

Designing Collaborative Learning Environments Mediated by Computer Conferencing : Issues and Challenges in the Asian Socio-Cultural Context

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Abstract : *The phenomenal growth of the Internet and global networking has provided the impetus to utilize computer conferencing to facilitate collaborative learning. This paper explores issues related to the design of collaborative learning environments mediated by computer conferencing, and discusses them from the perspective of challenges faced in the socio-cultural context of the Indian sub-continent. It examines the unique features of the online medium and their impact on social cohesiveness, group dynamics, interaction, communication anxiety, and participation. Based on several computer conferences, the paper offers guidelines to practice and focuses on the importance of the role of the moderator/facilitator in a computer conference. The necessity to change traditional roles from teacher-centered to learner-centered learning is emphasized and the challenge to design collaborative learning based on constructivist principles is explored. The paper concludes with a discussion of the need to develop new paradigms to evaluate collaborative learning mediated by computer conferencing.*

Introduction

The twenty-first century will increasingly place emphasis on global connectivity and on international and national collaborative learning efforts and team work. Asynchronous computer conferencing because of its time-independent and place-independent features has the ability to promote such global collaborations as well as interconnect geographically isolated persons within national boundaries. One of the predominant users of computer conferencing now and in the future will be institutions of higher education and national and international distance education systems. As educational institutions begin to utilize computer conferencing for networking and collaborative learning, it is important to consider the effective utilization of this new technology in order to design learning environments that facilitate collaboration and effective cross-cultural communication.

Internet development in Asia has only begun to take off since 1995. For the purpose of this paper the Asian socio-cultural context is defined as the cultural context of the Indian sub-continent which includes India, Pakistan, Bangladesh and Sri Lanka. In many of these countries, the Internet has been introduced by universities as is the case in India

and Sri Lanka (Firdhous & Dias, 1996). Ang and Loh (1996) note that the growth of the Internet has been fastest where there is a commercial push, aided by the availability of public access. This means that the major cities get access first. In general, Asian users have a more purposeful attitude toward the Internet than their Western counterparts. Pricing may have played a part in conveying the perception that the Internet is expensive, and therefore more suited for specific purposes such as communication, access to databases, and research. There are many barriers to Internet development in the Indian sub-continent some of which include high telecommunication costs, poor infrastructure, and language, as English is a second language in many of these countries. Ang and Loh (1996) note that despite these barriers, the Internet will grow at a much more rapid rate in Asia than in the West, and that the pace of growth will be influenced by history, culture, language and economics.

With the rapid growth of the Internet in Asia, educational institutions are beginning to utilize the features of computer-mediated communication (CMC): electronic mail (e-mail), computer conferencing, and the World Wide Web (WWW) and on-line databases, for educational purposes. Computer conferencing systems, in addition to e-mail, provide a conferencing feature which supports group or many-to-many communication. In these systems, messages are linked to form chains of communication and these messages are stored on the host computer till an individual logs on to read and reply to messages. Most conferencing systems based on groupware principles offer a range of facilities for enhancing group communication and information retrieval. These include directories of users and conferences, conference management tools, search facilities, polling options, cooperative authoring, the ability to customize the system with special commands for particular groups, and access to databases (Kaye, 1989). Computer conferencing systems are still being developed and some of the currently used systems include First Class, EIES, COSY, and several WWW based conferencing systems such as Netscape's Collabra. In addition to computer conferencing systems developed on group ware principles, Listservs (L-Soft 1995) enable communication between groups whose members are scattered throughout the world. A listserv is in effect, an automated mailing list program which enables the computer on which it is installed to receive messages from anyone subscribed to the list and retransmit each message to the entire list of subscribers. Messages sent to an "unmoderated" listserv are retransmitted automatically by the computer without being reviewed by a human moderator. Participants may join a list with no membership or other restrictions by using the automatic subscription feature of the Listserv program.

Purpose of the Paper

The purpose of this paper is to examine issues related to the design of collaborative learning environments mediated by computer conferencing, and discuss them from the perspective of challenges faced in the cultural context of the Indian sub-continent, referred to hereafter as the Asian cultural context. While it is obvious that the cultural context of the Indian sub-continent is not one concordant whole, as it represents many cultural differences both across and within countries, the term "Asian cultural context" is used in this paper as these countries face similar challenges in adopting and using a new technology such as computer conferencing.

The objectives of this paper are to:

- examine the unique features of the medium of computer conferencing,
- discuss issues related to designing collaborative learning experiences via computer conferencing,
- investigate ways in which the on-line environment impacts social cohesiveness of the group, group dynamics, interaction, communication anxiety, and participation,
- analyze the role of the moderator/facilitator in a computer conference, and examine techniques for online moderation, and
- discuss techniques for the evaluation of CMC mediated collaborative learning.

