ATHABASCA UNIVERSITY

ADAPTATION AND APPLICATON OF A TRANSCRIPT ANALYSIS TOOL TO ANALYZE A COMPUTER-MEDIATED COMMUNICATION (CMC) DISTANCE EDUCATION COURSE TRANSCRIPT

BY

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The undersigned certify that they have read and recommend to the Athabasca University Governing Council for acceptance a project "ADAPTATION AND APPLICATION OF A TRANSCRIPT ANALYSIS TOOL TO ANALYZE A COMPUTER-MEDIATED COMMUNICATION (CMC) DISTANCE EDUCATION COURSE TRANSCRIPT" submitted by VERNA KELLER in partial fulfillment of the requirements for the degree of MASTER OF DISTANCE EDUCATION.

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ABSTRACT

Traditionally, individuals engaged in correspondence course study were isolated in that they had no venue to communicate with fellow students. They used the telephone if and when they needed assistance from the instructor. Computer-mediated communication (CMC) has changed distance education study. Students are now engaged in computer conferences as part of the course requirements. The students are now able to interact with fellow students and the instructor. Most computer systems have the capability of producing a transcript of these interactions. The transcript becomes a valuable resource in charting patterns of interaction within the course conference(s). This study utilized a content analysis research design to determine the patterns of interaction in one computer-mediated conference from a graduate-level distance education university course. The Computer Mediated Communication Transcript Analysis Tool (CMC TAT) was used to conduct the content analysis. The CMC TAT has four categories: Questioning, Statements and Supports, Reflecting, and Scaffolding. Sixteen subjects (fifteen students and the instructor) in one graduate-level distance education course agreed that their postings to this course conference could be analyzed but not quoted. Summaries of the coding sessions using the CMC TAT are presented and the coding disagreements are outlined. Additional tables summarize the postings of each subject in the research study. Limitations of the study are described and further research questions are suggested.

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ABBREVIATIONS USED IN THIS PROJECT

ARF	-	Academic Research Fund
BBS	-	Bulletin Board Systems
CMC	-	Computer Mediated Communication
CMC TAT	-	Computer Mediated Communication Transcript Analysis Tool
Email	-	Electronic Mail
MACS	-	Multidimensional Audioconferencing Classification System
MDE	-	Master of Distance Education

CHAPTER I

INTRODUCTION

Computer-mediated communication (CMC) is gaining popularity as a means of allowing students registered in a distance education course to interact with each other and the instructor. One important advantage to this technology is that the software creates a transcript of all postings to the conference. There are various instruments in existence for analyzing postings to the conference.

Several conference postings were analyzed during the research study of the Academic Research Fund (ARF) Project in Fall 1998. The ARF Team had examined approximately one dozen analysis tools and chose two to experiment with further. One pair of researchers examined the Bullen tool in more detail. The other pair of researchers examined the Zhu tool, adapted it, and developed a revised tool called the CMC TAT. The other tools examined were very intricate and complex to use. This project will utilize a tool that is believed to be easier to use in analyzing CMC transcripts.

This proposed CMC transcript analysis project is based on the fact that the transcript is not being utilized as an important research instrument. Also, most of the existing transcript analysis tools are quite elaborate and can be confusing to those trying to conduct analyses with them. The CMC TAT, borne out of the ARF Project in December 1998, will have its inaugural testing in this project.

Purpose

The purpose of this project is to adapt and apply a transcript analysis instrument to analyze a computer-mediated conference in a graduate-level distance education university course to determine interaction patterns.

The Problem

With the advent of the technology age, many instructors are developing courses that incorporate new technologies. One technology, computer-mediated communication, is seen as an effective teaching strategy. This type of communication in the asynchronous mode is independent of time zones, geographical regions, etc. It allows the student to log on at his/her convenience and enter into the discussion. It is felt that computer conferencing will increase the interaction among distance education students and decrease the isolation experienced by these same students. Most computer conferencing systems have the capability of storing submissions in a transcript format. This transcript has been underutilized in research. It is important for instructors/conference moderators to understand the direction that the computer conference is taking. By analyzing the patterns of interaction within a course conference transcript, it is hoped that those wishing to incorporate this technology into their courses can gain a better understanding of the interaction taking place within the course conference. Likewise, those that already use this technology may take these ideas and modify their conferences to be more effective.

The intent of this study is to contribute to the field of distance education by better understanding the patterns of interaction that occur within a computer-mediated course discussion.

CHAPTER II

LITERATURE REVIEW

Theoretical Framework

Introduction

This project paper will present the results of a content analysis for determining interaction patterns in a graduate-level distance education university course. The content analysis will be conducted using the CMC TAT developed by the ARF Project Team.

Keywords

Computer mediated Communication, Interaction, Transcript Analysis, Electronic Mail (Email), Discussion Groups, Networking, Computer Conferencing, Online Education, Asynchronous Communication, Communications, Distance Education, Interaction Patterns, Analytic Tools, Instruments, Interaction Process Analysis

Overview of CMC

Higgins (1991/1998) states that CMC "refers to human communication via computer" with an emphasis on "interaction between humans using computers to connect with one another". Human communication can occur through the following text-based systems: computer conferencing, Electronic Mail (Email), Bulletin Board Systems (BBSs), and CHAT sessions. CMC was invented and implemented by Murray Turoff in 1970 (Hiltz and Turoff, 1978, p. 43). Harasim (1990, p. 41) believes Turoff "designed conferencing to be a collective intelligence environment, which would use the

computer to structure human communication for information exchange and effective problem solving".

In CMC, messages can be composed and sent to a central host computer for later retrieval by interested individuals. This is a form of one-to-many communication where the message is posted by one person for the benefit of many. This text-based system can replace the need for a meeting at a specific time and place since all of the discussion occurs in the conference. Individuals log into the conference at their convenience and post messages to the discussion.

Email is another method of text-based communication via computer. It is becoming extremely popular to communicate via email. Business organizations are now using email to communicate with their clients. Email is a one-to-one communication. A message is composed by one person, and received and read by another person. This is similar to the Postal System in that the communication is directed to one person. Bulk electronic mailings are also possible through LISTSERVs. In a listserv, one message is sent to the listowner for distribution to those individuals subscribed to the listserv. The subscribers can then reply to the message and add their own views to the discussion.

Bulletin Board Systems are another form of text-based communication via computers. In the early 1980s, according to Higgins (1991/1998), BBSs were established primarily by computer user groups "for the purposes of online distribution of software and related information". The original idea was to have a community bulletin board to post and read messages. The idea became very popular as members

realized they could respond to the postings and interact with others on the BBS. The CHAT mode of interaction is a popular feature of the BBS.

The CHAT mode is similar to a phone call or talking on a Citizen's Band Radio and it happens in real time. The individual "talks" to those that are presently on the air at that time. Text-based communication can be exchanged character by character, line by line, or in multiple-line segments. The messages are not saved for reading at a later time.

Harasim (1990, p. 41) reports that CMC "has been adopted commercially, first within government, then by the corporate and scientific sectors, and more recently within the educational community". McCreary and Van Duren (1987, p. 108) see CMC as "a medium of interaction that accommodates a variety of structured activities and thus is remarkably versatile in the educational functions it can fulfill." Harasim (1989, p. 50) reports that educational computer conferencing, a new phenomenon to appear in the early 1980s, has been traditionally approached by the perspectives that it is an extension of distance education or that it is a variant of classroom activities. She warns that neither one of these perspectives is accurate and, holding on to these traditional beliefs may inhibit the understanding and use of this new medium. Harasim (1989) characterizes CMC as independent of time and place, and many-to-many communication. She refers to the educational CMC environment as the "new domain", "online domain", and the "new medium".

CMC consists of three technical elements: individual computer terminals and modems which transmit and receive text, telephone lines to link the terminals, and software to link the computers into an interactive conference. CoSy is an example of

text-based CMC software used in education. In recent years, CMC has become popular through web-based software. An example of web-based software for CMC is WWWBoard.

Computer-mediated conferencing has been incorporated into undergraduate and graduate student courses, both on-campus and distance education, to provide support for education. Some conferences are directly related to the course while others provided a means for socializing and seeking help with the technology. McCreary and Van Duren (1987) identify the following ten uses of computer conferencing (listed in increasing degree of difficulty to implement):

1. The Notice Board
2. The Public Tutorial
3. The Individual Project
4. Free Flow Discussion
5. The Structured Seminar
6. Peer Counselling
7. Collective Database
8. Group Product
9. Community Decision-making
10. Inter-community Networking

CMC can occur in an asynchronous or a synchronous conceptual structure. Asynchronicity in educational CMC, according to Higgins (1991/1998), " increases the quality of exchanges through time for reflection of one's own cognitive style before responding". Synchronicity in educational CMC, on the other hand is seen by Higgins (1991/1998) as, increasing "the level of cognitive activity and cooperative processes through immediacy and control of interaction."

Advantages and Limitations of CMC

a) Advantages of CMC

Asynchronous communication has a number of strengths. This technology can promote structured learning activities such as debates, problem solving, and guest lectures from experts. Students can participate from anywhere in the universe. Wells (1993) reports that online communication provides learners with opportunities for "convenient course-related or social interaction with peers", facilitates interaction with the instructor, decreases turnaround time for feedback from the instructor, provides more efficient access to online resources such as library catalogues and course registration, and "enables learners to upload and download assignments and take on-line quizzes and tests".

Burge and Roberts (1993) report further strengths. CMC appeals to people who "like to be on their own physically but connected to others cognitively and emotionally". Strengths include:

- is convenient for people whose schedules make it difficult for them to attend classes at a fixed time. It provides personal convenience and control over time since it is available 24 hours a day.
- allows time for reflecting on the discussion.
- equality in discussion may be achieved since participants cannot see or hear one another. Students are not in competition with each other. The level of intimidation in a CMC conference may be lower than in a face-to-face discussion.
- Once the software and the computers have been bought, CMC "does not demand extensive staffing, production skills or special technical facilities".
- Online costs can be reduced if the participants download the messages into their own files prior to reading them. The messages can be read after the long distance connection has been disconnected.

b) Limitations of CMC

CMC also has some limitations. Feenberg (1987) notes that communication anxiety (individual feels like they are speaking into a vacuum) may occur when an individual does not receive a timely response to a posting or never receives a response. Harasim (1990) reports that it is important to be properly located in the "asynchronous timeline". What if someone logs into a conference late? How do they know what current topics (ie. threads) are being discussed? Have they missed their chance to participate in a specific discussion topic? Hiltz and Turoff (1985) acknowledge that there are concerns about threaded discussions in computer conferencing systems.

If a group needs to reach a consensus in a short period of time, CMC may not be the medium to use. Some participants may only log on once per week which would delay a response being sent to a request. Others may agree with the situation just to meet a deadline. Harasim (1990) suggests that the quality of the decision may be reduced by the delays created by the asynchronous mode.

Harasim (1990) cites some examples of the "vulnerability" of textual communication. Individuals may be reluctant to participate in CMC because the postings are being saved in a database in the form of a transcript. Who owns the conference comment and who controls how the comments will be used?

Information overload is definitely a limitation of CMC. Individuals enrolled in a course with a computer conference component must now read discussions online in

addition to reading the course notes/articles. User interfaces are awkward and inadequate for navigating through threaded discussions.

Interaction in Distance Learning

Interaction is promoted as one of the strengths of CMC. Anderson and Garrison (1997) present a model of transactional relationships in higher education which suggests the following six possible types of interaction: learner-teacher, learner-content, teacher-content in the first set of interactions where the three macro- components intersect and learner-learner, teacher-teacher, content-content as a second set of interactions within each of the macro-components. Moore (1989) identified the following three types of interaction: learner-teacher, learner-content, and learner-learner.

In distance education it is important that all types of interaction are available to the participants. In the past most of the interaction has been with the course content and possibly the instructor. Technology (eg. fax, internet) allows easier access to interact with instructors and other students about the content. With the introduction of course conferences via CMC, the geographic separation of learners is no longer a concern. Fulford and Zhang (1993) found that high levels of interactivity are associated with student satisfaction and learning in distance education.

According to McCreary and Van Duren (1987, p. 111), students log into conferences "in direct relation to the strength of the following two factors: 1) they have to be able to (accessibility) and 2) they have to see a reason to do so (perceived benefit)". They believe that student accessibility is comprised of "reasonably located

equipment, familiarity with a short list of essential commands, and a grasp of the conceptual model of computer conferencing". Burge and Roberts (1993) warn that appropriate preparation in using this technology is critical. They provide the following three guidelines:

- "Ensure that learners have easy and regular access to a computer and modem, as well as to the most cost effective long distance services.
- Train learners to use the software before they deal with the content of the course.
- Ensure that a technician is available for support immediately before, during and after your initial series of conferences." (pg. 53)

Just because there is a CMC component in a course does not mean the students will actively participate. The students usually have time demands and family/work commitments. The students must see the benefit of participating so they are motivated to log on to make conference postings. McCreary and Van Duren (1987) cite the following incentives for encouraging conference visits: make information (assignment answers, domain of a quiz, response to an in-class question) available only in the conference to encourage read-only participants, and assign a percentage of the final mark to conference participation to increase conference postings/discussion.

