NC	1
1003	F	28	3	0	82.0	0	75.0	1	80.0	1
1004	M	36	14	11	84.0	10	80.0	X	X	21
1005	M	38	18	0	NC	0	NC	X	X	0
1006	M	33	10	0	82.0	0	70.0	0	80.0	0
1007	F	35	6	2	83.0	0	NC	X	X	2
1008	F	30	7	3	92.0	2	67.	5	95.0	10
1009	M	31	5	0	84.0	6	60.0	1	NC	7
1010	M	35	15	0	88.0	2	63.0	14	92.0	16
1011	F	33	12	0	82.0	0	64.0	0	82.0	0
1012	F	33	6	0	72.0	1	52.0	0	55.0	1
1013	M	31	11	0	72.0	1	62.0	0	NC	1
1014	F	29	10	13	78.0	6	54.0	X	X	19
1015	M	26	10	0	86.0	0	75.0	X	X	0
1016	F	37	13	8	87.0	12	66.0	X	X	20
1017	M	36	12	5	80.0	5	71.0	2	74.0	12
1018	M	39	12	5	NC	0	NC	X	X	5
1019	M	30	5	0	NC	0	NC	X	X	0
1020	M	38	6	0	NC	0	NC	X	X	0
1021	F	35	15	0	74.0	0	53.0	5	69.0	5
1022	F	28	5	0	81.0	1	62.0	0	55.0	1
1023	M	30	10	3	NC	3	58.0	0	NC	6
1024	M	37	12	0	NC	2	72.0	X	X	2
1025	M	29	12	13	71.0	4	NC	1	NC	18
1026	M	33	3	0	NC	0	NC	5	92.0	5
1027	F	30	6	3	82.0	3	74.0	0	NC	6
1028	M	33	10	8	80.0	0	74.0	X	X	8
1029	M	29	5	2	18.0	3	22.0	X	X	5

				Professional Basis of Paramedic Practice		Issues in Prehospital Health Service Delivery		Professional Basis of Paramedic Practice 2		Total messages
Student ID	Gender	Age (years)	Experience (years)	Messages posted	Marks (%)	Messages posted	Marks (%)	Messages posted	Marks (%)	
1030	F	27	4	0	81.0	0	58.0	0	NC	0
1031	F	27	4	0	80.0	5	62.0	1	NC	6
1032	M	33	10	0	NC	4	NC	X	X	4
1033	M	29	8	0	76.0	0	54.0	1	58.0	1
1034	M	37	12	0	NC	0	NC	X	X	0
1035	M	33	13	0	NC	0	NC	X	X	0
1036	M	36	6	X	X	X	X	4	82.0	4
1037	F	30	10	X	X	X	X	4	75.0	4
1038	M	33	4	X	X	X	X	28	90.0	28
1039	M	32	12	X	X	X	X	36	90.0	36
1040	M	43	19	X	X	X	X	0	NC	0
1041	F	27	7	X	X	X	X	0	NC	0
1042	F	24	3	X	X	X	X	1	81.0	1
1043	M	30	8	X	X	X	X	24	64.0	24
1044	M	24	4	X	X	X	X	1	49.0	1
1045	F	32	8	X	X	X	X	0	49.0	0
1046	M	29	10	X	X	X	X	4	55.0	4
1047	M	33	12	X	X	X	X	2	NC	2
1048	M	36	4	X	X	X	X	10	69.0	10
1049	M	35	10	X	X	X	X	3	NC	3
1050	F	30	10	X	X	X	X	1	NC	1

X indicates that the students did not enrol for the subject, and NC indicates that the students did not complete the subject

Table D2. Demographic information of second year students, messages posted and their academic performance in two subjects

				Prehospital Ethical and Legal Issues		Research in Paramedic Practice		Total messages
Student ID	Gender	Age (years)	Experience (years)	Messages posted	Marks (%)	Messages posted	Marks (%)	
2001	M	36	11	4	53.0	X	X	4
2002	M	25	8	0	NC	X	X	0
2003	M	46	7	0	52.0	5	67.0	5
2004	M	35	9	0	63.0	2	NC	2
2005	M	26	6	1	60.0	4	NC	5
2006	M	33	6	0	64.0	0	NC	0
2007	F	29	12	3	73.0	1	74.0	4
2008	M	40	5	2	NC	6	82.0	8
2009	F	30	9	1	66.0	2	82.0	3
2010	M	33	5	0	56.0	X	X	0
2011	F	29	5	11	77.0	2	75.0	13
2012	M	31	4	12	60.0	X	X	12
2013	F	28	10	7	71.0	4	81.0	11
2014	M	29	11	0	NC	X	X	0
2015	M	48	11	1	51.0	X	X	1
2016	M	35	11	9	57.0	0	63.0	9
2017	M	35	4	3	66.0	X	X	3
2018	F	35	10	0	51.0	4	65.0	4
2019	F	26	8	2	75.0	3	86.0	5
2020	M	40	19	16	74.0	19	78.0	35
2021	F	33	4	10	51.0	10	77.0	20
2022	M	37	16	4	52.0	X	X	4
2023	M	32	10	1	51.0	0	63.0	1
2024	F	30	11	8	55.0	7	72.0	15
2025	M	30	5	6	62.0	5	85.0	11
2026	M	33	4	5	NC	8	NC	13
2027	M	28	7	8	55.0	6	74.0	14
2028	M	29	5	1	55.0	0	NC	1
2029	M	28	5	1	57.0	1	NC	2