The discussion is based on conceptual frameworks and research on computer conferencing, the author's experience in implementing and evaluating several online collaborative learning experiences, and the author's recent interviews with educators in India and Sri Lanka who are planning to use computer conferencing to facilitate collaborative learning. The paper is practitioner oriented in that it provides guidelines for practice by discussing issues related to computer conferencing design and organization. Advice given to practitioners is derived mostly from the author's experience in conducting several collaborative learning experiences online. These include two inter-university Globaled projects conducted in 1992 and 1993 which linked graduate students in several universities in the U.S.A. and overseas to participate in the sharing and discussion of research related to their coursework (Gunawardena, 1992; Gunawardena et al., 1994; Murphy et al., 1995; Rezabek et al., 1994). The Globaled projects were premised upon a learner-centered collaborative learning model where the learner would be an active participant in the learning process involved in constructing knowledge through a process of interaction and discussion with learning peers and instructors. Students at each participating university were responsible for moderating the Globaled discussions. Other collaborative learning projects involved a computer conference that was set up as a small group discussion within the context of a global electronic pre-conference for the international TeleTeaching '93 conference held in Norway, in which graduate students at the University of New Mexico shared and discussed their research with experts in the field of cooperative learning in North America and Europe (Gunawardena & Heeren, 1993), and class computer conferences between graduate students in instructional technology at the University of New Mexico, U.S.A. and the University of Guadalajara, Mexico. In addition to these student centered collaborative learning projects, the paper draws on a professional development experience; a global online debate, one of the first to be conducted across international time lines in an asynchronous format. The online debate was part of the International Council of Distance Education's pre-conference to its world conference in Birmingham, UK. in June 1995, and provided an opportunity for those who could not attend the conference to discuss issues online that would be addressed during the Birmingham conference. The participants in the online debate were predominantly practicing specialists or advanced students in the field of distance education, and the 500 list subscribers represented 35 countries (Gunawardena, Lowe and Anderson, 1996).

Perhaps one of the initial steps to be taken by designers as they approach the design of collaborative learning via a new medium is to understand the unique strengths and weaknesses of the medium so as to be able to maximize on the strengths and compensate for the weaknesses.

Issues and Challenges in Designing Collaborative Learning via Computer Conferencing

Understanding the Medium of Computer Conferencing

Harasim (1990, 1993) emphasizes the necessity to approach computer conferencing as a distinct and unique domain. She notes that the medium has five key attributes which impact the social educational environment: i) many-to-many communication, ii) place independence, iii) time independence, iv) text-based nature, and v) computer mediated interaction. “The group nature of computer conferencing may be the most fundamental or critical component underpinning theory-building and the design and implementation of on-line educational activities” (Harasim, 1989, p. 51). For distance educators CMC offers the capability to facilitate group work at a distance as the medium enables communication between geographically separated students over a sustained period of time. The opportunities to share multiple perspectives in an interactive group process is one of the unique advantages of this medium.

Place-independence affords access to the class from any location as long as instructors and students have easy access to a computer and phone line. Further, access to libraries, databases and archives may be available through the conferencing system.

The asynchronous or time-independent feature of CMC systems offers an advantage in that the CMC class is open 24 hours a day, seven days a week, to accommodate to the time schedules of distance learners. Although CMC systems may be either synchronous or asynchronous, the focus of this paper is on asynchronous CMC, because this time independence feature is an important dimension in facilitating cooperative group work among distance learners. One of the unique advantages of time-independence is that students have time for reflection before they post their comments on line. While a face-to-face classroom affords little time for reflection, CMC enables learners to refer to resources, experts, texts and reflect before they contribute to a conference. Harasim (1990) observes that the time-independent feature also has several drawbacks. Communication anxiety (the feeling of speaking into a vacuum) results when a participant receives no immediate response to comments posted online. Another difficulty is the “rolling present,” knowing whether a topic is still current or taken over by another topic. If group members do not log on frequently long delays can result in arriving at a consensus or decision.

The text-based nature of the medium has unique strengths and weaknesses. Harasim (1990) notes that writing comments is perceived by learners as contributing to more reflective interaction than talking in a face-to-face class or telephone conference. She cites Vygotsky who contends that the process of articulating thoughts into written speech involves deliberate analytical action. The medium of CMC affords the opportunity for students to compose and edit one’s response or respond spontaneously. One of the

problems of a text-based medium however, is that students who do not perceive themselves to be good writers may be reluctant to post their messages online. This may be compounded in the case of non-native speakers of the language that is being used for the CMC discussion.