McCreary and Van Duren (1987) recommend that successful computer conferencing "emphasize the importance of training prior to implementation and of providing several forms of printed and on-line assistance during the academic conference" (p. 107). This will build an environment which encourages active participation within the course conference.

History of the CMC TAT

In June 1998, the Academic Research Fund (ARF) Team was formed. Peter Cookson, then from the Centre for Distance Education at Athabasca University, received funding to pursue charting interaction patterns in computer conferencing. Other faculty involved in the ARF project, and also from the Centre, included Gail Crawford and Patrick Fahy. Mohamed Ally joined the project in September 1998. Cookson was promoted to Academic Vice President at Athabasca University and the leadership of the project was transferred to Patrick Fahy. Two graduate students registered in the MDE program, namely Verna Keller and Frank Prosser, joined the ARF team.

The purpose of the ARF project was to "chart patterns of interactions in computer conferencing". The original proposal stated that an instrument developed by Cookson and Chang (1995) would be used for the analysis. Since this instrument was developed for charting interactions in audioconferencing, it was decided that further investigation of the literature for existing analysis tools would be beneficial.

Keller and Prosser conducted the literature review and posted it to a web site. Keller focused on paper-based resources since she had excellent library access. Prosser didn't have a similar position concerning library access so he concentrated on the electronic resources. Searches were conducted on computer-mediated communication, interaction patterns, and instruments for transcript analysis. Audio-conferences were held at frequent intervals for team members to receive updates and determine the next steps to success.

The following ten instruments were identified in the literature as possible tools for analyzing interaction patterns in CMC transcripts, and considered for further review by the ARF team. Characteristics of a good analytic tool were identified by the ARF Team as ease of use, replicability, reliability, and based on a theoretical background.

Bullen, M. (1997). A case study of participation and critical thinking in a university level course delivered by computer conferencing. Unpublished doctoral dissertation. University of British Columbia, Vancouver, Canada. [On-line]. Available: http://courses.cstudies.ubc.ca/~bullen/Diss/thesis.doc

Cookson, P. S., & Chang Y. (1995). The Multidimensional Audioconferencing Classification System (MACS). The American Journal of Distance Education, 9(3), 18-36.

Dzuba, E. J. (1994). *Computer-mediated communication: Faculty and student conversations during the field experience*. Unpublished master's thesis, University of Regina, Regina, Saskatchewan, Canada.

Gunawardena, C. N., Lowe, C. A., & Anderson, T. (1997). Analysis of a global online debate and the development of an interaction analysis model for examining social construction of knowledge in computer conferencing. *Journal of Educational Computing Research*, 17(4), 395-429.

Henri, F. (1992). Computer conferencing and content analysis. In A.R. Kaye (Ed.), *Collaborative learning through computer conferencing: The Najaden Papers* (pp. 117-136). New York: Springer-Verlag.

Higgins, R. (1991/1998). Computer-mediated cooperative learning: Synchronous and asynchronous communication between students learning nursing diagnosis. [On-line]. Available: http://www.cybercorp.net/rhiggins/thesis/higtoc.html

Hillman, D. C. A. (1996). Improved coding and data management for discourse analysis: A case study in face-to-face and computer-mediated classroom interaction. Unpublished doctoral dissertation, University of Cambridge, Cambridge.

Howell-Richardson, C., & Mellar, H. (1996). A methodology for the analysis of patterns of participation within computer mediated communication courses. *Instructional Science*, 24(1), 47-69.

Newman, D. R., Webb, B., & Cochrane, C. (1995). *A content analysis method to measure critical thinking in face-to-face and computer supported group learning.* Interpersonal Computing and Technology: An Electronic Journal

for the 21st Century, 3(2), 56-77. [On-line]. Available: http://jan.ucc.nau.edu/~ipct-j/1995/n2/newman.txt

Zhu, E. (1996). Meaning negotiation, knowledge construction, and mentoring in a distance learning course. 25p. In: Proceedings of Selected Research and Development Presentations at the 1996 National Convention of the Association for Educational Communications and Technology (18th National Convention, Indianapolis, IN, 1996).

In November 1998, the ARF Team chose two existing tools (Bullen and Zhu) and worked with them to see whether they could be replicated. Crawford and Prosser critiqued the Bullen tool while Fahy and Keller worked with the Zhu tool. Ally collaborated with both groups at a later stage to determine inter-rater reliability. Fahy and Keller adapted the Zhu tool (Appendix A) and named it the CMC TAT (Appendix B). This project will advance the research on the CMC TAT.

Review of Transcript Analysis Instruments

This section will expand on each of the instruments listed in the previous section. These were the analysis tools identified by the ARF Team which deemed a closer review. The instruments appear in alphabetical order under the heading of the name of the tool. In the absence of a name, the researcher's name is listed. All instruments were published in the 1990s. The ARF Team was looking for a tool that was easy to

use and had a high level of inter-rater reliability. It was also important that the tool was based on a theory and was easy to replicate.

CMC Analysis Instruments Examined

1) Bullen Tool

Bullen's (1997) case study examined qualitative and quantitative dimensions of student participation and critical thinking. His dissertation, based on Norris & Ennis' (1989) model of critical thinking, also looked at how these dimensions changed over the duration of the course.

Categories in this tool include clarification, assessing evidence, making and judging inferences, using appropriate strategies and tactics, each with several positive and negative indicators. These were indicators such as focusing on a question, identifying or formulating a question, and focusing on a question unrelated to the problem. Individual messages (the unit of analysis) were coded as interactive or independent.

Inter-rater reliability was checked by having three independent judges analyze a sample conference transcript and sort the students into three critical thinking categories (high, medium, or low) in critical thinking indicators and in critical thinking skills.

The ARF Team considered this as a tool that could potentially be very valuable. Two members of the ARF Team have reviewed this tool closer. The results are not available to this researcher at this time.

2) MACS Tool

The Multidimensional Audioconferencing Classification System (MACS), proposed by Cookson and Chang (1995), is an instrument for the tabulation, analysis, and interpretation of audioconferencing instructional interactions. MACS is a combination of theories. The first theory is the interaction process analysis by Bales (1950). The 12 categories in this analysis of the process of social interaction in small groups are: 1. shows solidarity, 2. shows tension release, 3. shows agreement, 4. gives suggestion, 5. gives opinion, 6. gives information, 7. asks for information, 8. asks for opinion, 9. asks for suggestion, 10. shows disagreement, 11. shows tension, and 12. shows antagonism. The other theories incorporated into Cookson and Chang's tool are Layder's (1981) general social interaction theory which explains formal and substantive contextual factors, and Moore's (1989) differentiation of three kinds of interaction in distance learning.

The categories in this instrument of analysis are divided into the following four groups with subcategories as indicated:

1) instructional interpersonal interactions
   - ?? social-emotional dimension: positive and mixed (4 subcategories)
   - ?? task area dimension: attempted answers (6 subcategories)
   - ?? task area dimension: questions (4 subcategories)
   - ?? social-emotional area dimension: negative and mixed (4 subcategories)
   - ?? miscellaneous (2 subcategories)

?

2) instructor/participant responses to distance

   - ?? administrative dimension (6 subcategories)
   - ?? technical dimension (5 subcategories)
   - ?? visualizing dimension (9 subcategories)

3) instructional procedures - (3 categories)

4) miscellaneous - (2 categories)

There was no direct mention made of the tool's inter-rater reliability. This may be due to the fact that the tool was being piloted at the time of the article. Interaction events are the unit of analysis. Although unit of analysis is not clearly defined, it seems to be statements by individuals.

Although MACS is specifically designed to record and categorize the instructional process in audioconferencing, the first part of the instrument refers to interaction in any instructional setting. The ARF team determined that this tool may need modifying due to the fact it was created to analyze audioconferences. It may also be too complex to establish a high percentage of inter-rater reliability. The tool is best suited to teacher-directed activity.

3) Dzuba Tool

Computer-mediated communication between 15 health and physical education pre-service teachers at the University of Regina in Saskatchewan, Canada and a faculty contact person during the field experience is described in Dzuba's (1994) thesis. An interactive computer network system called UNIBASE was used to analyze communication patterns on the bulletin board, in the electronic journal and in real time conferences. Data was also collected by surveying the participants and interviewing three frequent users. The purposes for communication, based on the data analysis, were guided by the roles, needs and goals of the individuals.

The faculty contact person offered support, information and advice while most of the exchanges between the pre-service teachers offered information. Reflections on the teaching practices were indicated in the electronic journal. Reflection and social

support were an important part of the process since it allowed the pre-service teachers to validate their teaching philosophies and practices. This document contains appendices of the project administration materials, a summary of system usage by participant and a description of the codes used in the discourse analysis. Dzuba was one of the pre-service teachers.

4) Gunawardena Tool

Gunawardena, Lowe, and Anderson (1997) originally examined Henri's model but noted that her teacher-centred instructional paradigm is inappropriate in a constructivist environment where learning is based on the shared construction of knowledge. This prompted the researchers to build their own interaction analysis model for examining social construction of knowledge in computer-mediated communication. They applied their model by examining an online debate from a constructivist's perspective and assessed the knowledge construction process.

The tool consists of the following five phases:

1) sharing/comparing of information (5 subcategories)
2) discovery and exploration of dissonance or inconsistency among ideas, concepts or statements (3 subcategories)
3) negotiation of meaning, co-construction of knowledge (5 subcategories)
4) testing and modification of proposed synthesis or co-construction (5 subcategories)
5) agreement statement(s)/applications of newly-constructed meaning (3 subcategories)

Although the tool doesn't directly acknowledge or deal with inter-relater reliability, it does mention that messages were coded independently and discrepancies were discussed until a single coding could be assigned.

The ARF Team noted the tool was well suited to investigating the construction of meaning within CMC environments but may be of limited use in less constructivist settings. The authors note that, to date, the tool has only been used to evaluate professional development conferences which have been designed as constructivist learning experiences.

5) Henri Tool

Henri (1992) attempted to design a tool that would identify the learning processes and strategies selected or developed by learners. Kanuka and Anderson (1998) suggest that Henri has developed the most sophisticated cognitive analysis model for online interaction. The analytical model was developed to highlight five (participation, interaction, social, cognitive, and metacognitive) dimensions of the learning process as seen in messages.

Categories in this tool for 'non-specialists' include:

1) social
2) interactive
    - ?? explicit interaction (direct response, direct commentary)
    - ?? implicit interaction (indirect response, indirect commentary)
3) cognitive skills
    - ?? clarification (elementary and in-depth)
    - ?? inference
    - ?? judgement
    - ?? strategies
4) cognitive level of processing
    - ?? surface and deep (with multiple examples of each)
5) metacognitive
    - ?? knowledge (person, task, strategies and skills)
    - ?? evaluation
    - ?? planning regulation
    - ?? self awareness

The unit of analysis was defined as the unit of meaning which could be of varying lengths. It is not clear how one decides on the unit of meaning if they were going to use this tool. Inter-rater reliability is not addressed. This tool has been evaluated by at least one other researcher on this list. While the tool can be used as presented, the ARF Team felt it was somewhat teacher centred.

6) Higgins Tool

Higgins (1991/1998) thesis explores and describes the comparative effects of synchronous text-based CMC with asynchronous text-based CMC in terms of cognitive and cooperative activity, the quality of outcomes, and subjective im-pressions of the participants. The coding is based on models of cooperative learning and the actual tool is based on software called Content Coder. The transcript was analyzed qualitatively for evidence of cognitive activity and cooperation.

The categories, adapted from Powell (1986) with some modifications based on Beckwith (1987), include:

1. managing the task
2. formulating problems
3. arguing
4. response or debate type
5. giving an opinion
6. clarifying
7. giving information
8. asking for information
9. facilitative statements
10. debilitative statements
11. personal comments/activity
12. uncodeable

The unit of analysis was described as “an identifiable segment of any size that fits the criteria for the categories”. Higgins (1991/1998) states that achieving inter-rater

reliability would have been a problem since the coders require subject knowledge to perform the task. For this reason, the ARF team did not choose this tool to pursue further.

7) Hillman Tool

The coding in Hillman's (1996) doctoral dissertation is based on Bellack, Kliebard, Hyman, & Smith's (1966) model of pedagogical moves which was originally designed to examine back-and-forth interactions in a face-to-face classroom.