				Prehospital Ethical and Legal Issues		Research in Paramedic Practice		Total messages
Student ID	Gender	Age (years)	Experience (years)	Messages posted	Marks (%)	Messages posted	Marks (%)	
2030	M	33	10	2	60.0	X	X	2
2031	M	40	18	2	54.0	5	79.0	7
2032	M	30	7	3	52.0	X	X	3
2033	M	32	9	5	51.0	0	63.0	5
2034	M	40	5	4	52.0	10	65.0	14
2035	M	44	15	X	X	0	92.0	0
2036	F	35	8	X	X	6	NC	6
2037	F	26	4	X	X	1	NC	1
2038	M	35	6	X	X	12	62.0	12
2039	M	33	8	X	X	6	NC	6
2040	M	28	3	X	X	2	NC	2
2041	M	29	5	X	X	2	NC	2
2042	M	23	3	X	X	3	NC	3
2043	M	40	7	X	X	3	NC	3
2044	M	31	7	X	X	0	47.0	0
2045	F	30	11			0	49.0	0

X indicates that the students did not enrol for the subject, and NC indicates that the students did not complete the subject

APPENDIX E

TEACHERS' PERCEPTIONS OF STUDENTS' ONLINE MESSAGES

Contents:

Table E1. Teacher's perception of students' online messages in Professional Basis of Paramedic Practice 1

	Messages posted	Teacher's ranking	Rank of teacher's ranking	Marks (%)	Rank of marks obtained
1001	2	7	9.5	81.5	6
1004	11	2	2	83.6	3
1007	2	7	9.5	83.2	4
1008	3	4	4.5	92.0	1
1014	13	5	6.5	78.3	9
1016	8	1	1	87.0	2
1017	5	4	4.5	80.0	7
1025	13	6	8	70.7	10
1027	3	5	6.5	81.6	5
1028	8	3	3	79.9	8
1029	2	8	11	17.5	11

Table E2. Teacher's perception of students' online messages in Issues in Prehospital Health Service Delivery

Student ID	Messages posted	Teacher's ranking	Rank of Teacher's ranking	Marks (%)	Rank of marks obtained
1002	1	9	15	53.6	13
1004	10	1	1	80.0	1
1008	2	3	3.5	67.0	5
1009	6	4	6	60.0	10
1010	2	7	12.5	62.6	6
1012	1	8	14	52.2	14
1013	1	7	12.5	62.0	8
1014	6	5	8.5	54.2	12
1016	12	4	6	66.1	6
1017	5	2	2	70.9	4
1022	1	6	10.5	62.2	7
1023	3	5	8.5	58.4	11
1024	2	6	10.5	72.5	3
1027	3	3	3.5	74.1	2
1029	3	10	16	22.2	15
1031	5	4	6	61.9	9

Table E3. Teacher's perception of students' online messages in Professional Basis of paramedic Practice 2

Student ID	Messages posted	Teacher's ranking	Rank of teacher's ranking	Marks (%)	Rank of marks obtained
103	1	15	16	80.0	8
1008	5	10	10	95.0	1
1010	14	7	7	92.0	2.5
1017	2	13	13	74.0	12
1021	5	12	12	69.0	10.5
1026	5	3	3	92.0	2.5
1033	1	14	14.5	58.0	14
1036	4	6	6	82.0	6
1037	4	4	4	75.0	9
1038	28	2	2	90.0	4.5
1039	36	1	1	90.0	4.5
1042	1	11	11	81.0	7
1043	24	8	8	64.0	13
1044	1	14	14.5	49.0	16
1046	4	9	9	55.0	15
1048	10	5	5	69.0	10.5

Table E4. Teacher's perception of students' online messages in Prehospital Ethical and Legal Issues

Student ID	Messages posted	Teacher's ranking	Rank of teacher's ranking	Marks (%)	Rank of marks obtained
2001	4	7	8	52.9	18
2005	1	6	7	60.1	9
2007	3	14	16	73.2	4
2009	1	18	22.5	66.1	6
2011	11	1	1.5	77.1	1
2012	12	2	3	60.30	10
2013	7	3	4	71.0	5
2015	1	20	25	51.0	23.5
2016	9	9	10	57.2	12
2017	3	5	6	66.0	7
2019	2	4	5	75.0	2
2020	16	1	1.5	74.0	3
2021	10	12	13.5	51.0	23.5
2022	4	10	11	52.3	20.5
2023	1	17	20.5	51.0	23.5
2024	8	12	13.5	54.8	15.5
2025	6	11	12	61.7	8
2027	8	13	15	54.8	15.5
2028	1	18	22.5	55.3	14
2029	1	19	24	57.0	13
2030	2	16	19	60.0	11
2031	2	8	9	54.0	17
2032	3	17	20.5	52.3	20.5
2033	5	15	17.5	51.0	23.5
2034	4	15	17.5	52.4	19

Table E5. Teacher's perception of students' online messages in Research in Paramedic Practice

Student ID	Number of messages posted	Teacher's ranking	Rank of teacher's ranking	Marks (%)	Rank of marks obtained
2003	5	9	14	66.6	13
2007	1	10	15.5	73.6	10.5
2008	6	2	2	82.0	4
2009	2	5	6.5	82.4	3
2011	2	7	11.5	75.0	9
2013	4	3	3	81.0	5
2018	4	10	15.5	65.0	14.5
2019	3	4	4.5	86.0	1
2020	19	1	1	78.0	7
2021	10	4	4.5	77.0	8
2024	7	6	9	72.0	12
2025	5	5	6.5	84.6	2
2027	6	8	13	73.6	10.5
2031	5	7	11.5	79.0	6
2034	10	6	9	65.0	14.5
2038	12	6	9	62.0	16

APPENDIX F
SCATTER DIAGRAM OF ONLINE PARTICIPATION AND ACADEMIC PERFORMANCE

Contents:

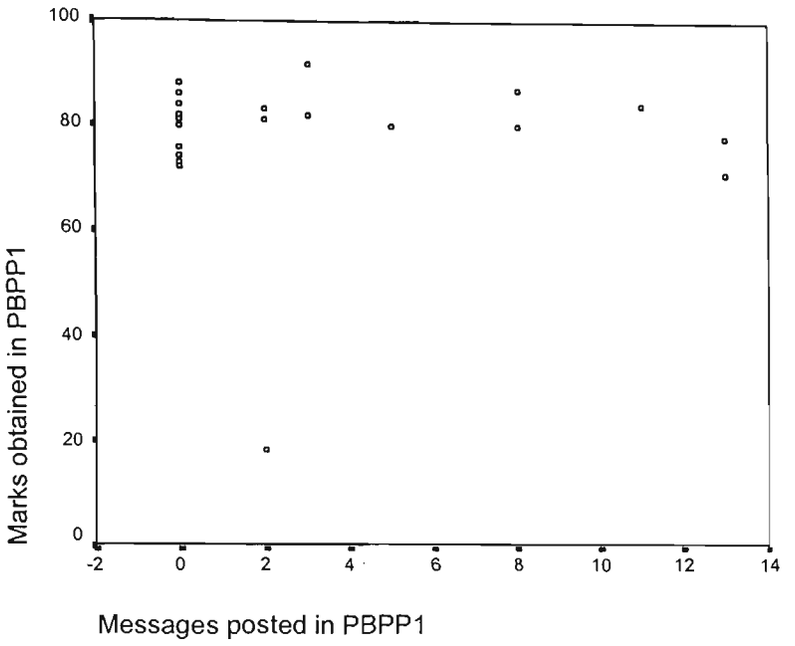

Figure F1. Scatter diagram of online participation and academic performance in Professional Basis of Paramedic Practice 1 (PBPP1).

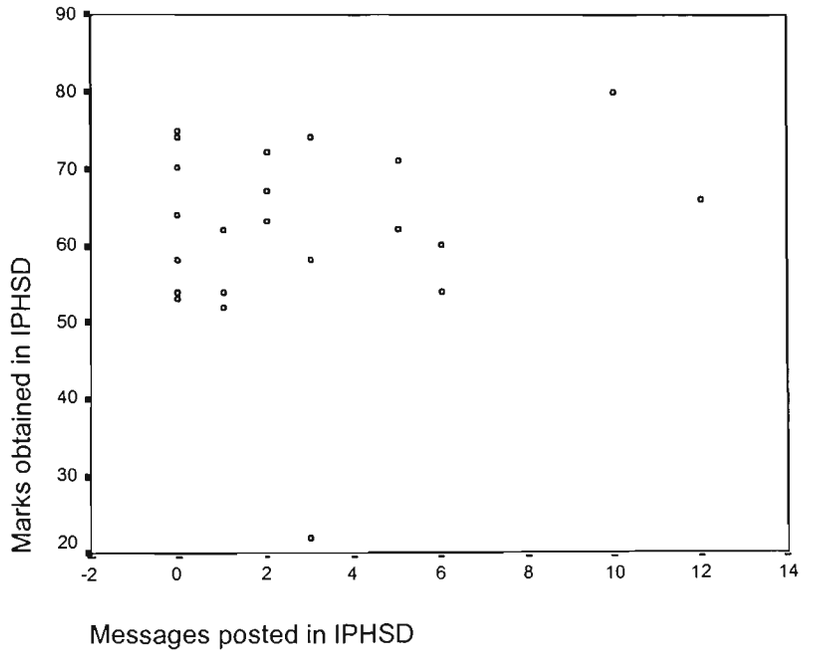

Figure F2. Scatter diagram of online participation and academic performance in Issues in Prehospital Health Service Delivery (IPHSD).

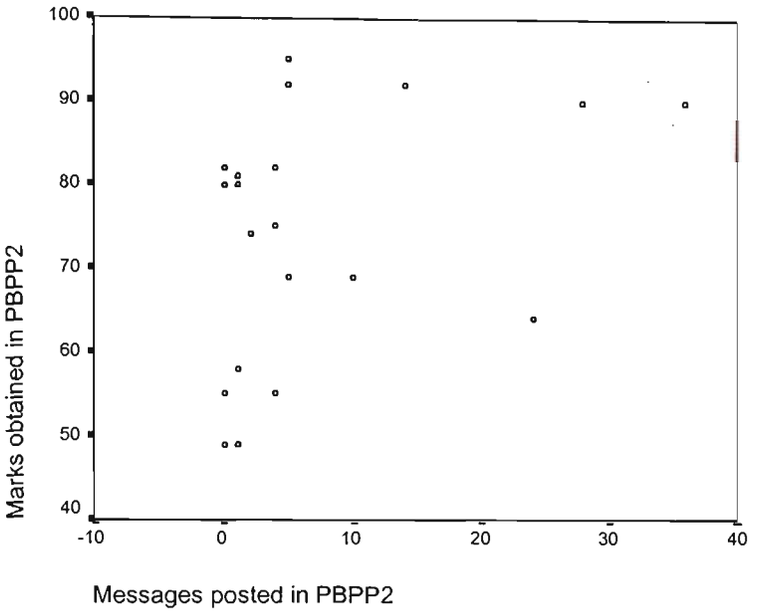

Figure F3. Scatter diagram of online participation and academic performance in Professional Basis of Paramedic Practice 2 (PBPP2).