Text-based communication also means that non-verbal cues such as facial expressions, voice intonations, and gestures that usually accompany face-to-face communication are absent. This may lead to misunderstandings of the intent of the communication and participants in conferences need to make the effort to communicate clearly and foresee the impact of their messages. This becomes an even greater issue when cross-cultural online groups are involved. On the other hand one advantage of the medium is that text-based communication devoid of non-verbal cues provides no social or physical cues to distract from the content of the message thereby equalizing the conferencing group. In Asian cultures where there are social distinctions based on caste and creed, this medium may be a good means of equalizing the group of participants.

One of the disadvantages of the text-based feature is that it can contribute to information overload as computer conferences depending on the number of participants and frequency of communication can generate heavy amounts of reading. A related problem is inadequate user interfaces for navigating through the discussion threads of a conference. Current conferencing systems have tools for linking comments but no suitable mechanisms for linking and relating ideas. Therefore tools for linking and organizing information is needed for conferencing systems to be more responsive to group information needs. While there are new developments in incorporating graphics and video (Cuseeme) into conferencing, the medium remains largely a text-based one. Novice conference users therefore have to be trained in the unique characteristics of the medium, information management techniques, and navigation through a conference.

The computer-mediated learning feature of this medium is its most distinct feature that separates it from other media such as books, audio and video conferencing. It is an interactive medium encouraging active involvement from participants. Lectures that involve one person dominating the conference space for a long period of time will not go well with this medium. Discussion, where there is equal participation among members is what this medium fosters best. The computer-mediated feature offers the advantage of the control capabilities of the computer - the ability to read, print, search, revise, copy, paste, upload and download information. A unique advantage of the medium is that it provides an archived transcript of the conference, allowing teachers and evaluators to examine the contributions of participants and the process of learning that has taken place.

Designers need to understand the unique strengths and weaknesses of the medium of CMC as they begin to design collaborative learning experiences for adults.

Designing Collaborative Learning Experiences

In Hofstede's (1980) study of the four dimensions of national culture, India and Pakistan scored moderately high on Power Distance, which is the degree to which a society accepts the idea that power is to be distributed unequally. Goodman (1994) notes that these societies are characterized by teacher-centered education, in which the teacher

transfers wisdom to students. Students are not expected to initiate communication or speak up unless called upon to do so. In such societies teachers are respected in and out of class and are not to be publicly contradicted. Age is respected and formal presentations such as lectures are appreciated. This to a certain extent describes the socio-cultural context of the Indian sub-continent. Distance education reflects traditional face-to-face education, and in most large scale distance education systems in these countries, print-based courses are designed with the information usually delivered one-way from the teacher to the student, placing emphasis on independent learning.

Computer conferencing because of its essentially interactive group nature offers a challenge to these educators to move from teacher-centered learning paradigms that view the learner as a passive recipient of knowledge from an expert, to more learner-centered collaborative learning, that treats the learner as an active participant in the learning process. Technologies such as computer conferencing that foster collaborative learning may break traditional forms of teacher oriented education and incorporate interaction into distance education. For isolated distance learners for whom the need for affiliation is critical, and for those who share values of group ethos, computer conferencing will offer an opportunity to develop bonds and working relationships with fellow classmates and their instructor.

Computer conferencing is particularly suited to collaborative learning because the medium facilitates information exchange and provides the shared space essential for group work. Members of a conference can read the same message on a topic, reply to messages which can form chains of communication to be read by all, generate new messages and share files. Further, conferencing systems enable the linking of students to instructors, peers, experts, databases, online libraries, and multimedia instruction available through the WWW. These features of the medium facilitate the design of instruction where the learner is central to the learning experience.

Collaborative or group learning is premised upon a learner-centered model that treats the learner as an active participant in the learning process involved in constructing knowledge through a process of discussion and interaction with learning peers and experts (Harasim, 1989; Harasim, 1990). "Knowledge is not something that is 'delivered' to students in this process, but something that emerges from active dialogue among those who seek to understand and apply concepts and techniques" (Hiltz, 1990, 135). According to Bouton and Garth (cited in Harasim, 1990), learning is an interactive group process whereby the learner actively constructs knowledge by formulating ideas into words and then by building upon them through the reactions of others.