The tool has three tiers:

1) purpose
   - ? organizing
   - ? eliciting
   - ? responding
   - ? lecturing
   - ? humanizing
   - ? idling
   - ? rhetorical device
   - ? filler
   - ? not clear
2) mechanism
   - ?? fact stating
   - ?? explaining
   - ?? opining
   - ?? repeating
   - ?? rating
   - ?? rhetorical device
   - ?? filler
   - ?? not clear
3) subject (refers to what is being discussed in sentences)
   - ?? person
   - ?? action
   - ?? procedure
   - ?? content
   - ?? supplies
   - ?? not clear

The unit of analysis is individual sentences. The coding was done primarily by one individual other than the author. The author coded several random segments as a test and measured inter-rater reliability. The categories were adjusted based on the results of the reliability test. There are 22 separate categories and each sentence must be coded for each of the tiers.

The ARF Team viewed this instrument as usable in its present form although it seems better suited to teacher centered instruction. It was also noted that coding every sentence for each tier would be quite time consuming.

8) Howell-Richardson and Mellar Tool

Howell-Richardson and Mellar (1996) propose a methodology for the analysis of text-based interchanges on computer-mediated conferences used in distance education courses. The methodology was based on the Speech Act theory which is specifically devised for face-to-face communications. The tool was used to evaluate two course conferences that used differing instructional strategies. It aimed to show the differing patterns of interaction provoked by the differing task designs (learner independence, guest speaker seminar). The data consisted of the first 44 messages in each conference. Each act must be identified prior to any analysis.

The categories in the Howell-Richardson and Mellar instrument are:

1) illocutionary act
    - ?? interrogative
    - ?? declarative
    - ?? directive
    - ?? elicitation
2) group focus
    - ?? organizational
    - ?? rechannel

- ?? socio-affective
- ?? debilitative
- ?? metacomment

3) task focus
- ?? initiate/suggest/propose
- ?? reject/disagree
- ?? confirm/elaborate
- ?? refer to external sources
- ?? summarize
- ?? request

4) off task

5) target addressee
- ?? all
- ?? individual
- ?? subgroup

6) inter-message reference (explicit references to other posts)
- ?? reference
- ?? no reference

Inter-rater reliability is not mentioned in this study. The ARF Team determined that the number of categories would make it too cumbersome to use effectively.

9) Newman, Webb, & Cochrane Tool

This instrument, based on Garrison's (1992) model of critical thinking and on Henri's (1991) paired indicators, is interested in group learning, deep learning, and critical thinking. Newman, Webb and Cochrane (1995) simplified Henri's paired indicators by looking for indicators in all of Garrison's stages.

The pairs for each category are shown below. It was noted that the pairs had two to six subpairs that could be coded.

1. Relevance
2. Importance
3. Novelty, New information, ideas, solutions
4. Ambiguity and clarity/confusion
5. Bringing outside knowledge/experience to bear on problem
6. Linking ideas and interpretation
7. Justification

8. Critical assessment
9. Practical utility (grounding)
10. Width of understanding

The unit of analysis was indicated as a phrase, sentence, paragraph, or messages containing one unit of meaning. The authors did not code every statement in the transcript. Only those meaning units that were considered "obvious" were coded and they ignored those areas they referred to as intermediate shades of gray. The unit of analysis could be coded into more than one category. Subject knowledge was required to be a coder in this study. The authors did not test for inter-rater reliability.

The ARF Team found this tool to be very complex and inter-rater reliability was not determined. The definition of a meaning unit was not defined concisely enough. It appears that only “obvious” meaning units were coded.

10) Zhu Tool

Zhu (1996), based on Vygotsky’s learning theory (originally developed for children) of proximal development and theories of cognitive and constructive learning, describes the interaction in a 16-week graduate distance learning course at a large Midwestern university. Discussion was conducted through email prior to using the electronic conferencing software called VaxNotes. Participation was worth 25% of the final grade.

Both the instructor’s and the participant’s postings were analyzed. Zhu constructed a specific coding scheme for the data analysis since no previous analytical framework or coding schemes could be readily applied to her data analysis. Zhu’s coding scheme incorporated both Hatano and Inagaki’s (1991) theory of group

interaction and Graesser and Person's (1994) theory of question analysis. The tool focuses on social negotiation, collaborative sense making and mentoring in collaborative activities and knowledge construction as ways of improving the problem-solving capabilities of individuals (Zhu, p. 822).

Zhu notes that Vygotsky's theory provides a good basis for understanding learning as a process of social negotiation and collaborative sense making. Vygotsky (1981) defined the zone of proximal development as the distance between the actual developmental level as determined by independent problem solving and the level of potential development as determined through problem solving under adult guidance or in collaboration with more capable peers. Vygotsky's theory also states that intellectual development takes place between people before internalization takes place. Social and cognitive development occur during interaction with fellow students and the instructor. Zhu (p. 822) elaborates in that "instruction is most effective when it is in a form of discussions or dialogues wherein learners can interact with peers and adults or mentors who challenge, support, and scaffold their learning." Zhu cites an electronic conference in distance learning courses or regular courses as a tool through which interactions between learners and instructors can occur. Both the learners and the instructors can voice their opinions, reflect on the postings of others, and reconstruct concepts and ideas to gain new knowledge. Through CMC conferences, students no longer need to be passive learners.

The full Zhu instrument can be found in Appendix A. Briefly, the categories are:

1) Interaction Type
    - ?? Vertical Questioning (type 1 questions that ask for information)
    - ?? Horizontal Questioning (type 2 questions that inquire or start a dialogue)
2) Answer
3) Information Sharing
4) Reflection
3) Discussion
4) Comment
5) Scaffolding
6) Participant Category (tied to Categories 1-8)
    - ?? Contributors
    - ?? Wanderers
    - ?? Seekers
    - ?? Mentors

The text was coded at the sentence and at the paragraph level. Inter-rater reliability was not addressed. Zhu recommended further empirical research be conducted to verify the coding schemes and models of analysis. The ARF Team felt this instrument could be used as presented and accepted Zhu's suggestion for further research. The ARF Team assigned a pair of individuals to research the tool further. The pair adapted the Zhu tool and named the revised tool the CMC TAT. Further research on the CMC TAT is provided in this document.

Summary and Research Question

While tools have been developed to analyze interaction patterns in CMC, further research is needed in using these tools. Some tools, such as the Gunawardena instrument, have been tested several times. Several of the tools do not have proven inter-rater reliability. The CMC TAT is the newest addition to the transcript analysis tools and research needs to be conducted to advance the instrument.

This study examined the interaction patterns of distance education students engaged in computer-mediated communication in a graduate-level university course. The following question will be researched.

1. What interaction patterns do computer conferencing users develop?

CHAPTER III

METHOD

Design

This study utilized a content analysis research design to determine the patterns of interaction within a computer-mediated course conference. By analyzing one computer conference from a graduate-level distance education course, patterns of interaction will be determined. The selected course conference, number four of six, was divided into eight parts for ease of coding.

A content analysis research design is not experimental in that it does not include any control group and does not seek to predict an outcome. The basic idea of a content analysis is to determine the meaning units within the text and classify the meaning units into content categories. Meaning units can be words, phrases, sentences, paragraphs, etc. This study used sentences as the meaning units to classify. The meaning units were classified into the four content categories in the CMC TAT (Questioning, Statements and Supports, Reflecting, and Scaffolding). A content analysis, compared to interviews, is an unobtrusive research method of collecting information. Neither the sender of the message or the receiver is aware that the message is being analyzed. Therefore, there is little chance that the measurement technique will confound the data.

To date, the tools available to analyze computer conference transcripts are limited. Those that are available are complex to use. This content analysis will be conducted with the CMC TAT which is hoped to be less cumbersome to apply to a

computer-mediated course conference transcript. This study explores the patterns of interaction within a computer-mediated conferencing transcript while applying the CMC TAT.

Definitions

ARF Project**.** Academic Research Fund Project

ARF Team**.** Members of the ARF Team were Mohamed Ally (MDE Faculty Member), Gail Crawford (MDE Faculty Member), Pat Fahy (MDE Faculty Member), Verna Keller (MDE Graduate Student), and Frank Prosser (MDE Graduate Student).

Asynchronous Communication. Most communication in computer conferences take place in the asynchronous mode. This means that messages can be sent at any time and at irregular intervals and others can read them at their convenience. It is the main mode of communication used in electronic mail.

Inter-Rater Reliability. The level of agreement among two or more coders in the analysis of the meaning units.

Intra-Rater Reliability. If a researcher coded a document today and then coded it three months from now, the intra-rater reliability would be the level of agreement in both coding situations.

Level of Agreement. The level of agreement is the number of meaning units that each coder coded the same divided by the total number of meaning units. The level of agreement is usually quoted as a percentage.

Masters of Distance Education (MDE) Program**.** The MDE program at Athabasca University was established in 1994. (Athabasca University is one of the

world's leading open universities.) It is the sole graduate program in North America to focus primarily on the fields of distance education and training. There are five graduate programs, including the MDE, worldwide with this focus. MDE courses are available through a variety of distance education media. There are no face-to-face requirements for degree completion. Degree students enter the program with diverse distance education backgrounds from government agencies, private organizations and businesses, hospitals and other health care organizations to voluntary and professional associations, and schools, colleges, and universities.

Meaning Units. The text to be coded is divided into smaller units for the ease of coding. These smaller parts are called Meaning Units. Meaning units can be words, phrases, sentences, paragraphs, etc.

Postings. Each entry into a computer-mediated course conference is referred to as a posting. Postings can vary in length. The conference moderator may enter a sample posting for the conference participants to model. It is recommended that a posting not exceed one screen of text.

Synchronous Communication**.** In the synchronous mode of communication, all those communicating must be logged in at the same time. It is similar to a telephone call but conducted online. A chat room where individuals are all typing at the same time is a good example of synchronous communication.

Text-Based Communication**.** Text-based communication is one of five characteristics of online education cited by Harasim (1990). Communication and interaction is conducted solely through text typed into the system. The sender types the

message into the keyboard (ie. text) and the receiver reads the message on the computer screen (ie. text).

Threaded Discussions. Due to the nature of CMC, several discussions can occur at the same time. Each discussion is assigned a topic or thread. The participants can read each thread to follow the discussion, or further the discussion by posting to the conference.

Subjects

The subjects in this study were the students registered in MDDE 610 at Athabasca University in Alberta, Canada in the Winter 1999 (January to April) term. MDDE 610 is one of the three-credit elective courses in the Master of Distance Education program at Athabasca University. This graduate-level distance education course, called Introduction to Media and Technology in Distance Education and Training, had fifteen students registered across the nation. The students were from a variety of backgrounds (education, corporate business, health sector) and can be considered adult learners.

An undergraduate degree is required for admission to the Master of Distance Education program. The subjects would have been taking this course as a requirement for the program (program student) or for interest (non-program student). Non-program students can apply for program student status at a later time. These students could be enrolled in one or more courses for the Winter 1999 term. The sample included fifteen students and the instructor. Gender and age information was not required for this study.

MDDE 610 was delivered by the traditional paper-based mode of distance

education with an internet component. Computer conferences using WWWBoard augmented the course content and allowed for online discussion of the course material. The course is taught two times per year - usually in the Winter and Spring terms. Each session has 5-6 computer-mediated conferences representing the major topic areas: Technology, Educational Technology, Instructional Technology, Telecommunications Technology, Designing Instruction, and Technology and Learning. Enrollment ranges from 13-25 students per course.

Conference postings vary a lot - probably a minimum of 100 to a maximum of 400. There was a lot of activity within the course conference since 30% of the student's grade is based on participation in the computer-mediated conference. The conference grade is measured according to quality of input rather than number of comments posted. (The remainder of the grade is based on two papers; the first paper is worth 30% and the second paper is worth 40%.) The instructor was experienced in offering courses with conferencing components.

Instrument

Computer Mediated Communication Transcript Analysis Tool (CMC TAT). This four-category interaction coding tool was developed by Pat Fahy and Verna Keller as a result of their work in the ARF Project. Mohamed Ally assisted in refining the tool for inter-rater reliability. The tool was used with the permission of all three authors. This tool underwent several iterations and the most recent one (see Appendix B) was used for the coding in this project. The tool categorizes four patterns of interaction: Questioning, Statements and Supports, Reflecting, and Scaffolding. This is the tool's

inaugural test to determine its usefulness. It is hoped that the tool will be easy to use with a high level of agreement in inter-rater reliability.