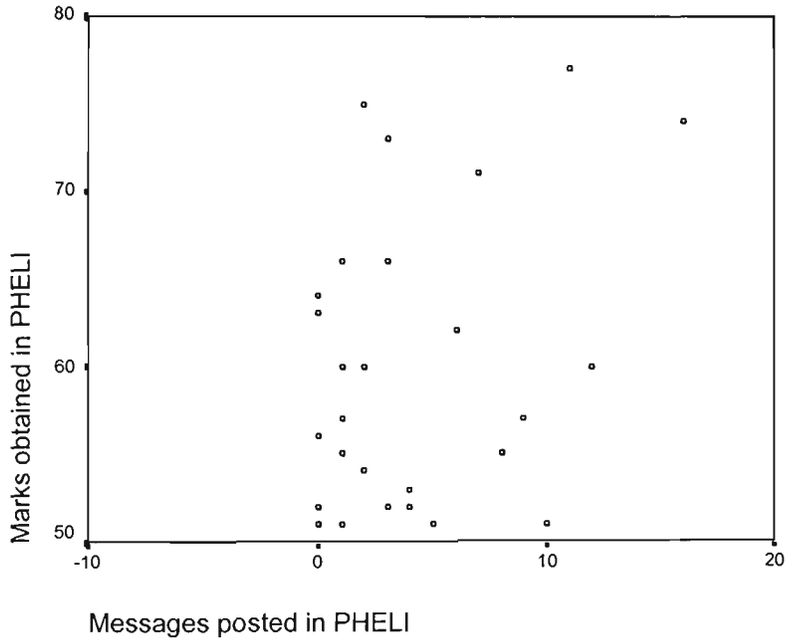

Figure F4. Scatter diagram of online participation and academic performance in Prehospital Ethical and Legal Issues (PELI).

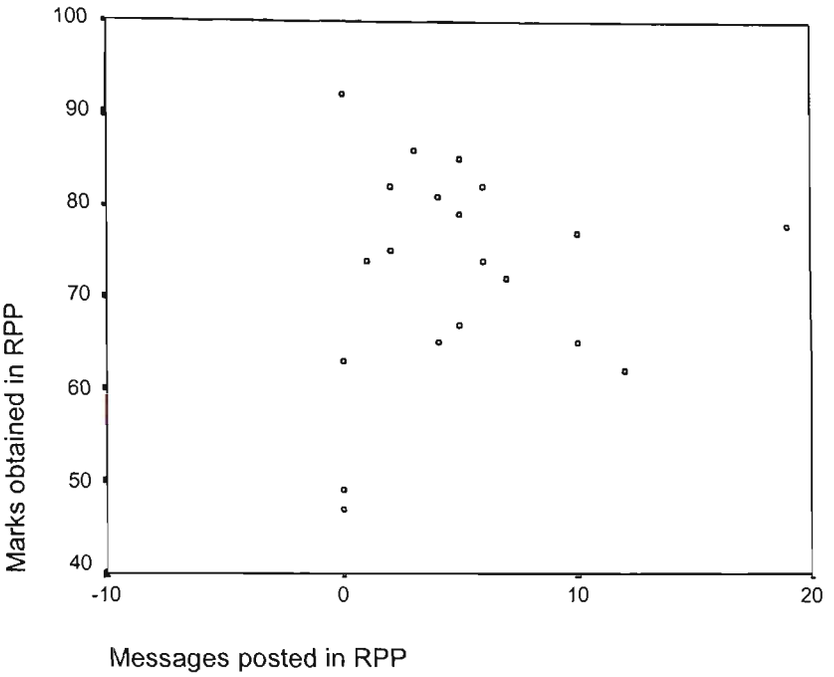

Figure F5. Scatter diagram of online participation and academic performance in Research in Paramedic Practice (RPP).

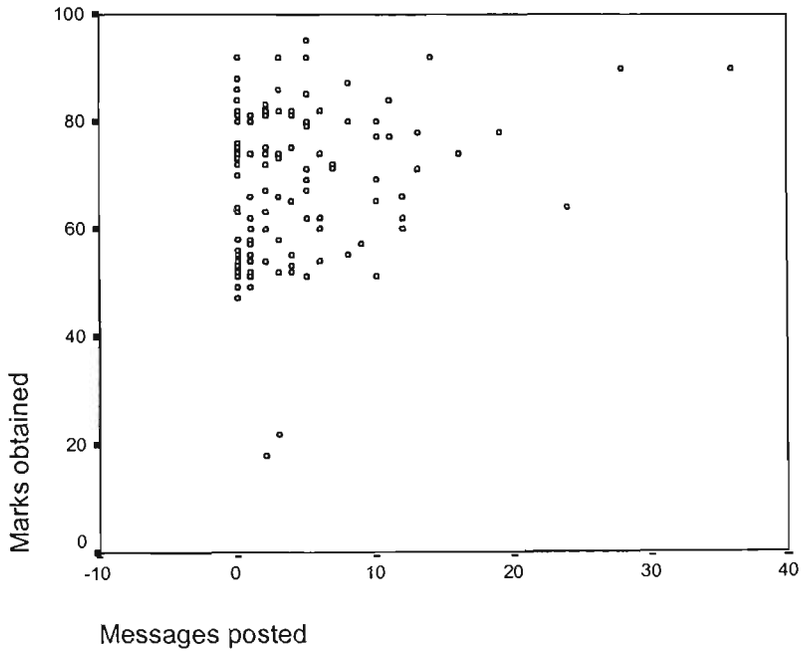

Figure F6. Scatter diagram of online participation and academic performance for five subjects combined.

APPENDIX G
EXAMPLES OF CATEGORIES OF STUDENTS' MESSAGES

The examples are the exact transcripts of students' messages copied from the saved electronic files. So spelling mistakes and grammatical errors may happen in the transcripts of students' messages.

A. Sharing experience

Student 1048: 1) Irregularly Irregular

Not all 'irregularly irregular' rhythms are AF – full stop. Regularity is based on the spacing of the QRS intervals (or the R-R interval for those with a fetish for extbooks). Therefore, the generation of any QRS complex from any ectopy in the heart can

produce rhythm disturbance or irregularities. The key indicators for AF are indiscernible (or fibrillatory) P waves and an irregular rhythm (ie lacking in order, routine or convention). I recently was working with a student and was asked that if I thought an ECG was showing first degree AV block. We agreed it was borderline. They then commented "Well, in any case it is AF because it is irregular"! I asked what about the nicely rounded, positively deflected P waves? The amusing thing here was I can remember saying a similar thing myself in the past. As (student 3) said – don't jump to conclusions. Just because a rhythm is irregularly irregular, it is not always AF.