Peer interaction among students has been identified as a critical variable in learning and cognitive development: the conversation (verbalizing), multiple perspectives (cognitive restructuring), and argument (conceptual conflict resolution) that are a part of group learning may be responsible for greater cognitive development in groups than when the same individuals work alone (Harasim, 1990). Hiltz (1990) notes that in her evaluation of the Virtual Classroom, students who experienced high levels of communication with other students and with their professor, and participated in the 'collaborative approach to learning' were most likely to judge the outcomes of the Virtual Classroom courses to be superior to those of traditionally delivered courses.

Literature on peer collaboration indicates that as ideas are presented, there is a need to actively build linkages and associations and to organize the ideas. Interaction among peers seems important to internalizing attitude change. Information is processed, weighed, reorganized, and structured in this process, both by each individual and also by the group (Harasim, 1990, p. 44)

Building CMC environments that promote higher-order thinking through collaborative learning has been a concern for many distance education designers. Constructivism has recently begun to influence the design of technology mediated learning environments. Jonassen (1994) observes that according to constructivists, thinking is grounded in perception of physical and social experiences, which can only be comprehended by the mind. The mind produces mental models that explain what the individual has perceived. These models are then used to explain, predict, or infer phenomena in the real world. Constructivists also believe that much of reality is shared through a process of social negotiation. Jonassen (1994) discusses the implications of constructivism for instructional design and observes that purposeful knowledge construction may be facilitated by learning environments which a) provide multiple representations of reality, b) focus on knowledge construction and not reproduction, c) provide real world case-based learning environments, d) foster reflective practice, e) enable context and content dependent knowledge construction, and f) support collaborative construction of knowledge through social negotiation. Employing constructivist principles, CMC environments can be designed to provide multiple perspectives and real world examples, encourage reflection, and support collaborative construction of knowledge through social negotiation. It is an excellent medium for supporting collaborative construction of knowledge through social negotiation. However, such learning environments may promote collaborative learning only if participants can relate to one another, share a sense of community and a common goal.

Moving from teacher-centered learning environments to learner-centered collaborative learning will be a challenge to both teachers and students in the Asian cultural context. Patronage systems which foster values of obedience, honor, and respect for authority are evident in many Asian educational systems through students' respect and loyalty toward their teacher or professor. Students generally do not question nor disagree with the statements made by a professor. While it would be a challenge to teachers to move away from the control and authority they maintain in the classroom to designing learning environments where students and teachers are more or less equal, it would also be a challenge to students to change their expectations of the role of the teacher as an authority figure who is responsible for delivering knowledge. In collaborative learning environments, learners will have to give up their dependency on teachers as sources of knowledge. They will be held responsible for their own learning and will need to interact with each other and the teacher to negotiate meaning and construct knowledge. For learners who are not comfortable with interacting with their peers this will be a challenging task. The medium of CMC is an interactive medium that promotes discussion and interaction. Lectures are better placed as read only files in a separate conference space and the medium is used to discuss the content of the lecture.

Therefore, in the Asian cultural context, selecting a suitable format and topic for facilitating collaborative learning via CMC will be key. A teacher led discussion format will be a good start with control given to student discussion leaders as teachers and

students become more comfortable interacting with each other. Inviting a guest expert to discuss a paper is another fairly non-threatening format for an initial conference. Students who are more comfortable with the medium and interaction can be asked to lead a discussion on a research paper or a group project they have completed. Stimulating questions or topics with sufficient controversy should be introduced as participants become more comfortable with interaction. The format should be structured enough to provide a framework for the discussion but not so rigid that its formality discourages participants from interacting. A non-threatening collaborative learning exercise that worked well in the Globaled project was inter-university teams developing annotated bibliographies of research related to a specific topic and sharing these bibliographies with the rest of the conferencing group. As the group becomes more comfortable with the medium and with each other, more challenging formats such as the discussion of case studies and debates can be tried.

In the K-12 context, Riel (1993) discusses the promotion of global education and cross-cultural education through "learning circles;" small electronic communities that form to accomplish specific goals. As in the AT&T Learning Network, teachers and students who share academic interests but represent different geographic or cultural perspectives are grouped together. She notes that "learning circles" in the educational community, like "quality circles" in the business community, involve participatory management by teachers. A "learning circle" is not controlled by a single teacher, it is a collective construction by participants.

One of the questions that is often asked when designing collaborative learning is, what is the best time frame for a CMC conference activity? The characteristics of the medium create some difficulties for the participants to maintain a clear picture of the discussion over time. Spreading a discussion over a longer period of time introduces difficulties in keeping an overall perspective of the discussion as a whole (Romiszowski & de Haas 1989). Ironically, it is this very feature of being able to spread a discussion over time that is considered to be one of the unique advantages of the online environment. To be able to chew over an idea and come back to the conference with a new and different perspective will be seriously hampered when online discussions are limited by specific time periods. However, if a group goal has to be achieved, it is important to assign time frames for collaborative learning activities and this would largely depend on the nature of the activity, how often the participants can get online, and the social cohesiveness of the group. The Globaled projects indicated that a two-week period was sufficient for discussion of a question or topic when participants could be online frequently, that is log into their computer every day or once in two days.