Adaptation of the Zhu Tool

The eight categories in the Zhu tool (Appendix A) were collapsed into four categories in the CMC TAT (Appendix B). When using the categories in the Zhu tool, it was difficult to get inter-rater reliability because the categories overlapped. For example, a meaning unit could be coded into Zhu's categories of Answer, Information Sharing, Discussion, or Comment. The categories were too broad. The Zhu tool contained two types of questions (Type 1 of vertical interaction and Type 2 of horizontal interaction). The CMC TAT retained the Type 1 Vertical questioning and incorporated the Type 2 Horizontal questioning into the Scaffolding category.

The Zhu tool also contained four participant categories called Contributors, Wanderers, Seekers, and Mentors. Given all participants are contributors, the tool actually only has three participant categories. It was felt that every participant could fall into each remaining category at different stages throughout the conference. The participant categories were not included in the CMC TAT.

Procedure

In choosing the transcript for MDDE 610, the researcher was combining an interest in technology with an interest in advancing the CMC TAT. Permission to use the course transcript was obtained from the instructor (Appendix C). The course was comprised of six computer conferences. The original plan was to code all six computer

conference transcripts. Considering this course was particularly active, it was suggested that one computer conference be selected and analyzed. The researcher chose the fourth computer conference with the thinking that by the middle of the course the students would be accustomed to the conferencing software and corresponding with each other. The intent was to code sentences within the discussion not sentences that reveal difficulty in using the conferencing software.

Once the course conference was selected and approved for analysis, the instructor allowed Glenda Hawryluk in the Centre for Distance Education at Athabasca University access to the conference transcripts. Glenda removed all the names and identifying information from the transcript. While Glenda was modifying the transcript to maintain the confidentiality of the subjects, the researcher surveyed (by email and fax) the students registered in the course. The instructor supplied the researcher with a list containing the email addresses of the students registered in MDDE 610. The letter to the participants can be found in Appendix D. Students were given two weeks to say they didn't want to participate in this research project. There weren't any students who opted out of the research. There were many students who supported the research and encouraged the researcher to continue with the project. Ethical approval was received from the Ethics Review Committee of Athabasca University.

Subject Selection. Subjects for this project were those involved in the computer conference for MDDE 610 for the Winter 1999 term. All fifteen students and the instructor agreed to the analysis of the fourth computer conferencing transcript. MDDE 610 is an elective course in the Master of Distance Education program at Athabasca University in Alberta Canada. Both program students and non-program students can

enrol in this course. One could assume that those enrolling in this course had some exposure to technology. This course is taught in the Winter and Spring terms.

Course Requirements for Conference Participation. A high percentage of the grade (30%) was allotted to participation in the computer conferences part of the course. There was no minimum number of contributions stated in the course requirements. It is not known whether the course instructor suggested an appropriate length for a posting or whether a sample posting was modelled for the students to follow. It is also not known whether the course instructor, acting as conference moderator, contacted those students who were not participating in the course conference.

Software Characteristics. WWWBoard was the software used for the computer-mediated communication component of the course. WWWBoard is a threaded World Wide Web discussion forum and message board which allows users to post new messages and reply to previous posts. Each subject received a guide (created by Athabasca University staff) on how to use WWWBoard. Every subject was free to participate in the discussion by expressing or exchanging views to construct a better understanding of the issues within the course. Postings to WWWBoard are stored in text-based archives or transcripts.

Examination of Computer Conferencing Transcript. The confidential transcript was sent electronically to the researcher in two separate files. The researcher prepared the transcripts for coding by inserting a blank line after each sentence. This took a large amount of time to do but both coders agreed that the transcript presented with the line breaks was much easier to code than one without the line breaks. Once

the line breaks were inserted, the course transcript was divided into eight sections for ease of coding.

The first section was analyzed with both coders in the same room working on the transcript independently. Once both had completed the analysis, the coding was checked. Areas of disagreement were discussed. The remaining seven sections were analyzed by both coders at separate times and locations. Analysis involved assigning a number (1 through 4) to the sentence. The number was written in the left-hand margin next to the sentence. When a coder was uncertain as to the appropriate category, it was common for a subsection of the category (i.e. 2.6, 3.5) to be written in the left-hand margin. This aided the discussion as to why a specific category had been assigned to that meaning unit. Salutations and emoticons were not considered meaning units in this research.

Summary of Training Sessions. Five training sessions were held during the period Saturday, March 13, 1999 to Monday, April 19, 1999. Conference transcripts from the ARF Project were used. Since the transcripts had already been coded by at least two members of the ARF Team, they were used as references when there was a discrepancy in training the second coder. These sessions are summarized in Table 1. Table 1 is divided into two sections to reflect the training process. Since it was uncertain to the researcher how to calculate the level of agreement following the first two training sessions, the researcher consulted with Pat Fahy, co-developer of the tool, for advice. It was determined that each sentence would be considered a meaning unit. Therefore, in the last three training sessions, sentences were not split into segments.

The level of agreement was calculated by dividing the Number of Agreed Upon Meaning Units by the Total Number of Meaning Units.

Individual tables showing the results of the five training sessions can be found in Appendix E. The information in Appendix E was submitted electronically to Mohamed Ally and Patrick Fahy on Thursday, April 22, 1999 for comment. Agreement rates of over 85% were achieved in the last three training sessions.

Table 1

Summary of the Five Training Sessions

A. Summary of the First Two Training Sessions

Category	Coder #1	Coder #2
1. Questioning	1	2
2. Statements and Supports	38	53
3. Reflecting	64	45
4. Scaffolding	24	22
Total	127	122
Time	20 minutes	25 minutes

Number of Meaning Units = 113

Level of Agreement = 82/113 (72.6%)
(Agreement = Number of Agreed Upon Meaning Units/Total Number of Meaning Units)

B. Summary of the Last Three Training Sessions

Category	Coder #1	Coder #2
1. Questioning	3	3
2. Statements and Supports	103	109
3. Reflecting	43	35
4. Scaffolding	12	14
Total	161	161
Time	30 minutes	45 minutes

Number of Meaning Units = 161

Level of Agreement = 145/161 (90.2%)

General Comments/Observations from the Training Sessions. Once the training sessions were completed, both coders commented on the experience.

?? Ignore typing mistakes and grammar errors.

?? Coder #1 usually took less time to code the transcripts although Coder #2 did not take considerably longer.

?? Each transcript presents new ideas to code. A large majority of the postings were from the Second Category (Statements and Supports) and the Third Category

(Reflecting). It would be ideal to have a model transcript to practice coding. A model transcript would deal with every situation the tool is claiming to categorize.

?? The transcripts that have a line space following each sentence are a blessing. It is advisable to take the time upfront to modify the transcript to include this blank line. Coding paragraphs that are not split require more careful reading.

?? Don't let punctuation influence whether a sentence splits. There were several occurrences of a question mark following a statement. The question mark would place the meaning unit in the Questioning or Scaffolding Category. Ignoring the question mark would categorize the meaning unit as Statements and Supports.

?? Emoticons were noted in the comments when they were present in the transcript.

CHAPTER IV

DATA ANALYSES

Research Question #1

To answer the research question "What interaction patterns do computer conferencing users develop?", the CMC TAT was applied to the eight sections of the confidential computer conferencing transcript supplied by Athabasca University. The CMC TAT contains four categories, namely Questioning, Statements and Supports, Reflecting, and Scaffolding.

The first category, Questioning, requests information from someone who has the information. This type of questioning was retained from the Zhu tool in that someone is asking for information or requesting an answer. The emphasis is on the question while the focus is on the data. The intent is not to promote dialogue but to find an answer to a question.

Statements and supports is the second category in the CMC TAT. This category emphasizes the impersonal self and the impersonal other. There is no invitation from one to another to engage in dialogue. The types of statements and supports found in this category include: answering a question with a fact, explaining, supplying examples, drawing conclusions, reporting personal experiences factually, stating implications, analyzing, and reasoning.

The third category in the CMC TAT, Reflecting, emphasizes the personal self. The other person is assumed to be interested in what is happening. Reflecting includes: answering questions with personal opinions or experience, expressing personal views or opinions, speculating on the meaning of personal experiences,

reflecting on personal experiences or views, and using personal experiences to support or justify a position or conclusion.

In the fourth category, Scaffolding, the emphasis is on the personal self and the personal other - another individual interested and concerned. The focus is on the dialogue with a reply being crucial. This type of exchange includes: inviting others to speculate or elaborate, suggesting or hypothesizing, encouraging the other individual, thanking, recommending, advising, apologizing, asking rhetorical questions, emoticons, and agreeing.

Further descriptions of each category and examples within each category are provided in Appendix B. A summary of the content analysis of the eight sessions is presented in Table 2. The numbers in brackets indicate the number of coding disagreements within that category. To figure out the number of coding agreements, subtract the coding disagreements from the number of postings. A summary of each individual content analysis can be found in Appendix F. Each table includes the number of meaning units, the time it took each coder to perform the analysis, and the level of agreement.

The statements of disagreement were also analyzed. The summary of the coding disagreements for the eight coding sessions is shown in Table 3. The individual coding session summaries can be found in Appendix G.

Table 2

Summary of the Eight Coding Sessions

Category	Coder #1	Coder #2
1. Questioning	168 (19)	167 (20)
2. Statements and Supports	1196 (94)	1240 (150)
3. Reflecting	494 (139)	453 (87)
4. Scaffolding	179 (40)	177 (35)
TOTALS	2037 (292)	2037 (292)
TIME	3 hours and 50 minutes	4 hours and 28 minutes

Number of Meaning Units = 2037

Level of Agreement = 1745/2037 (86%)

The bulk of the postings in Conference #4 were those in the Category Statements and Supports. In 2307 meaning units, Coder #1 analyzed 1196 of the meaning units as Category #2 (Statements and Supports) while Coder #2 analyzed 1240 of the meaning units as Category #2 (Statements and Supports). The remaining meaning units were categorized (highest to lowest) as: Reflecting, Scaffolding, and Questioning. There were 292 coding disagreements in 2,037 postings. Therefore, both coders agreed on 1,745 posted meaning units.

Table 3

Summary of Coding Disagreements for Eight Coding Sessions

Disagreement	Coder #1	Coder #2	Total
1 - 2	1	2	3
1 - 3	1	3	3
1 - 4	1	4	13
2 - 1	2	1	2
2 - 3	2	3	79
2 - 4	2	4	13
3 - 1	3	1	3
3 - 2	3	2	126
3 - 4	3	4	10
4 - 1	4	1	14
4 - 2	4	2	19
4 - 3	4	3	7
Total			292

The majority of the coding disagreements were those where Coder #1 analyzed the meaning unit as Category #3 while Coder #2 analyzed the same meaning unit as Category #2. Example: ignoring IMO acronym of In My Opinion. The second highest level of discrepancy occurred when Coder #1 analyzed the meaning unit as Category #2 and Coder #2 analyzed the same meaning unit as Category #3. Example: a meaning unit of “I bet …”. The third highest level of discrepancy appears when Coder

#1 analyzed the meaning unit as Category #4 and Coder #2 analyzed the same meaning unit as Category #2. Example: slang.

The posting activity within each session for each subject was examined and summarized. Table 4 shows the posting activity and number of meaning units for each participant within each coding session. Data for this summary was collected from the tables in Appendix H. In fifteen postings, the course moderator submitted 103 meaning units. Six of the subjects (Subject #4, #10, #11, #12, #15, #16) submitted less postings than the instructor. Subject #8 submitted an equivalent number of postings (15) as the instructor. The same six subjects (Subject #4, #10, #11, #12, #15, #16) submitted less meaning units than the instructor. Although Subject #8 had an equal amount of conference postings as the instructor, #8 submitted 115 meaning units compared to the moderator's 103 meaning units.

There were eight subjects (Subject #2, #3, #5, #6, #7, #9, #13, #18) that submitted more postings than the course moderator. These same eight subjects plus Subject #8 submitted more meaning units to the conference than the course moderator did. Subject #5 submitted the highest number of postings and meaning units (36 postings and 307 meaning units). Subject #6 submitted the second highest number of postings and meaning units (32 postings and 252 meaning units).

The posting activity for each participant and the instructor can be found in Table 1 through 16 in Appendix I. Each table reports the number of postings per subject, whether the postings were new messages or whether they were replying to a previous post by another subject. The number of meaning units within each posting are listed.