B. Exchanging information

Student 1039 to student 1037: I'll try and answer some of the questions you raised from my perspective. Firstly no I don't believe this constitutes EMD because people with Afib (who still have a pulse) still have electrical (albeit abnormal elecrical activity) and mechanical activity. The easiest way to determine EMD (or PEA) is in a person who has electrical activity on the ECG but no palpable pulses. Secondly, yes I have heard of patients converted from Afib to a sinus rhythm (either electrically by cardioversion or pharmacologically) requiring ongoing anticoagulant therapy because of the risk of thrombus formation. In this case the patient isn't actually still in Afib. They have been successfully reverted to a sinus rhythm but it may take a couple of weeks (or more) before the contractions of the atria become forceful. Imagine if you like a leg that has been in plaster for six weeks and the muscles haven't been used. When the plaster is removed the muscles in the legs will be weak and will need some physio and exercise before they are restored to full strength. In AFib the atria have been fibrillating away for a period of time so the muscle becomes weak. After cardioversion it takes awhile before the atrial muscle regains its strength and begins contracting forcefully. So the patient is actually out of AFib and in a sinus rhythm its just the atria taking time to recover and because the atria are still not fuctioning optimally blood still tends to 'stagnate' in the atria therefore increasing the risk of thrombus formation. Thirdly if the monitor indicates NSR then it is NSR.

Hope this helps you in some small way.

C. Comparing ideas

Student 1037: Also being new to this, perhaps you/someone can help me with the following. On the 12 lead ECG on page 20 of Grauer, leads V2, V3 and V4 have no distinct J point, rather the QRS blends into the ST without any obvious demarcation.

Is this an issue, or am I right in assuming the rationale behind locating the J point is to determine ST elevation/depression and that in this instance elevation is quite obvious even without the J point to use as reference? Given this is so, and in the instance the J point is lost in another ECG WITHOUT significant ST changes - would the J point be unimportant due to the lack of ST changes? Any help would be appreciated.

D. Justifying knowledge

Student 1039: Following are some of my thoughts about the use of 12 lead ECG's (and some other things) in pre-hospital care. I tend to get a little heated when I talk about some of this stuff, so let me start by saying I don't mean to offend or insult anybody, just stimulate a bit of discussion about some things that I think are important for the future of the 'pre-hospital professional'. So here goes.

12 lead ECG's may not have any significant effect on how we treat patients according to our current 'protocols', but if we had 12 lead ECG's, and the knowledge to competently interpret them, would that maybe change some of our current 'protocols'?? Another argument against 12 lead ECG's might be that recording a 12 lead would add too much on-scene time. Studies from the US demonstrate consistently that recording a pre-hospital 12 lead adds on average 90 seconds to the on-scene time. That's not a great amount of time and when you consider that the same studies show that time to initiate inhospital thrombolysis is reduced anywhere from 20mins to 2 hours then I would tend to think that the extra 90 seconds is worth it. We also need to be careful about using a monitor as a diagnostic tool because they are not. How many times have you had a patient on a standard monitor that showed ST segment elevations/depression/peaked T waves etc and when the 12 lead was recorded none of these things really existed? And how many times has the reverse happened, where your monitor didn't show any changes and there were in fact significant changes on the initial 12 lead ECG? ECG interpretation takes a little time to learn, but so does learning all those drug 'protocols' with all the indications, contraindications.... but once you've got the information securely stored in the brain you tend to find it is fairly easy to retrieve once you need it... that is provided you use it. Which brings me to my next point. The reason I think most people find it hard to read ECG's and retain the knowledge is because they stop reading them. That is, they do an ECG interpretation course (sort of like this one) but then once they've finished and got the "pass" they all of a sudden stop reading ECG's. Don't believe me? Well I'm sort of betting that at the moment everyone doing this course gets their patients ECG's and sysytematically interprets them... and some of us probably even get copies of their 12 leads from the hospital. I'll bet though that within a few months of doing this course many of us will not be doing this, and a few months further down the track we'll have forgotten much of what we're now learning. Why? Because we're not continually applying it. So the question then would be why bother learning about ECG's at all? Why bother paying $$$ to do this course?? I'm sure that a lot of officers would object to learning all this technical stuff. Probably the same officers who resisted defibrillators and everything else that has ever been introduced into pre-hospital care... except TV's and recliner chairs of course!! And anyhow does pre-hospital care start and finish with ambulance services? Granted at present they are the biggest employer of 'pre-hospital professionals' but look a little further. Paramedics on remote mine sites, paramedics being the sole providers of health

services in rural areas, paramedics working in occupational health centres, paramedics working as sole health providers at resorts, on ships and in aircraft... If we don't improve our education and our capabilites we won't be doing any of the above, others will and ambulance will continue to be the narrow field that it currently is while nurses, doctors, physios, etc continue to evolve and move into these areas. Bring on the 12 leads (and a lot of other things), improve the education standards and grow as a professional group, and for those who don't want to... then enjoy being the 'drivers/bearers' of the future.
Cheers

E. Sharing resources

Student 1026: up till this time have been using the method suggested by Caroline 1995 p533 of rhythm, rate, p-waves, intervals and complexes but as i am also a newcomer Grauer's 1992(library copy till mine comes in) method also seems to have its benifits, i might develop an intertwining of the two. Off the track, i have found the 3000qr not a bad machine (i always thought it was standard paper although i know it is different from the lifepak) the only probs are in monitoring enroute which never supplys a smooth reading and this is my own opinion i suspect the fluros in the back of the truck interfere with it.Have a look at the heartstart 4000 and see what you think of that.

F. Seeking help

Student 1037: Okay,
After much reading and asking of the educated I still have no idea what VENTRICULAR ACTIVATION TIME (VAT) is, nor can anyone seem to explain/define INTRINSICOID DEFLECTION.
Any ideas as to their definition and importance would be most appreciated.