Planning and Organization

When organizing inter-university or inter-institutional collaborations, advanced planning, collaborative planning and organization are key to the successful operation of the computer conference. In the Globaled projects (Gunawardena, 1992; Gunawardena et al., 1994) planning began a semester before Globaled was due to begin when several instructors teaching distance education and telecommunications who had indicated an interest in such a project were contacted. Previous experience had indicated that unless

the CMC activity is integrated as a class assignment, motivation for participation among students would be low. Professors at each institution had different goals for their particular courses but were able to integrate Globaled activities as class assignments in a number of ways.

One of the problems was scheduling when the conference would begin and end, as participating universities were either on a semester or quarter system. Group activities had to be arranged to take into account the spring breaks and course schedules at each institution. When international course schedules are involved, this becomes even more complicated. The planning among instructors was carried out using a group distribution list on e-mail with each instructor making suggestions for conference activities. The ability to collaborate in the planning process and come to a consensus was very important to the success of this conference.

Technical System and Access

One of the major decisions that need to be made by a designer is the type of technical system that will be used for the conference. A Listserv enables the interconnecting of any individual who has an e-mail address and is therefore versatile as an initial conferencing system. One of the problems however, is that a listserv delivers each conference message to the individual's private e-mail box thus causing information overload. In addition, there are no mechanisms for linking the messages, or looking at threads in a conference. Therefore, while the listserv is conducive to generating many ideas, it is not suitable for synthesizing them and building knowledge. Excellent moderators who can facilitate group activity, link ideas, synthesize and summarize the discussion, and manage information overload are necessary if listserv technology is selected.

Groupware based conferencing systems on the other hand are more versatile in affording navigational tools and separate conferencing spaces. But they have to be installed in servers or mainframe computer systems and access to them may be limited by the institution that has purchased the conferencing system. Large distance education systems however, can purchase the conferencing software and make it available to its numerous users. The other alternative is to explore web based conferencing systems if all students have access to the WWW.

Access can be defined to include two aspects. Physical access, that is access to a networked computer to participate in the conference, and psychological access, that is comfort with using the medium of CMC. Access perhaps will be the major deterrent for using computer conferencing in Asian countries because of the high cost involved in providing both physical and psychological access. It is important that students who are expected to participate in a conference have easy access to a computer and a modem if they are to be present online frequently.

Psychological access or mastery of the technical system by both teachers and students is the key to enhancing collaborative learning via CMC. In the Globaled inter-university project, each instructor was responsible for training students to use CMC and a listserv at their respective university during the first two weeks of class. Since e-mail systems

at each university have a set of commands unique to that system it was difficult for some students to initially subscribe to the conference. It was also difficult to foresee the problems that occurred due to the updating of computer systems at participating universities. Frequent test messages to the system as a result of these problems irritated participants.

In order to overcome technical problems, the instructor or listowner must be trained to maintain a listserv, and have access to a computer expert who can solve technical problems at the subscribing sites. The subscribing instructors and students must be trained to use the system and be able to work with their own consultants to solve initial technical problems. Comfort with the use of the technical system and easy access are key to effective group learning.

Social Cohesion and Group Dynamics

Computer conferences generate complex social environments. The social interactions tend to be unusually complex because of the necessity to mediate group activity in a text based environment devoid of non-verbal cues. Feenberg (1989) notes that failures tend to occur at the social level far more than they do at the technical level. This problem is magnified when cross-cultural groups are linked. Therefore, one of the design challenges is to create a socially cohesive online group where participants can relate to each other and maintain group goals till the tasks assigned are completed.

Research has indicated that a minimum amount of social cohesiveness is required for the effective performance of a group task (Davies, 1989). Because of the unpredictable time lag between sending and receiving messages and the text-based nature of computer-mediated communication, it is difficult to achieve this cohesiveness unless moderators of computer conferences make a genuine effort to do so. Harasim (1990) observes that "group dynamics can suffer because in many ways this medium does not offer tools to support such processes as forming groups and identifying and coordinating group tasks." (p. 48).