As per Table 1 in Appendix I, the course moderator made fifteen postings in total. There were ten new postings (postings 1, 2, 10, 34, 85, 114, 141, 197, 199,

Table 4

Total Postings and Meaning Units in Session #1 through #8

Subject	1	2	3	4	5	6	7	8	Postings	Meaning Units
			(Meaning Units)							
1	33	3	10	11	0	27	15	4	15	103
2	17	16	8	29	10	24	13	25	20	142
3	4	6	47	1	6	26	12	29	17	131
4	0	0	9	0	7	0	0	9	3	25
5	0	84	11	54	61	8	49	40	36	307
6	59	44	25	30	35	28	12	19	32	252
7	7	7	49	30	17	20	9	12	25	151
8	8	35	13	17	7	16	13	6	15	115
9	18	12	18	80	9	0	0	32	23	169
10	0	0	0	0	0	0	38	0	4	38
11	0	0	0	38	0	0	0	5	4	43
12	10	5	27	6	0	17	9	12	10	87
13	18	11	0	30	58	4	41	0	17	162
14	48	18	42	33	18	23	9	20	18	211
15	21	0	12	5	7	6	0	4	10	55
16	0	0	24	0	2	15	0	6	6	47
Total	243	241	295	364	237	214	220	223	255	2037

236) and replies to five previous posts. (A couple of the reply postings dealt with technology not working the criterion for assigning grades.) Subject #5 (Table 5) entered two new postings (posting 203, 204); Subject #7 (Table 7) entered a new posting (posting 217) as did Subject #8 (posting 110) (Table 8). Subject #13 (Table 13) posted two new postings (posting 208, 216). While the instructor/course moderator made new postings throughout the conference, most of the new postings from the students occurred in the second half of the conference.

The remaining subjects posted entries that were replying to previous posts. All subjects, except for Subject #8 (Table 8), replied at least once to the postings of the course moderator. Subject #4 (Table 4) only replied to the postings of the course moderator.

Table 1 in Appendix I shows that the moderator's postings varied from one meaning unit (posting 1, 114) to twenty-two meaning units (posting 2). The postings appear fairly consistent in staying equal or below twenty-five meaning units. Subject #5 (Table 5) strays over this limit twice: in posting 164 when replying to the course moderator and in posting 203 when entering a new posting. In Table 14, Subject #14 also goes over this limit twice: in posting 11 and 86 when replying to the course moderator.

CHAPTER V

DISCUSSION, IMPLICATIONS AND SUGGESTIONS

Summary of the Study

For many years, distance education courses have been taken in isolation of any discussion of the course content with the instructor or fellow students. With the advent of technology, in particular computer-mediated conferencing, this situation is changing. Through computer conferencing, students can discuss issues with both the instructor and other registered students. Since asynchronous computer conferencing is independent of time and place, students can log on at their convenience. This is a tremendous benefit to those students who have family and job commitments. Computer conferencing also benefits the students and enriches the course experience since the discussion is taking place on a national, and sometimes international, level.

This study analyzed one of six computer conferences within a graduate-level distance education course at Athabasca University. The tool used for the analysis was the CMC TAT which was developed in the ARF Project work in the Fall 1998 term. The CMC TAT consists of four categories: Questioning, Statements and Supports, Reflecting, and Scaffolding. The computer conference was divided into eight sections. The meaning units were determined as sentences. Each sentence was classified according to the CMC TAT categories.

The purpose of this study was to adapt and apply a transcript analysis tool to analyze a computer-mediated communication distance education course transcript to determine patterns of interaction in a graduate-level university course. The research question posed was:

1. What interaction patterns do computer conferencing users develop?

Discussion of the Findings

Limitations of the Study. There are some limitations to consider when discussing the findings of this study. The scope of this research project is limited in that it deals with conference transcript postings from one computer conference; 2,037 postings to be exact. This may not provide a sufficient analysis to determine the effectiveness of the tool. Further research and analysis using the tool on additional computer-mediated communication conference transcripts is recommended.

There are limitations to the generalizability of this study. The transcript analysis was conducted on one graduate-level distance education course from one Canadian university. One out of six conference transcripts (conference four) from this graduate-level distance education course was analyzed. The results may not hold for the other other five computer conferences in this course. The analysis was conducted by two individual coders. Due to the amount of data to be coded (one computer conference transcript), the use of additional coders and the training time needed was not justified. Once again, further research and analysis using the tool is recommended.

Research Question #1

What interaction patterns do computer conferencing users develop?

As can be seen from Table 2, the greatest number of postings were analyzed as Statements and Supports. Coder #1 determined that 1,196 meaning units fell into this category and Coder #2 analyzed 1,240 meaning units for this category. Activities within the Statements and Supports category include: explaining or elaborating, stating as if providing facts, supplying examples, drawing conclusions, summarizing a position or point of view as if factual, stating implications, analyzing, and reasoning.

The category which received the second highest number of postings was Reflecting. Coder #1 determined that 494 meaning units were analyzed as Reflecting while Coder #2 analyzed 453 meaning units in this category. Activities within the Reflecting category include: answering questions with personal opinions or experiences, expressing personal views or opinions, evaluating based on personal values or personal experience, interpreting, speculating, reflecting on personal experiences or views, and using personal experience to support or justify a position or conclusion.

Category #4, Scaffolding, received the third highest number of postings. Coder #1 believed that 179 meaning units were of the Scaffolding type while Coder #2 analyzed 177 of the meaning units as Scaffolding. Activities within the Scaffolding category include: inviting others to speculate or elaborate, suggesting or hypothesizing, encouraging, inviting or affirming the other person, thinking, expressing gratitude, recommending, advising, giving advice, asking rhetorical questions, apologizing, emoticons, and (dis)agreeing.

Following close behind Scaffolding, was the Questioning category. Coder #1 analyzed 168 meaning units as Questioning while Coder #2 determined that 167 of the

meaning units fell in the Questioning category. The Questioning category is basically someone asking someone else for an answer. The focus is on getting the answer.

Users of computer conferencing systems develop a variety of interaction patterns according to the content analysis derived from analysis using the CMC TAT. The majority of the postings in the MDDE 610 course conference were Statements and Supports. The second highest level of postings were subjects interacting using Reflection type postings. According to Burge and Howard (1990), relevant personal vignettes, anecdotes, and experiences encourage trust among participants and reduce anxiety.

There was some scaffolding interaction taking place. Fewer postings occurred in the Questioning category of the tool than any other category. The results were not surprising to the researcher. One would not expect a computer-mediated communication conference to be dominated by questions or scaffolding activity. One would expect that a question is posed by the course moderator and then discussion follows around the question. The discussion would involve entries of Statements and Supports, and Reflection statements. Kanuka and Anderson (1998), in analyzing text from an online conference using Gunawardena's interaction analysis model, found an overwhelming number of messages coded to the first phase of knowledge construction. The first phase contains information on sharing and comparing information such as a statement of observation or opinion, corroborating examples provided by one or more participants, and definition, description or identification of a problem. Dzuba (1994), while examining communication patterns of preservice teachers using electronic

communication, found that the intent of most messages was to offer information. In addition to offering information, the faculty contact person offered support and advice.

Since this was the inaugural analysis for the CMC TAT, the researcher summarized the areas where the two coders disagreed in the coding category. This summary can be found in Table 3. In total, over the four categories in the CMC TAT, there were 292 coding disagreements. The highest number of coding disagreements appeared in the Category 3-2 situation. These disagreements occur because each individual has his/her own unique way of categorizing a statement. This could indicate a weakness in the tool which needs to be improved. Disagreements between these two categories occurred because the specific meaning units were not itemized in the coding tool. Therefore, each coder individually analyzed these meaning units differently. For example, a meaning unit beginning with "I can" was analyzed by one coder as a Category #2 Statements and Supports while the second coder thought of it as Category #3 Reflecting. The second highest number of coding disagreements appeared in the Category 2-3 situation. The third highest disagreement area was the 4-2 Category. If the full category is compared, Category #2 Statements and Supports had 94/292 coding disagreements while Category #3 Reflecting had 139/292 coding disagreements. Agreement on these meaning units could sway the results to indicate a higher level of Reflecting, or Statements and Supports within the course conference. Further examination of these meaning units may be able to refine the tool so further use of the CMC TAT would yield even higher levels of agreement than the 86% level of agreement achieved in this study.

Preliminary notes taken during coding indicate several areas of coding disagreement. In several places the acronyms IMO and IMHO were used. Coder #2 knew that these acronyms respectively stood for In My Opinion and In My Honest Opinion and coded the meaning units as Category #3 Reflecting (Expressing Personal Views or Opinions). Ignoring the acronyms, which is what Coder #1 did, resulted in a coding of Category #2. A lot of the other disagreements had to do with phrases starting with "I want", "I bet", "I guess", "I enjoyed", "I would", "I can", "It seems". If these types of words were incorporated into the CMC TAT, a higher level of agreement would be achieved. Several coding disagreements involved using slang, such as "Holy Cow!" The tool does not mention how to code slang terms.

During the coding some conventions were agreed upon by both coders. Meaning units with "may" or "might" indicate a Category #3 Reflecting posting and not a Category #2 Statements and Supports posting. Also, any meaning unit containing "perhaps", "certainly", "appears", "hope", and "probably" was determined to be a Category #3 Reflecting posting and not a Category #2 Statements and Supports posting. The coders also decided that URLs listed in the text would be coded as Category #2 Statements and Supports. There was a considerable amount of repeating text from previous messages when replying to a message. Both coders agreed that this should appear under Category #2 Statements and Supports as "restating previously posted material

Implications and Suggestions for Further Study

Distance education has started to incorporate computer technology, particularly computer conferencing, into the course materials. Instructors will be required to monitor course conferences and evaluate them for their effectiveness. What interaction, if any, is taking place? Is learning taking place?

This study documents the content analysis of conference four of the MDDE 610 distance education course in the Winter 1999 term. The results of the analysis will be useful to program administrators, instructional course designers, and conference moderators.

This study conducted the inaugural analysis using the CMC TAT. The conclusions that can be drawn from the research are limited. It appears that it is easy to use and results in high inter-rater reliability. With continued use and application, this statement can be verified. Coding of the other five computer course conferences would allow for a more generalized statement of the interaction within the full course.

The results are informative and interesting. Further research questions using this same course transcript and others from the same course are being posed. This is only a partial list of the suggestions for further research.

1. examination of questions (rhetorical versus answer seeking)
2. examination of the coding discrepancies to refine the tool for an even higher level of agreement
3. determining patterns of interaction according to gender
4. exploring the possibility of computerizing the CMC TAT for coding
5. examining the use of emoticons

6. determining patterns of interaction among the six computer conferences to see whether interaction changes from the beginning to the end of the course
7. a deeper examination of the role of the conference moderator
8. comparing the CMC TAT results with results using another tool
9. examine subject line entries and threaded discussions
10. examine learning styles of students and patterns of interaction
11. examine how the moderator's behaviour affects the conference participation
12. design of conference activities (ie. debate, scenarios) to encourage participation
13. types of learners needed within a course conference

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APPENDIX A

ERPING ZHU INSTRUMENT

Table 1: Note Category and Interaction Type

(Definitions of interaction-type follow the table.)

Note Category with Characteristics and Examples

Interaction-Type
Type I Question
Ask for information or request an answer

Vertical
Example: "What does hypermedia mean?"

Type II Question
Inquire, start a dialogue

Horizontal
Example: "How can we resolve the control issues such as governing the shared space when using a collaborative tool?"

Answer
Provide answers to information-seeking questions
Example: "Hypermedia means ..."

Information sharing
Share information
Example: "My colleague and I have done a lot of thinking about the nature and effect of simulations ... "

Discussion
Elaborate, exchange, and express ideas or thoughts
Example: "What intrigues me from this week's readings is not how we define a tool,... but rather how tools change ourselves ..."

Comment
Judgmental

Example: I agree with A that Schorr's article was ..."

Reflection
Evaluation, self-appraisal of learning
Example: "I found the class last night to be completely frustrating yet intellectually stimulating. ... it is what makes me think!"

Scaffolding
Provide guidance and suggestions to others
Example: "... let us not move our lives in this same 'scripted' direction. Use the tool as an idea generator, a place holder of ideas ... "

DEFINITIONS

Vertical Interaction
The individual concentrates on looking for desired answers rather than expressing or exchanging opinions.

Horizontal Interaction
Students express and exchange views, directly contributing to the discussion and knowledge construction.

Table 2: Participant Category

(Definitions of participant category follow the table.)

Participant Category	Involved Categories from Table 1
Contributor	Categories 1-8
Wanderer	Mainly categories 1, 4, and 6
Seeker	Category 1
Mentor	Categories 1-8

DEFINITIONS

Contributors
Each participant in the discussion was viewed as a contributor no matter what type of note was contributed.

Wanderers
The participants who seem to be lost, for at least the time being, in the reading or the discussion. Those notes usually discussed teaching and learning in general rather than specific issues in weekly readings. They reflected a specific learning stage where

learners are floundering, re-adjusting themselves, and striving for an understanding of the issue by relating and associating different pieces of information and knowledge. This stage is an important precedent to learning and understanding. The wanderer's notes contribute to the discussion from a different angle; that is, not through elaboration, but through creating perturbation and conflicts in the reader.