G. Providing help

Student 1039 to student 1037: I'll try and explain what VAT and intrinsicoid deflection is...as for its relevance clinically well I'll let you be the judge of that. Ventricular activation time refers to the time taken from the beginning of ventricular activation i.e. the start of the QRS to the point at which the impulse arrives at a particular electrode. The deflection produced by these impulses is called the intrinsicoid deflection. Bundle branch blocks increase the ventricular activation time because the time it takes the impulse to travel through the ventricles is longer due to the block. They also change the intrinsicoid deflection. If you look at a normal V1 QRS you usually see a small r followed by an S wave so you get a rS complex. In a normal V6 QRS complex you get a small q wave followed by an R wave so you get a qR complex. The hallmark of RBBB is the late intrinsicoid R wave that is seen. This is because the right ventricle is activated later and by a slower mechanism when the RBBB is blocked. With LBBB the intrinsicoid deflection is shown as a broad positive complex in V6 with no q wave and no s wave. Well I hope this sort of helps because after writing it I'm sort of confused myself but basically I think it is a lot of 'technical mumbo jumbo' for what you probably already know, that is, bundle branch blocks cause wide complexes (VAT), and the normal morphology (intrinsicoid deflection) of the QRS complexes in

leads V1 and V6 are changed due to the altered course the impulse takes as it passes through the ventricles.

Good Luck!!!

H. Acknowledging peer help

Student 1037 to student 1039: Thanks.... I think.

I. Seeking technical help

Student 1043: am i the only person having trouble downloading the workbook? have tried a dozen times. YES I DO HAVE THE ACROBAT READER before anyone askes the obvious. some pages are appearing with nothing on them and as a result my machine wont let me print. any ideas from anyone would be appreciated. be good if someone who was successful in downloading the work book if they could email it to me at (email address) regards

J. Providing technical help

Student 1026: [hi (student 1043), i've been partly succesful, i did it this way

1 uninstaled adobe 3.0 2 downloaded workbook to 3.5 floppy 3 installed adobe 4.0 from uni site printed pages 1-11 individually printed the remaining pages (landscape form)

BUT missing pages 13 15 18 (21 if there is one) it took me about 2 hours just to sort that out, good luck

K. Providing support

Student 1039 to student 1043: I agree with that comment absolutely (student 2). Anybody who has worked in a clinical role knows that patients don't present like the textbooks say they should and ECGs are no exception to this rule.

L. Providing feedback

Student 1038 to students 1039: As (student 1039) suggests in his reply it isn't that AF is persisting despite sinus on the monitor, but the effectiveness of atrial contraction. Also how the patient was reverted can have an affect, some studies I have read suggest that atrial ejection force is greater in patients who are reverted chemically rather than electrically, implying a "stunning" effect of DC reversion on the atria, although ejection force improves over time. The other factor associated is atrial enlargement (remember Starlings law of the heart), we tend to talk about it in relation tho the ventricles, but I cant see why the same wouldn't apply to atria.

M. Arguing with peers

Student 1037 to student 1038: Hi (student 1038), I'm inclined to agree with you.

I believe the most significant effect determining a BBB will make with regard to the standard (Non-ALS) care of the patient with a BBB is to avoid misinterpretation of Q waves and ST segment changes that can

be explained by the BBB rather than being attibuted to ischemia or infarction in the patient without a BBB.

N. Arguing with teacher

Student 1038: EMD literally just means that what is seen on the ECG is not what is actually occuring. I know that in practise we use the term to describe the preterminal condition, but I'm just wondering. As (course leader) says in his lecture notes AF and AFib are both SVT's but we dont tend to think of them in that way, because that is not the way that the terminology is used. But none the less the statement is correct, so literally speaking what does EMD mean? Perhaps this is the reason for the coining of the term PEA. It's just that the more I think about (student 1037) question, if something is happening electrically that is not reflected mechanically, be it ventricular contraction or someting else, I can't really think of a reason why this would not be EMD.

O. Supporting teacher

Student 1038: Hi (teacher), you're right, I don't know where I got 6 sec from, must have been half asleep when I was typing. Took your advice and went back and had another look at the strip I stick by my previous call in saying that it is regular apart from that one complex. Hence I don't think I can call it anything other than VT at the minute.

APPENDIX H
NUMBER OF MESSAGES POSTED BY STUDENTS IN RESPONSE TO THE TASK, FELLOW STUDENTS, AND THE TEACHER

Contents:

Table H1. Number of messages posted by 13 first year students who posted a message in Response to the task set, fellow students, and the teacher in Professional Basis of Paramedic Practice 1

Student ID	Total number of messages posted	Number of messages posted in response to		
		Fellow students	Task set	Teacher
1001	2	1	1	0
1004	11	3	7	1
1007	2	1	1	0
1008	3	1	2	
1014	13	4	8	1
1016	8	2	6	
1017	5	1	4	0
1018	5	1	2	2
1023	3	0	3	0
1025	13	3	9	1
1027	3	2	1	0
1028	8	2	6	0
1029	2	0	2	0
Total	78	21	52	5

Table H2. Number of messages posted by 18 first year students who posted a message in response to the task set, fellow students, and the teacher in Issues in Prehospital Health Service Delivery

Student ID	Total number of messages posted	Number of messages posted in response to		
		Fellow students	Task	Teacher
1002	1	0	1	0
1004	10	4	4	2
1008	2	2	0	0
1009	6	4	2	0
1010	2	0	2	0
1012	1	0	1	0
1013	1	0	1	0
1014	6	4	2	0
1016	12	2	9	1
1017	5	1	4	0
1022	1	0	1	0
1023	3	0	2	1
1024	2	0	2	0
1025	4	3	1	0
1027	3	1	2	0
1029	3	1	2	0
1031	5	1	3	1
1032	4	2	2	0
Total	71	25	41	5

Table H3. Number of messages posted by 22 first year students who posted a message in response to the task set, fellow students, and the teacher in Professional Basis of Paramedic Practice 2