Some of the techniques for building social cohesion and group dynamics that worked well in the Globaled project and that would transfer to the Asian cultural context are discussed as follows. It must be noted that for Asian students who may not be comfortable with interacting and sharing their professional interests and ideas in an open forum, a greater effort will have to be made to achieve social cohesion. The conference should be organized so that the first two weeks would be spent on introductions before the scheduled activities begin. Getting to know each other is very important if the online group is to remain cohesive for a long period of time. In order to create the sense of an online community and promote social cohesiveness, participants should be asked to introduce themselves and talk about their professional interests and experiences. Participants will soon connect with those who have similar professional interests. All introductions should be acknowledged by the moderator at the end of every week in order to avoid the communication anxiety caused by the unpredictable time lag between sending and receiving messages in an electronic environment. In addition to introductions, "ice breakers" that will make participants comfortable communicating with each other will be a good way to start the conference.

The social environment CMC creates necessitates the development of a new set of social and communication skills. It is crucial to make students understand the unique features of the medium and problems inherent in communicating through this medium. Students should be introduced to a set of communication protocols for the conference which provides information on procedures for signing on and using the system, and netiquette (etiquette for the discussion). Because communication via CMC is a novel experience for most students, Netiquette should include guidelines on the length of messages, writing style, the use of the subject line, providing cultural context cues for unfamiliar phrases, the use of wit and humor, etc.

In order to maintain social cohesiveness throughout the conference, a separate conferencing space should be assigned for social chit chat. Often labelled a Coffee House or Electronic Cafe, these spaces afford opportunity for lighthearted banter and sharing of jokes which helps to form a community of online personalities.

Research on social presence and CMC (Gunawardena, 1995) has indicated that despite the low social bandwidth of the medium, users of computer networks are able to project their identities whether "real" or "pseudo," feel the presence of others online, and create communities with commonly agreed on conventions and norms that bind them together to explore issues of common interest. CMC users develop an ability to express missing nonverbal cues in written form. One way of expressing emotion through this text-based medium is the use of "emoticons" or icons that express emotion, the contrived sideways faces that can be made by combinations of punctuation marks. For example, where :-) indicates a smiling face or "smiley" and :- (indicates an unhappy face or "unsmiley." These marks contextualize the message within the relationship. Parenthetical metalinguistic cues such as "hmmm" or "yuk" in a message adds emotion to a text-based message. Such cues and emoticons add affective information and indicate informality and participants can be encouraged to use them.

Further discussion on social cohesion and group dynamics is found in Gunawardena, 1994. One of the best methods of building social cohesion between a group is to alleviate participants' communication anxiety.

Communication Anxiety

"Communication online involves a minor but real personal risk, and a response — any response — is generally interpreted as a success while silence means failure" (Feenberg 1989, p. 23). In the absence of non-verbal cues to support communication, communication anxiety results when no immediate responses are received for a participant's comments, ideas or questions. Since CMC messages are lodged instantly in the central computer, we feel an intense need for response when we send a message. "This technical improvement, which makes rapid exchanges possible, also makes unusual delay a sign of rejection or indifference." (Feenberg, 1989, p. 24). Therefore, computer communication places a premium on active participation and is often critical of "lurkers" or passive readers. Experience with the Globaled projects have indicated that while it is important to encourage students to participate, they should not be penalized for being lurkers as they often learn from the conference discussions even if they do not post a comment online. So, the argument for letting lurkers be lurkers.

Communication anxiety occurs in computer conferences because of the following reasons: lack of immediate responses, lack of non-verbal cues, lack of communication protocols, lack of good writing skills especially in the case of non-native speakers, uncertainty of cultural context cues in messages and domineering personalities on line. In order to alleviate communication anxiety, moderators or teachers need to be present online frequently and acknowledge messages posted by participants. This is specially true in conferences where there are many novices. As participants gain experience using the medium, these acknowledgements can become less frequent. Creating a socially conducive climate, a cohesive community and developing a set of communication protocols or netiquette will help overcome communication anxiety. Another technique is to encourage students to write private e-mail messages to moderators or instructors voicing their concerns.

In the Asian cultural context, special concern must be given to the language selected for the conference. Since non-native speakers of the language will be involved, their fears related to inadequacies in the use of the language have to be assuaged and clear guidelines provided for writing style. Another technique that has worked well with novice users who are concerned about the inadequacy of language or writing skills, is to have them work in groups to respond to the questions and topics in the conference, and sign the messages posted to the conference as a group. When responsibility for a message is shared, anxiety about its content and appearance can be reduced.