Seekers

The students who feel an information deficit and a need to seek information in order to gain a better or an appropriate understanding of the issue. A seeker, for example, wrote: "I don't understand what they meant by shared space. I read the section more than once, but the idea doesn't want to sink in my mind. Can you help?". The "seeker" here apparently does not have enough knowledge and understanding about the concept - shared space. Without this, the "seeker" could not compre- hend the meaning after reading the article.

Mentors

Those students who when reading participant notes, try to understand the participants' interpretation and knowledge levels and guide them in their reading or help them defend and develop their own ideas and understanding of issues. A mentor in the discussion of Week 12, for instance, said: "Note A commented that the IdeaFisher could constrain one's creative thinking because you are using someone else's opinion of what things might be associated with other things. In fact, every piece of software you use could be considered an interpretive work at some level ...".

Analysis

The analysis of this study consisted of close reading of every note and counting note length and the number of notes and contributors. Each note was read and analyzed at the sentence and the paragraph level with a concentration on its meaning.

Source: Zhu, E. (1996).

APPENDIX B

CMC TAT - adapted from the Zhu Instrument

December 4, 1998

Note: Information in boldface was added after the sessions to train the second coder.

Zhu notes that learning is "a process of social negotiation and collaborative sense making" (p. 822). Further, instruction is interaction with peers and mentors "who challenge, support, and scaffold their learning" (ibid).

Applying the above results in categories of questioning and challenge, statements and supporting statements, reflecting, and scaffolding. These categories differ in the interpersonal emphasis and context they assume, as follows:

Questioning: the emphasis is on the question, the focus is on data, and the impersonal exchange is between the other-as-data bank and the question or issue. There is no real search for dialogue - a communication of "the question" and "the answer" is the intention.

Statements and Supports: the emphasis is on the impersonal self and the impersonal other. The "self" and the "other" (the object of the question or challenge) in this situation are impersonal - another intellect or reasoning being. There is no self-revelation and no opening to the other to engage in dialogue. The self is a lecturer, a source of correction or information, which it is assumed the other needs in order to overcome his or her error.

Reflecting: the emphasis is on the personal self. The other is assumed to be interested in the revelations, and empathetic.

Scaffolding: the emphasis is on the personal self and the personal other - another human being interesting, interested and concerned. Dialogue is the focus; a reply is central and an exchange are essential.

The categories represent the following processes of social negotiation and sense making, and are characterized by these elements:

1. Questioning (emphasis = impersonal other + data)

Question type 1 (retained from Zhu): requests information from a "superior" source (someone presumed to know the answers, have the information).

2. Statements and Supports (emphasis = impersonal self and impersonal other)

2.1 Answering a specific question with a fact, or in a factual tone;
2.2 Explaining or elaborating;
2.3 Criticizing or critiquing another's views or position;
2.4 Stating as if providing facts or information;
2.5 Supplying examples;
2.6 Reporting personal experiences factually;
2.7 Drawing conclusions;
2.8 Summarizing a position or point of view as if factual;
2.9 Stating implications;
2.10 Analyzing;
2.11 Reasoning.

3. Reflecting (emphasis = personal self)

3.1 Answering questions with personal opinions or experience;
3.2 Providing the personal meaning of things;
3.3 Expressing personal views or opinions;
3.4 Evaluating based on personal values or personal experience;
3.5 Interpreting or explaining one's own behaviour or views;
3.6 Speculating on the meaning of personal experience or opinions;
3.7 Re-examining or re-assessing;
3.8 Reflecting on personal experiences or views;
3.9 Using personal experience to support or justify a position or conclusion.

4. Scaffolding (emphasis = personal self + other)

4.1 Asking rhetorical questions;
4.2 Inviting others to speculate or elaborate;
4.3 Suggesting or hypothesizing;
4.4 Encouraging, inviting or affirming the other person;
4.5 Thanking, expressing gratitude directly to another party;
4.6 Recommending, advising, giving advice, counseling empathetically;
4.7 Apologizing;
4.8 Empathizing;
4.9 "Emoticons," "smilies," and other symbols of tone and emotional context;
4.10 Agreeing.

Each of the above implies a dialogue/relationship between the self and others (and some image of the self). For example:

Questioning:
focus is on the other(s), and on the issues or questions. The self is reserved, muted, passionless, inquiring. Examples include:

"OK, let me see if I have this straight. . ."
"Do you mean to say that. . .?"
"What is . . .?"

Supporting statements:
implies an impersonal self and others - connection is cerebral and theoretical, on the issues. Examples include:

"Just the facts, ma'am"
"Clearly. . ."
"Thus. . ."
"Therefore. . ."

Reflecting:
focus on self, as human being seeking truth, etc. Examples include:

"I may be wrong, but. . ."
"As I thought this over it seemed to me. . ."
"If this is true then. . ."
"I never thought about this before but. . ."
"This is wonderful!"
"I believe. . ."
"However, I. . ."

Scaffolding:
co-focus on self and other as a pair engaged in dialogue; importance of communication and relationship is implicit; exploring, testing, seeking. Examples include:

"Help me understand. . ."
"Let us reason together."

Implies openness, welcoming inquiry, readiness to learn, compromise, willingness to change views, etc. Other is equal, interesting, stimulating, etc.

"Isn't this wonderful!?"
"What do you think?"
"Maybe we should try. . ."
"What if. . .?"
"It would be great if you/we. . ."
"Don't you sometimes think that. . .?"
"Maybe you/we should. . ."
"If I were you I would. . ."

Meaning units

The unit of meaning in a computer conference varies from a phrase to whole paragraphs or groups of paragraphs. (Generally speaking, sentences are the minimum meaning unit except as explained below).

The key in identification of meaning units is detecting shifts in position, tone or attitude toward the listener or the subject matter. Some words and phrases may indicate such a shift. For example:

But
However
On the other hand
Nevertheless

Other words and phrases serve to end an argument, and usually do not indicate a change in tone or a shift in meaning. For example:

So
And
Because
Thus
Therefore

In identifying a meaning unit the analyst should ask, "Has the writer/speaker changed the relationship with the reader/listener? Or, is the speaker adopting a new position on the subject or the audience?"

Source: ARF Project Team (December 1998).

APPENDIX C

LETTER OF PERMISSION TO COURSE INSTRUCTOR

sent via email to howardr@agt.net

Dear Dale Howard:

I am presently working on my MDDE thesis/project under Mohamed Ally's supervision. I am charting interaction patterns using the tool Pat Fahy and I created in the Academic Research Fund (ARF) Project. It is based on the Erping Zhu tool for transcript analysis.

I am writing to gain permission to use your Introduction to Technology course transcripts. I have been advised to ask for transcripts where WWW Board was used and not CoSy since the latter are more difficult to read. (I took the course when we used the CoSy software so that would be another reason not to choose transcripts done in CoSy.)

All transcript submissions will be held in strict confidence. Glenda from the MDE Centre will remove all names, contacts, etc. prior to sending them to me.

Looking forward to hearing from you,

Verna Keller
MDE Graduate Student
Waterloo, Ontario

APPENDIX D

LETTER OF REQUEST TO PARTICIPANTS

Dear MDDE610 Students,

I am a graduate student in the Masters of Distance Education Program at Athabasca University. Presently, I am working on the thesis/project requirement of the degree. My project is entitled "Analyzing a Computer Mediated Communication (CMC) Distance Education Transcript to Determine Patterns of Interaction". The instrument I am using to analyze the transcript was developed in Fall 1998 by two AU professors and myself. The instrument consists of the following four categories: Questioning, Statements and Support, Reflecting and Scaffolding.

I am proposing to use the CMC transcript from the fourth conference in MDE610 from Winter 1999. Dale Howard has passed your name to me as a student registered in that course. Here's how it works.

Glenda Hawryluk, from the MDE Centre, will remove any identifying information (ie. name) from the transcript prior to forwarding it to me. I will then look at the transcript, sentence by sentence, to determine which category the sentences fall into. For example, a sentence citing a reference will be coded as Stating and Supporting. After coding the full transcript I will summarize my findings. There is one other coder doing the same analysis so we can determine the tool's inter-rater reliability. I will not be quoting any part of the transcript in my project report.

This study will contribute to the field of Distance Education by examining the interactions in CMC to help conference moderators and course designers.

If you have any objections to me using the MDDE610 transcript to complete my project, please contact me by Monday, June 21, 1999 at vkeller@watserv1.uwaterloo.ca or the University of Waterloo at (519)885-1211, Ext. 3132.

Sincerely,

Verna Keller
Waterloo, Ontario

APPENDIX E

INDIVIDUAL STATISTICS FOR FIVE TRAINING SESSIONS

Table 1

First Training Session - Saturday, March 13, 1999

Category	Coder #1	Coder #2
1. Questioning	1	2
2. Statements and Supports	21	21
3. Reflecting	42	32
4. Scaffolding	9	10
TOTALS	73	65
TIME	10 minutes	15 minutes

Number of Sentences/Meaning Units = 59

Level of Agreement = 42/59 (71%)

Comments:

?? There were 59 sentences in this coding session. Both coders split a considerable number of the sentences. The coders did not agree in 17 areas; 11 of these were discrepancies between the Second Category (Statements and Support) and the Third Category (Reflecting). If these had been agreed upon, the agreement rate would have been 81% (48/59).
?? There was one emoticon in the text.
?? There was a discrepancy as to whether the question “Can I get in on this definition?” is of a rhetorical nature or not.

Table 2

Second Training Session - Saturday, March 13, 1999

Category	Coder #1	Coder #2
1. Questioning	0	0
2. Statements and Supports	17	32
3. Reflecting	22	13
4. Scaffolding	15	12
TOTAL	54	57
TIME	10 minutes	10 minutes

Number of Sentences/Meaning Units = 54

Level of Agreement = 40/54 (74.1%)

Comments:

?? There were 54 sentences in the transcript of this training session. The second coder split several sentences.
?? The coders did not agree in 14 areas; 10 of these were between the Second Category (Statements and Supports) and the Third Category (Reflecting). If these had been agreed upon, the agreement rate would have been 92.6% (50/54).
?? There were two emoticons in the text.

Here are some of the statements that the coders did not agree upon. The first coder thought they fell into Category Two (Statements and Supports) while the second coder thought they fell into Category Three (Reflecting).

1. This is what I found.
2. These skills comprise an hierarchy in that learning a more complex skill presupposes prior learning of a less complex skill.
3. Traditional classroom style teaching seems to focus on reading, memorization and looking for answers that already exist.
4. In the face to face classroom we tend to evaluate based on the lower function of memorization, hence the wide use of multiple choice tests.
5. In my profession of Information Technology the way you are tested or certified by industry is through multiple choice exams.
6. They inevitably ask “So how are you tested if you’re not in a classroom?”
7. When I tell them that many of the courses are based on papers or answering questions about reading they immediately dismiss it as being a give away.

Table 3

Third Training Session - Monday, April 19, 1999

Category	Coder #1	Coder #2
1. Questioning	0	0
2. Statements and Supports	48	51
3. Reflecting	3	0
4. Scaffolding	0	0
TOTAL	51	51
TIME	15 minutes	20 minutes

Number of Sentences/Meaning Units = 51

Level of Agreement = 48/51 (94.1%)

Comments:

?? The transcript was basically statements, definitions, and references. A lot of statements started with “It was agreed” or “A suggestion was made”. The coders differentiated these statements from those that would have started with “I agreed” or “I suggested”. The latter would fall under the Fourth Category (Scaffolding).

Table 4

Fourth Training Session - Monday, April 19, 1999

Category	Coder #1	Coder #2
1. Questioning	2	2
2. Statements and Supports	29	26
3. Reflecting	2	3
4. Scaffolding	2	4
TOTAL	35	35
TIME	5 minutes	10 minutes

Number of Sentences/Meaning Units = 35

Level of Agreement = 31/35 (88.6%)

Comments:

?? This transcript allowed further practice with questions. One coder thought they were rhetorical questions and the other coder did not. A couple of sample questions appear below.

1. Why bother with an undergraduate program when you can be openly admitted to a graduate one?
2. Does this make an open learning graduate degree equal in value to a normal undergraduate degree?

Table 5

Fifth Training Session - Monday, April 19, 1999

Category	Coder #1	Coder #2
1. Questioning	2	2
2. Statements and Supports	29	26
3. Reflecting	2	3
4. Scaffolding	2	2
TOTAL	35	35
TIME	5 minutes	10 minutes

Number of Sentences/Meaning Units = 75

Level of Agreement = 66/75 (88%)

Comment: All discrepancies were in the Second Category (Statements and Supports) and Third Category (Reflecting).