Student ID	Total number of messages posted	Number of messages posted in response to		
		Fellow students	Task	Teacher
1003	1	0	1	0
1008	5	3	2	0
1009	1	0	1	0
1010	14	5	8	1
1017	2	0	2	0
1021	5	2	3	0
1025	1	0	1	0
1026	5	1	4	0
1031	1	0	1	0
1033	1	0	1	0
1036	4	2	2	0
1037	4	1	3	0
1038	28	12	15	1
1039	36	17	18	1
1042	1	0	1	0
1043	24	11	12	1
1044	1	0	1	0
1046	4	1	3	0
1047	2	0	2	0
1048	10	5	5	0
1049	3	1	2	0
1050	1	0	0	1
Total	154	61	88	5

Table H4. Number of messages posted by 27 second year students who posted a messages in response to the task set, fellow students, and the teacher in Prehospital Ethical and Legal Issues

Student ID	Total number of messages posted	Number of messages posted in response to		
		Fellow students	Task	Teacher
2001	4	0	4	0
2005	1	0	1	0
2007	3	1	1	1
2008	2	0	2	0
2009	1	1	0	0
2011	11	4	7	0
2012	12	5	6	1
2013	7	3	2	2
2015	1	0	1	0
2016	9	3	5	1
2017	3	1	2	0
2019	2	1	1	0
2020	16	5	8	3
2021	10	4	6	0
2022	4	0	4	0
2023	1	0	1	0
2024	8	5	3	0
2025	6	0	6	0
2026	5	0	5	0
2027	8	3	5	0
2028	1	0	1	0
2029	1	0	1	0
2030	2	0	2	0
2031	2	1	1	0
2032	3	0	3	0
2033	5	2	3	0
2034	4	0	4	0
Total	132	39	85	8

Table H5. Number of messages posted by 27 second year students who posted a messages in response to the task set, fellow students, and the teacher in Research in Paramedic Practice

Student ID	Total number of messages posted	Number of messages posted in response to		
		Fellow students		
2003	5	0	5	0
2004	2	0	2	0
2005	4	0	4	0
2007	1	0	1	0
2008	6	0	5	1
2009	2	0	2	0
2011	2	1	1	0
2013	4	0	4	0
2018	4	0	3	1
2019	3	0	3	0
2020	19	4	14	1
2021	10	1	8	1
2024	7	1	6	0
2025	5	0	4	1
2026	8	0	7	1
2027	6	3	3	0
2029	1	0	1	0
2031	5	0	5	0
2034	10	0	10	0
2036	6	3	3	0
2037	1	0	1	0
2038	12	0	12	0
2039	6	2	4	0
2040	2	0	2	0
2041	2	0	2	0
2042	3	0	3	0
2043	3	0	3	0
Total	139	15	118	6

APPENDIX I

STUDENTS' RESPONSES TO THE END OF YEAR QUESTIONNAIRE (SQ2)

Contents:

Table I1. Usefulness of online interaction viewed by high, moderate and low message contributors

Student	Total number of respondent	Very useful (%)	Quite useful (%)	Useful (%)	Not useful (%)
High contributor	14	5 (55.6)	5 (38.4)	4 (25.0)	0 (0)
Moderate contributor	11	1 (11.1)	4 (30.8)	6 (37.5)	0 (0)
Low contributor	15	3 (33.3)	4 (30.8)	6 (37.5)	2 (100)
Total	40	9 (100)	13 (100)	16 (100)	2 (100)

Table I2. Discussion topic relevant to students' professional needs

Response type	Respondents	Percent
Most of the topics	14	35.9
Some of the topics	20	51.3
Very few topics	5	12.8
None of the topics	0	0
Total	39	100.0

Table I3. Usefulness of teachers' feedback in online interaction and CD of resources

Response type	Usefulness of teachers' online feedback		Usefulness of CD materials	
	Respondents	Percent	Respondents	Percent
Very useful	14	35.9	13	32.5
Quite useful	12	30.8	9	22.5
Useful	13	33.3	15	37.5
Not useful	0	0	3	7.5
Total	39	100	40	100

Table I4. Usefulness of teachers' feedback in discussion viewed by high, moderate and low contributors

Student	Total number of respondent	Very useful (%)	Quite useful (%)	Useful (%)	Not useful (%)
High message poster	14	8 (57.1)	2 (16.8)	4 (30.7)	0 (0)
Moderate message poster	11	2 (14.3)	5 (41.6)	4 (307)	0 (0)
Low message poster	14	4 (28.6)	5 (41.6)	5 (38.6)	0 (0)
Total	39	14 (100)	12 (100)	13 (100)	0 (0)

APPENDIX J

QUALITATIVE ANALYSIS OF DISCUSSION TASKS

Content:

Table J1. Qualitative analysis of discussion tasks in Professional Basis of Paramedic Practice 2

Week	Discussion task	Relevance of the tasks	Controversial/ application of knowledge	Open ended/ closed	Number of messages posted
Week 1	What method do you utilize to ensure that you always note the important information on any ECG?	Assessment of patients	Not controversial	/Closed	0
	The criteria for finding the "J" point is quite clear, however the actual practice is often not so clear, what further rational do you use to define where the QRS ends and the ST segment begins?	Assessment of patients and interpretation	Controversial	Open ended	7
	How does the ECG waveform relate to the mechanical activity taking place in the heart, and what implications does this relationship have for our clinical observations and assessment of our patient?	Diagnosis of patients	Controversial	Open ended	7
	Why is determination of cardiac axis important in ECG interpretation, surely it is just an academic exercise?	Assessment of patients	Controversial	Open ended	4
	The hospital 12 lead machine calculates the axis for the P< QRS & T waves, why don't we?	Use of an equipment for patient assessment	Controversial (to some extent)	Open ended	3
Week 2	If rhythm is "irregularly irregular" is it always AF?	Interpreting assessment results of a patient	Controversial	Open ended	9
	Artial flutter can be difficult to diagnose, especially if the rate of ventricular response is not 150. What drug might affect the rate of an atrial flutter?	Application of a drug used for patient assessment	Not controversial	Closed	2
	Digoxin is a common drug for the treatment of AF, what are the ECG characteristics of digoxin toxicity? What are some of the common reasons why AF patients are at risk of digoxin toxicity?	Assessment of patients	Application of knowledge	Closed	0
	How can recognizing the type of AV block assist us in assessing our patients?	Assessment of patients	Not controversial	Closed	1
	Is there any point in administering Atroine to a 3(degree) Av block, why might it work or not work?	Assessment of patients and interpretation	Controversial (to some extent)	Open ended	5
	Do you know which of your receiving hospitals is capable of cardiac pacing or pacemaker implantation?	General issue of paramedics	Not controversial	Closed	0