Cross-cultural communication issues need to be considered when designing collaborative learning in both the international and national contexts. Even within national boundaries misunderstandings due to cultural differences can occur. India, for example, represents many diverse cultures and religions as well as diverse socio-cultural contexts in urban, rural and tribal communities. These differences are bound to play a part in online communication and designers of computer conferences need to foresee them and address them in the communication protocols they develop for the conference. Explaining cultural context cues when participants post messages is a good way to overcome some of the misunderstandings that tend to occur.

Equal Participation

Harasim (1993) observes that the text-based nature of online communication enhances interaction among the group by reducing discriminatory communication patterns based on physical and social cues such as gender, race, socio-economic status and physical features. "Text-only communication can free people from the bonds of physical appearance and enable communication at the level of ideas" (p. 26). This statement, however, may be only partially true. Social equality may be evident only in the initial phases of a conference. As the conference progresses, participants may interject social cues to messages leading to differences in status. Phillips and Pease (1987) note that a computer conference that linked high-level professionals in business and academia to discuss top-level management yielded intriguing insights on social interactions on CMC. Participants complained about feeling ostracized for expressing opposing views or opinions. This ostracism was conveyed subtly by ignoring the opposing points of view. Those who complained were not worried about getting into arguments, but were concerned about being left out for even daring to be critical.

Active participation and interaction by group members are claimed to be necessary ingredients for effective collaborative learning. Jarvenpaa et al., (1988) suggest that shifting member participation in the direction of equal participation results in higher quality group decisions. It appears that, in organizational settings, the use of electronic media increases participation by otherwise reticent members. The asynchronous nature of computer conferencing allows for equal participation by all members, even the more reserved group members, unlike in a face-to-face setting where the vocal members might dominate the conversation. The asynchronous feature also allows the participants to reflect on current topics and even to consult outside resources before contributing to the conference. However, even though CMC affords the opportunity for equitable participation, it does not guarantee it. Learners can be excluded by lack of access or through fear of the technology. There may be other reasons such as the dynamics of the group, and gender related communication issues that might exclude participants.

In the socio-cultural context of the Indian sub-continent, societal tradition of male dominance and female subservience may initially restrain female students from participating in computer conferences with their male counterparts, or they may feel unequal participants in the conference. This may particularly be true for female students from tribal or rural areas. Further, technology is perceived as a masculine domain, and female students may be reluctant to learn to use the technology because they feel they are incapable of mastering it. Another aspect that needs to be considered is the use of language which might exclude female participants. Sharma (1996) stresses that it is essential that gender inclusive language be the norm. She notes that even now in many cases the student is addressed as "he" which gives the impression that the female learner is not important or is not targeted at. Therefore, designers need to understand the influence of the socio-cultural context on communication between genders, self-concept, and self efficacy. Women students may need more support and positive feedback from the moderators/instructors of computer conferences in order to boost their self-concept and self-efficacy. During the conference, it is important that moderators determine reasons for non-participation or inequitable participation and address the problem as this may detract from an effective collaborative effort.

The above discussion on various issues and challenges in designing computer conferences has highlighted the need for effective moderators and moderating techniques.

Moderating Computer Conferences

An active moderator who is capable of skillfully leading a computer conference can overcome some of the deficiencies inherent in online communication. The moderator should attempt to relieve the communication anxiety experienced by participants by issuing warm invitations and sending encouraging private messages. Feedback and acknowledgement of initial messages are crucial to making people feel comfortable in participating in the conference. Since collaborative learning activities such as seminars, working groups, learning partnerships and team debates use cooperative task structures based on active learner participation and peer interaction to achieve a common goal, it is important that the moderator frequently summarize or clarify what has been taking place and try to express the emerging consensus of the group. These "weaving

comments” supply a unifying overview and synthesis of the discussion. A conference is doomed for failure without an active moderator. The strong leadership of the moderator must compensate for the missing cues in the medium.

Instructors who are beginning to use CMC as a medium of instruction, should make an attempt to learn the skills of an effective online moderator. Teaching through this medium requires a change of role from “deliverer” of information to an active and equal participant. In the CMC environment, “the instructor is more of a facilitator of group communications, organizer of group learning activities, and resident consulting expert” (Turoff, 1990, p. xii). As was discussed previously this will be a challenge to many Asian instructors. Further, moderating a computer conference requires the instructor to develop a unique set of skills to communicate and maintain group process through a text-based medium, and be technically competent to some degree in order to answer or direct technical questions. Gunawardena (1995) points out that an important skill online moderators and participants need to develop is “social presence,” defined as the degree to which a person is perceived as a “real person” in mediated communication (Short et al., 1976). Social presence skills enable moderators to create a sense of online community in order to promote interaction and collaborative learning.