APPENDIX F

INDIVIDUAL STATISTICS FOR THE CODING SESSIONS

Table 1

Coding Session #1 - Monday, July 19, 1999

Category	Coder #1	Coder #2
1. Questioning	9 (1)	13 (6)
2. Statements and Supports	135 (17)	129 (8)
3. Reflecting	75 (9)	81 (16)
4. Scaffolding	24 (8)	20 (5)
TOTALS	243 (35)	243 (35)
TIME	15 minutes	20 minutes

Number of Meaning Units = 243

Level of Agreement = 208/243 (86%)

The bulk of the postings in the first coding session were those from the Category Statements and Supports. In 243 meaning units, Coder #1 analyzed 135 of the meaning units as Category #2 while Coder #2 analyzed 129 of the meaning units as Category #2. The remaining meaning units were categorized (highest to lowest) as: Reflecting, Scaffolding, and Questioning.

Table 2

Coding Session #2 - Monday, July 19, 1999

Category	Coder #1	Coder #2
1. Questioning	21 (0)	22 (1)
2. Statements and Supports	142 (12)	145 (12)
3. Reflecting	58 (9)	58 (12)
4. Scaffolding	20 (6)	16 (2)
TOTALS	241 (27)	241 (27)
TIME	20 minutes	23 minutes

Number of Meaning Units = 241

Level of Agreement = 214/241 (89%)

The bulk of the postings in the second coding session were those from the Category Statements and Supports. In 241 meaning units, Coder #1 analyzed 142 of the meaning units as Category #2 while Coder #2 analyzed 145 of the meaning units as Category #2. The remaining meaning units were categorized (highest to lowest) as: Reflecting, Questioning, and Scaffolding. (Questioning and Scaffolding were close to being tied.)

Table 3

Coding Session #3 - Tuesday, July 20, 1999

Category	Coder #1	Coder #2
1. Questioning	24 (4)	21 (1)
2. Statements and Supports	181 (19)	174 (14)
3. Reflecting	64 (14)	70 (20)
4. Scaffolding	26 (1)	30 (3)
TOTALS	295 (38)	295 (38)
TIME	40 minutes	45 minutes

Number of Meaning Units = 295

Level of Agreement = 257/295 (87%)

The bulk of the postings in the third coding session were those from the Category Statements and Supports. In 295 meaning units, Coder #1 analyzed 181 of the meaning units as Category #2 while Coder #2 analyzed 174 of the meaning units as Category #2. The remaining meaning units were categorized (highest to lowest) as: Reflecting, Scaffolding, and Questioning.

Table 4

Coding Session #4 - Tuesday, July 20, 1999

Category	Coder #1	Coder #2
1. Questioning	41 (5)	36 (1)
2. Statements and Supports	223 (11)	244 (33)
3. Reflecting	75 (28)	60 (12)
4. Scaffolding	25 (7)	24 (5)
TOTALS	364 (51)	364 (51)
TIME	45 minutes	50 minutes

Number of Meaning Units = 364

Level of Agreement = 313/364 (86%)

The bulk of the postings in the fourth coding session were those from the Category Statements and Supports. In 364 meaning units, Coder #1 analyzed 223 of the meaning units as Category #2 while Coder #2 analyzed 244 of the meaning units as Category #2. The remaining meaning units were categorized (highest to lowest) as: Reflecting, Questioning, and Scaffolding.

Table 5

Coding Session #5 - Wednesday, July 21, 1999

Category	Coder #1	Coder #2
1. Questioning	23 (6)	21 (4)
2. Statements and Supports	120 (11)	125 (16)
3. Reflecting	73 (15)	64 (5)
4. Scaffolding	21 (4)	27 (11)
TOTALS	237 (36)	237 (36)
TIME	40 minutes	45 minutes

Number of Meaning Units = 237

Level of Agreement = 201/237 (85%)

The bulk of the postings in the fifth coding session were those from the Category Statements and Supports. In 237 meaning units, Coder #1 analyzed 120 of the meaning units as Category #2 while Coder #2 analyzed 125 of the meaning units as Category #2. The remaining meaning units were categorized (highest to lowest) as: Reflecting, Scaffolding, and Questioning.

Table 6

Coding Session #6 - Wednesday, July 21, 1999

Category	Coder #1	Coder #2
1. Questioning	15 (1)	17 (3)
2. Statements and Supports	139 (6)	146 (23)
3. Reflecting	42 (25)	31 (4)
4. Scaffolding	18 (2)	20 (4)
TOTALS	214 (34)	214 (34)
TIME	20 minutes	25 minutes

Number of Meaning Units = 214

Level of Agreement = 180/214 (84%)

The bulk of the postings in the sixth coding session were those from the Category Statements and Supports. In 214 meaning units, Coder #1 analyzed 139 of the meaning units as Category #2 while Coder #2 analyzed 146 of the meaning units as Category #2. The remaining meaning units were categorized (highest to lowest) as: Reflecting, Scaffolding, and Questioning.

Table 7

Coding Session #7 - Thursday, July 22, 1999

Category	Coder #1	Coder #2
1. Questioning	15 (2)	16 (3)
2. Statements and Supports	120 (7)	140 (32)
3. Reflecting	57 (27)	42 (8)
4. Scaffolding	28 (10)	22 (3)
TOTALS	220 (46)	220 (46)
TIME	25 minutes	30 minutes

Number of Meaning Units = 220

Level of Agreement = 174/220 (79%)

The bulk of the postings in the seventh coding session were those from the Category Statements and Supports. In 220 meaning units, Coder #1 analyzed 120 of the meaning units as Category #2 while Coder #2 analyzed 140 of the meaning units as Category #2. The remaining meaning units were categorized (highest to lowest) as: Reflecting, Scaffolding, and Questioning.

Table 8

Coding Session #8 - Thursday, July 22, 1999

Category	Coder #1	Coder #2
1. Questioning	20 (0)	21 (1)
2. Statements and Supports	136 (11)	137 (12)
3. Reflecting	50 (12)	47 (10)
4. Scaffolding	17 (2)	18 (2)
TOTALS	223 (25)	223 (25)
TIME	25 minutes	30 minutes

Number of Meaning Units = 223

Level of Agreement = 198/223 (89%)

The bulk of the postings in the eighth coding session were those from the Category Statements and Supports. In 223 meaning units, Coder #1 analyzed 136 of the meaning units as Category #2 while Coder #2 analyzed 137 of the meaning units as Category #2. The remaining meaning units were categorized (highest to lowest) as: Reflecting, Questioning, and Scaffolding.

APPENDIX G

INDIVIDUAL STATISTICS FOR CODING DISAGREEMENTS

Table 1

Session #1 - Coding Disagreements

Disagreement	Coder #1	Coder #2	Total
1 - 4	1	4	1
2 - 1	2	1	1
2 - 3	2	3	14
2 - 4	2	4	2
3 - 2	3	2	7
3 - 4	3	4	2
4 - 1	4	1	5
4 - 2	4	2	1
4 - 3	4	3	2
Total			35

The majority of the coding disagreements were those where Coder #1 analyzed the meaning unit as Category #2 while Coder #2 analyzed the same meaning unit as Category #3. The second highest level of discrepancy occurred when Coder #1 analyzed the meaning unit as Category #3 and Coder #2 analyzed the same meaning unit as Category #2. The third highest level of discrepancy appears when Coder #1 analyzed the meaning unit as Category #4 and Coder #2 analyzed the same meaning

unit as Category #1.

Table 2

Session #2 - Coding Disagreements

Disagreement	Coder #1	Coder #2	Total
2 - 3	2	3	11
2 - 4	2	4	1
3 - 2	3	2	8
3 - 4	3	4	1
4 - 1	4	1	1
4 - 2	4	2	4
4 - 3	4	3	1
Total			27

The majority of the coding disagreements were those where Coder #1 analyzed the meaning unit as Category #2 while Coder #2 analyzed the same meaning unit as Category #3. The second highest level of discrepancy occurred when Coder #1 analyzed the meaning unit was Category #3 and Coder #2 analyzed the same meaning unit as Category #2. The third highest level of discrepancy appears when Coder #1 analyzed the meaning unit as Category #4 and Coder #2 analyzed the same meaning unit as Category #2.

Table 3

Session #3 - Coding Disagreements

Disagreement	Coder #1	Coder #2	Total
1 - 3	1	3	1
1 - 4	1	4	3
2 - 3	2	3	19
3 - 2	3	2	14
4 - 1	4	1	1
Total			38

The majority of the coding disagreements were those where Coder #1 analyzed the meaning unit as Category #2 while Coder #2 analyzed the same meaning unit as Category #3. The second highest level of discrepancy occurred when Coder #1 analyzed the meaning unit as Category #3 and Coder #2 analyzed the same meaning unit as Category #2. The third highest level of discrepancy appears when Coder #1 analyzed the meaning unit as Category #1 and Coder #2 analyzed the same meaning unit as Category #4.

Table 4

Session #4 - Coding Disagreements

Disagreement	Coder #1	Coder #2	Total
1 - 2	1	2	1
1 - 4	1	4	4
2 - 3	2	3	10
2 - 4	2	4	1
3 - 2	3	2	28
4 - 1	4	1	1
4 - 2	4	2	4
4 - 3	4	3	2
Total			51

The majority of the coding disagreements were those where Coder #1 analyzed the meaning unit as Category #3 while Coder #2 analyzed the same meaning unit as Category #2. The second highest level of discrepancy occurred when Coder #1 analyzed the meaning unit as Category #2 and Coder #2 analyzed the same meaning unit as Category #3. The third highest level of discrepancy was tied between a 1-4 coding disagreement and a 4-2 coding disagreement.

Table 5

Session #5 - Coding Disagreements

Disagreement	Coder #1	Coder #2	Total
1 - 2	1	2	1
1 - 3	1	3	1
1 - 4	1	4	4
2 - 1	2	1	1
2 - 3	2	3	6
2 - 4	2	4	4
3 - 1	3	1	1
3 - 2	3	2	11
3 - 4	3	4	3
4 - 1	4	1	2
4 - 2	4	2	2
Total			36

The majority of the coding disagreements were those where Coder #1 analyzed the meaning unit as Category #3 while Coder #2 analyzed the same meaning unit as Category #2. The second highest level of discrepancy occurred when Coder #1 analyzed the meaning unit as Category #2 and Coder #2 analyzed the same meaning unit as Category #3. The third highest level of discrepancy was a tie between a 1-4 coding disagreement and a 2-4 coding disagreement.

Table 6

Session #6 - Coding Disagreements

Disagreement	Coder #1	Coder #2	Total
1 - 2	1	2	1
2 - 3	2	3	4
2 - 4	2	4	2
3 - 1	3	1	1
3 - 2	3	2	21
3 - 4	3	4	3
4 - 1	4	1	1
4 - 2	4	2	1
Total			34

The majority of the coding disagreements were those where Coder #1 analyzed the meaning unit as Category #3 while Coder #2 analyzed the same meaning unit as Category #2. The second highest level of discrepancy occurred when Coder #1 analyzed the meaning unit as Category #2 and Coder #2 analyzed the same meaning unit as Category #3. The third highest level of discrepancy appears when Coder #1 analyzed the meaning unit as Category #3 and Coder #2 analyzed the same meaning unit as Category #4.

Table 7

Session #7 - Coding Disagreements

Disagreement	Coder #1	Coder #2	Total
1 - 3	1	3	1
1 - 4	1	4	1
2 - 3	2	3	5
2 - 4	2	4	2
3 - 2	3	2	27
4 - 1	4	1	3
4 - 2	4	2	5
4 - 3	4	3	2
Total			46

The majority of the coding disagreements were those where Coder #1 analyzed the meaning unit as Category #3 while Coder #2 analyzed the same meaning unit as Category #2. The second highest level of discrepancy was a tie between a 2-3 coding disagreement and a 4-2 coding disagreement. The third highest level of discrepancy occurred when Coder #1 analyzed the meaning unit as Category #4 and Coder #2 analyzed the same meaning unit as Category #1.

Table 8

Session #8 - Coding Disagreements

Disagreement	Coder #1	Coder #2	Total
2 - 3	2	3	10
2 - 4	2	4	1
3 - 1	3	1	1
3 - 2	3	2	10
3 - 4	3	4	1
4 - 2	4	2	2
Total			25

The majority of the coding disagreements were tied between 2-3 coding disagreements and 3-2 coding disagreements. The second highest level of discrepancy occurred when Coder #1 analyzed the meaning unit as Category #4 and Coder #2 analyzed the same meaning unit as Category #2. Each of the remaining categories (2-4, 3-1, 3-4) had one coding disagreement.