Week	Discussion task	Relevance of the tasks	Controversial/ application of knowledge	Open ended/ closed	Number of messages posted
	Is there a role for external cardiac pacing in pre-hospital emergency care?	General issue of duties of paramedics	Controversial (to some extent)	Open ended	3
Week 3	How will determination of a BBB affect the prehospital care of my patient?	Assessment of patients and interpretation	Controversial (to some extent)	Open ended	3
	What is the point of looking for BBB when I only have three leads?	Assessment of patients	Not controversial	Closed	0
	Is there any value in MCL1 or MCL2 as a monitoring lead?	Question about equipment used in patient assessment	Not controversial	Open ended	0
	Why is VT sometimes a rhythm of cardiac arrest and sometimes a sustaining rhythm with an output?	Assessment of patients and interpretation	Controversial (to some extent)	Open ended	4
Week 4	If a lead is so important when making a diagnosis of aberrancy why don't we have them on the ambulance	Use of an equipment in prehospital settings	Controversial	Open ended	12
	How can I make a differential diagnosis without a 12 lead?	Diagnosis of patients in prehospital settings	Controversial	Open ended	15
	What difference does WPW make to my management of the patient?	Treatment of a patient in prehospital settings	Controversial	Open ended	5
Week 5	My patient has chest pain that is not typical, they look well, but have an ambivalent family history. Can I base my recommendation on transport on the ECG? Why?	Decision making on a particular patient situation	Controversial	Open ended	3
	Why is my partner always asking our patients if they have an old ECG for him to look at?	Relevant to paramedics	Not controversial	Open ended	0
Week 7	My patient has a history of cardiomyopathy and congestive heart failure, how will this affect acute episode?	Example of a particular patient situation in prehospital settings	Controversial	Open ended	4
	People keep talking about "strain pattern" what does this mean?	General issue of patient assessment	Application of knowledge	Closed	0
Week 8	Can I get a shock from a patient who has a firing ICD when I am touching them?	General question about precaution when assessing a patient	Not controversial	Closed	0

Week	Discussion task	Relevance of the tasks	Controversial/ application of knowledge	Open ended/ closed	Number of messages posted
Week 9	A detailed understanding of pharmacology and specialist training is not required with well written "protocols" describing the appropriate course of action for a given set of circumstances. Hence Fire Brigade Members could fulfill the task of a Paramedic. Please comment on the above statement	An issue of paramedics' scope of drug administration in prehospital patient care	Controversial	Open ended	20
	What is the clinical consequence of the variance in half-lives between narcotic agents and naloxone when tending to someone who has taken a narcotic overdose?	Administering drugs in prehospital care of patients	Controversial	Open ended	7
	Narcotics drugs are invaluable in the prehospital management of a number of different conditions. The risk of serious adverse effects or overdosing a patient is minimal because of the availability of naloxone. Therefore, all paramedic personnel should be able to administer morphine, not only intensive-care paramedics.	Administering drugs in prehospital care of patients	Controversial	Open ended	9
	A man drinks 3 x 285ml glasses of full strength beers and three 'nips' (30ml) of scotch over a period of three hours. At the end of the three hours, what would be his expected blood alcohol level?	Interpretation on patient situation in prehospital care	Not controversial	Closed	4
	As an activity, categorise the effects of alcohol shown in the flow chart according to the rule of "D"s	Effect of a drug	Application of knowledge	Closed	0
	The medical and social costs of alcohol on the community are immense. Indeed, from the paramedic perspective the consequences of alcohol consumption on the road, in the home, and in combination with legal and illicit drugs from (sic) a huge part of our work. The consequences of alcohol use are often as worse and certainly more widespread compared to that of heroin. At the very least, there should be a	General issue of paramedic practice	Controversial	Open ended	0

Week	Discussion task	Relevance of the tasks	Controversial/ application of knowledge	Open ended/ closed	Number of messages posted
	zero alcohol level when driving a car. What do you think?				
	For each of the three drug groups (TCAs, SSRIs and NSRIs), state an example generic agent and its trade name	Different types of drugs and their trade names	Not controversial	Closed	2
Week 10	Compare and contrast two compounds from the categories (Cough Suppressants, Expectorants, Decongestants, and Antihistamines), with reference to mechanism of action, duration of action, indications, adverse effects and trade names	Introduction of different drugs	Application of knowledge	Open ended	0
	Passive smoking adds a Huge financial burden upon the healthcare system; therefore active smokers should pay higher Medicare levies. Comment on this statement and provide evidence (references) and discuss disease states where passive smoking has been implicated as a casual factor	General issue of paramedics' duties	Controversial	Open ended	3
Week 12	Select one pituitary and one thyroid disorder (students were given ideas of endocrine system and pharmacology)	Paramedic pharmacology of the endocrine system	Application of knowledge	Closed	0
	Proportion of body fluid is found in each compartment? (for a given figure that illustrates the body fluid compartments)	Pharmacology of fluid therapy	Application of knowledge	Closed	0