APPENDIX H

POSTING INFORMATION FOR SESSION #1 THROUGH #8

Table 1

Summary of Postings from Session #1 and #2

	Session #1		Session #2	
Subject	Postings	Meaning Units	Postings	Meaning Units
1	**1**, 22, 7, 3	33	3	3
2	11, 6	17	13, 3	16
3	4	4	6	6
4		0		0
5		0	14, 6, 4, 11, 7, 7, 11, **24**	84
6	13, 4, 6, 9, 15, 12	59	6, 10, 7, 4, 7, 4, 6	44
7	2, 5	7	**2**, 5	7
8	8	8	13, 8, 4, 6, 4	35
9	8, 4, 6	18	5, 7	12
10		0		0
11		0		0
12	10	10	5	5
13	9, 9	18	11	11
14	**48**	48	6, 12	18
15	10, 4, 7	21		0

16		0		0
Total	26 Postings	243	32 Postings	241

Table 2

Summary of Postings from Session #3 and #4

	Session #3		Session #4	
Subject	Postings	Meaning Units	Postings	Meaning Units
1	10	10	**1**, 6, 4	11
2	8	8	4, 14, 11	29
3	4, 6, 2, 10, 16, 5, 4	47	**1**	1
4	9	9		0
5	6, 5	11	7, 22, 2, 5, 3, 13, 2	54
6	10, 15	25	4, 5, 2, 5, 14	30
7	4, 14, 6, 3, 8, 4, 10	49	7, 13, 10	30
8	13	13	3, 3, 11	17
9	12, 5, **1**	18	15, 5, 6, 6, 6, 7, 1, 3, 5, 1, **25**	80
10		0		0
11		0	20, 8, 10	38
12	15, 12	27	4, 2	6
13		0	16, 8, 6	30
14	**34**, 8	42	6, 6, 5, 3, 13	33
15	4, 8	12	5	5
16	15, 9	24		0
Total	33 Postings	295	50 Postings	364

Table 3

Summary of Postings from Session #5 and #6

	Session #5		Session #6	
Subject	Postings	Meaning Units	Postings	Meaning Units
1		0	6, **21**	27
2	8, 2	10	11, 7, 6	24
3	6	6	11, 15	26
4	7	7		0
5	**1**, 11, 27, 18, 4	61	4, **1**, 3	8
6	11, 3, 4, 4, 13	35	5, 14, 9	28
7	4, 6, 7	17	3, 2, 10, 5	20
8	7	7	5, 11	16
9	9	9		0
10		0		0
11		0		0
12		0	17	17
13	**24**, 5, 5, 18, 6	58	4	4
14	11, 7	18	2, 16, 5	23
15	2, 5	7	6	6
16	2	2	8, 7	15
Total	29 Postings	237	27 Postings	214

Table 4

Summary of Postings from Session #7 and #8

	Session #7		Session #8	
Subject	Postings	Meaning Units	Postings	Meaning Units
1	2, 10, 3	15	4	4
2	5, 5, 3	13	3, 8,7,7	25
3	12	12	5, 8, 16	29
4		0	9	9
5	8, **28**, **1**, 4, 4, 4	49	**1**, 3, **24**, 4, 8	40
6	12	12	16, 3, 2	19
7	9	9	5, 3, 4	12
8	13	13	6	6
9		0	16, 13, 3	32
10	8, 8, 6, 16	38		0
11		0	5	5
12	9	9	5, 7	12
13	8, 10, 3, 10, 10	41		0
14	9	9	14, 6	20
15		0	4	4
16		0	6	6
Total	27 Postings	220	31 Postings	223

APPENDIX I

POSTING ACTIVITY SUMMARIES

Table 1

Posting Activity for Subject #1 (course instructor/conference moderator)

Message Number	Session	New Posting	Reply to Post submitted by	Meaning Units
1	1	yes	-	1
2	1	yes	-	22
7	1	no	#2	7
10	1	yes	-	3
34	2	yes	-	3
85	3	yes	-	10
114	4	yes	-	1
134	4	no	#12	6
141	4	yes	-	4
193	6	no	#3	6
197	6	yes	-	21
199	7	yes	-	2
200	7	no	#1	10
221	7	no	#10	3
236	8	yes	-	4
Totals		15 postings		103

Table 2

Posting Activity for Subject #2

Message Number	Session	New Posting	Reply to Post submitted by	Meaning Units
6	1	no	#1	11
20	1	no	#13	6
28	2	no	#1	13
31	2	no	#3	3
62	3	no	#1	8
101	4	no	#9	4
107	4	no	#2	14
131	4	no	#1	11
143	5	no	#9	8
157	5	no	#15	2
181	6	no	#1	11
186	6	no	#7	7
189	6	no	#16	6
202	7	no	#10	5
209	7	no	#13	5
225	7	no	#13	3
229	8	no	#8	3
246	8	no	#14	8
248	8	no	#5	7
254	8	no	#11	7
Totals		20 postings		142

Table 3

Posting Activity for Subject #3

Message Number	Session	New Posting	Reply to Post submitted by	Meaning Units
25	1	no	#13	4
30	2	no	#8	6
65	3	no	#15	4
68	3	no	#12	6
70	3	no	#5	2
73	3	no	#1	10
77	3	no	#7	16
79	3	no	#7	5
82	3	no	#7	4
117	4	no	#9	1
162	5	no	#1	6
175	6	no	#5	11
191	6	no	#1	15
222	7	no	#10	12
230	8	no	#2	5
234	8	no	#6	8
238	8	no	#1	16
Totals		17 postings		131

Table 4

Posting Activity for Subject #4

Message Number	Session	New Posting	Reply to Post submitted by	Meaning Units
92	3	no	#1	9
144	5	no	#1	7
256	8	no	#1	9
Totals		3 postings		25

Table 5

Posting Activity for Subject #5

Message Number	Session	New Posting	Reply to Post submitted by	Meaning Units
37	2	no	#1	14
39	2	no	#9	6
43	2	no	#6	4
45	2	no	#8	11
49	2	no	#1	7
51	2	no	#6	7
54	2	no	#1	11
58	2	no	#8	24
69	3	no	#3	6
72	3	no	#12	5
108	4	no	#2	7
115	4	no	#1	22
119	4	no	#8	2
126	4	no	#11	5
129	4	no	#6	3
137	4	no	#1	13
140	4	no	#7	2
146	5	no	#13	1
149	5	no	#13	11
164	5	no	#1	27
166	5	no	#13	18
169	5	no	#13	4
174	6	no	#8	4
177	6	no	#7	1
184	6	no	#14	3
203	7	yes	-	28
204	7	yes	-	5
207	7	no	#12	1
212	7	no	#14	4
214	7	no	#10	4

223	7	no	#3	4
232	8	no	#7	1
233	8	no	#2	3
239	8	no	#1	24
241	8	no	#7	4
247	8	no	#2	8
Totals		36 postings		307

Table 6

Posting Activity for Subject #6

Message Number	Session	New Posting	Reply to Post submitted by	Meaning Units
4	1	no	#1	13
14	1	no	#15	4
16	1	no	#15	6
18	1	no	#12	9
22	1	no	#1	15
23	1	no	#6	12
33	2	no	#3	6
35	2	no	#1	10
36	2	no	#1	7
42	2	no	#5	4
46	2	no	#8	7
48	2	no	#8	4
50	2	no	#5	6
75	3	no	#7	10
87	3	no	#1	15
106	4	no	#9	4
128	4	no	#5	5
130	4	no	#5	2
132	4	no	#2	5
138	4	no	#1	14
150	5	no	#5	11
153	5	no	#15	3
155	5	no	#15	4
161	5	no	#16	4
170	5	no	#5	13
179	6	no	#1	5
190	6	no	#16	14
194	6	no	#1	9
218	7	no	#7	12

228	8	no	#16	9
235	8	no	#3	5
249	8	no	#2	5
Totals		20 postings		142

Table 7

Posting Activity for Subject #7

Message Number	Session	New Posting	Reply to Post submitted by	Meaning Units
12	1	no	#14	2
26	1	no	#1	5
27	2	no	#2	7
52	2	no	#5	5
61	3	no	#9	4
74	3	no	#3	14
76	3	no	#6	6
78	3	no	#3	3
80	3	no	#3	8
84	3	no	#1	4
89	3	no	#16	10
95	4	no	#13	7
109	4	no	#1	13
139	4	no	#12	10
148	5	no	#13	4
159	5	no	#9	6
168	5	no	#13	7
176	6	no	#5	3
185	6	no	#1	2
187	6	no	#2	10
198	6	no	#1	5
217	7	yes	-	9
231	8	no	#3	5
240	8	no	#5	3
243	8	no	#14	4
Totals		25 postings		151

Table 8

Posting Activity for Subject #8

Message Number	Session	New Posting	Reply to Post submitted by	Meaning Units
8	1	no	#2	8
29	2	no	#2	13
44	2	no	#6	8
47	2	no	#6	4
53	2	no	#5	6
56	2	no	#12	4
83	3	no	#7	13
110	4	yes	-	3
112	4	no	#9	3
118	4	no	#5	11
171	5	no	#13	7
172	6	no	#8	5
196	6	no	#3	11
215	7	no	#14	13
226	8	no	#13	6
Totals		15 postings		115

Table 9

Posting Activity for Subject #9

Message Number	Session	New Posting	Reply to Post submitted by	Meaning Units
3	1	no	#1	8
5	1	no	#6	4
9	1	no	#8	6
38	2	no	#5	5
40	2	no	#5	7
59	3	no	#1	12
60	3	no	#9	5
82	3	no	#7	1
96	4	no	#1	15
98	4	no	#12	5
99	4	no	#9	6
102	4	no	#2	6
104	4	no	#13	6
111	4	no	#8	7
113	4	no	#8	1
116	4	no	#5	3
122	4	no	#15	5
125	4	no	#11	1
142	4	no	#1	25
158	5	no	#15	9
237	8	no	#1	16
245	8	no	#14	13
251	8	no	#12	3
Totals		23 postings		169

Table 10

Posting Activity for Subject #10

Message Number	Session	New Posting	Reply to Post submitted by	Meaning Units
201	7	no	#1	8
210	7	no	#2	8
213	7	no	#5	6
220	7	no	#13	16
Totals		4 postings		38

Table 11

Posting Activity for Subject #11

Message Number	Session	New Posting	Reply to Post submitted by	Meaning Units
120	4	no	#5	20
123	4	no	#9	8
127	4	no	#5	10
253	8	no	#1	5
Totals		4 postings		43

Table 12

Posting Activity for Subject #12

Message Number	Session	New Posting	Reply to Post submitted by	Meaning Units
17	1	no	#1	10
55	2	no	#5	5
67	3	no	#1	15
71	3	no	#3	12
97	4	no	#9	4
133	4	no	#1	2
178	6	no	#1	17
206	7	no	#5	9
227	8	no	#8	5
250	8	no	#2	7
Totals		10 postings		86

Table 13

Posting Activity for Subject #13

Message Number	Session	New Posting	Reply to Post submitted by	Meaning Units
19	1	no	#12	9
24	1	no	#1	9
32	2	no	#3	11
93	4	no	#1	16
103	4	no	#2	8
136	4	no	#1	6
145	5	no	#1	24
147	5	no	#5	5
151	5	no	#5	5
165	5	no	#5	18
167	5	no	#5	6
192	6	no	#3	4
205	7	no	#5	8
208	7	yes	-	10
216	7	yes	-	3
219	7	no	#6	10
224	7	no	#10	10
Totals		17 postings		162

Table 14

Posting Activity for Subject #14

Message Number	Session	New Posting	Reply to Post submitted by	Meaning Units
11	1	no	#1	48
41	2	no	#9	6
57	2	no	#8	12
86	3	no	#1	34
91	3	no	#16	8
94	4	no	#13	6
100	4	no	#9	6
105	4	no	#9	5
124	4	no	#11	3
135	4	no	#1	13
156	5	no	#6	11
163	5	no	#3	7
173	6	no	#8	2
183	6	no	#1	16
195	6	no	#6	5
211	7	no	#13	9
242	8	no	#1	14
244	8	no	#7	6
Totals		18 postings		211

Table 15

Posting Activity for Subject #15

Message Number	Session	New Posting	Reply to Post submitted by	Meaning Units
13	1	no	#1	10
15	1	no	#6	4
21	1	no	#1	7
64	3	no	#1	4
66	3	no	#3	8
121	4	no	#11	5
152	5	no	#1	2
154	5	no	#6	5
180	6	no	#1	6
252	8	no	#2	4
Totals		10 postings		55

Table 16

Posting Activity for Subject #16

Message Number	Session	New Posting	Reply to Post	Meaning Units
88	3	no	#1	15
90	3	no	#7	9
160	5	no	#15	2
182	6	no	#2	8
188	6	no	#7	7
255	8	no	#1	6
Totals		6 postings		47