The author’s experience with designing, implementing and evaluating several computer conferences has led to the formulation of the following guidelines for moderating computer conferences. The moderator’s role in an academic computer conference can be discussed in relation to three types of responsibilities:

- 1) To humanize the online environment and create a sense of community,
- 2) To facilitate learning, and
- 3) Achieve group goals.

The tasks included in each of these responsibilities are listed below:

1) To humanize the online environment and create a sense of community :

A. Be present online frequently.

The moderator should be on-line at least once a day to see if participants need clarification, and focus the discussion if it wanders off the topic.

B. Ask participants to introduce themselves.

At the beginning of a conference encourage participants to introduce themselves by first providing a sample introduction and then encouraging those who haven’t already done so, to post their introductions. It is also important to remind participants to sign their name at the end of each message.

C. Encourage participation.

This is particularly important very early in the conference when there are several novice users. Send private e-mail messages.

D. Initiate and sustain meta communication.

That is communication about communication. Whenever communication problems

arise, give explanation of unclear messages, request clarification of the tone of messages and suggest changes in the rules of the conference.

E. Send encouraging private messages.

In order to alleviate communication anxiety, acknowledge participant contributions, and pay compliments, send private e-mail messages.

2) To facilitate learning :

A. Encourage participants to generate ideas.

(Example: brainstorming, information sharing, and looking at different perspectives to a problem.)

B. Help participants to link ideas together and see relationships.

C. Help participants to see the structure of ideas, synthesize them, and build knowledge.

D. Summarize the discussion.

Moderator summaries can be of two types:

a). Summative synthesis (listing ideas which have been presented, showing relationships between the ideas).

b). Query-posing synthesis (asking questions which will help the students to discover relationships between ideas and opposing viewpoints).

3) To Achieve group goals moderators need to :

A. Choose a communication model or a set of communication protocols. (Netiquette).

B. Summarize or clarify frequently.

C. "Weave" thoughts and comments..

D. Express emerging consensus of the group.

E. Develop techniques for managing information overload.

F. Maintain social equality of the group (by making sure that everyone has an equal chance to be heard and that nobody tries to dominate the discussion).

While these guidelines serve as a useful starting point, it is important that CMC moderators develop their own techniques with which they are comfortable and make their own personalities come through.

Evaluating Collaborative Learning via CMC

Perhaps one of the greatest challenges to designing collaborative learning experiences via CMC is to develop effective frameworks for evaluating such experiences. New paradigms for evaluating learning are needed if collaborative learning experiences are designed based on constructivist principles. As Jonassen (1994) has noted Constructivism emphasizes knowledge construction through social negotiation rather than reproduction,

where learners are actively engaged in building knowledge structures. Then, as evaluators we need to assess the intellectual processes of knowledge construction, not reproduction, which suggests new forms of assessment emphasizing process variables rather than outcome variables. .

Questions that are uppermost in evaluators' minds as they approach the evaluation of CMC learning experiences are:

- 1) Did people participate in the conference?
- 2) Was useful knowledge created?
- 3) Did participants learn? and
- 4). Were participants satisfied with the learning experience?

Since the adoption of a single technique for analyzing the quality of the learning experience in a computer conference will not yield satisfactory answers, it is important to examine several techniques and select methods that suit a particular learning experience and socio-cultural context. Techniques that have been used to answer these questions are: participation analysis, participant reports of learning and satisfaction in the transcript, online or mail surveys, and content or interaction analysis of the computer transcript.

For analyzing participation patterns and the structure of interactions in computer conferences, Levin, Kim, and Riel (1990) developed a model that includes participant structures analysis, intermessage reference analysis and message act analysis. Henri (1992) contends that quantitative analysis of participation in computer conferences tends to yield "superficial" results, often expressed in the number of messages or participants. However, participation patterns still has much to tell us about the capacity of a conference to engage members and about comparative patterns of participation among learners from varying backgrounds. It is a useful tool for determining who participated, how actively and for how long. It is even more useful, perhaps, for determining whether patterns exist regarding the comparative frequencies with which differing types of participants participated.

Another type of information that is valuable and fairly reliable is participants' own reports of learning or satisfaction with the conferencing experience. These occur spontaneously in the transcript of the computer conference itself, or can be solicited by online surveys or by assigning a separate conference space for the evaluation of the conference from the participants' perspective.

Perhaps the most challenging type of evaluation and one that would yield the most useful information on the process of collaborative learning and knowledge negotiation, is content analysis or interaction analysis of the conference transcript. One major advantage of computer conferencing as an instructional medium is its self-documenting feature. Evaluating the quality of a computer-mediated conference by content analysis entails studying the transcript to determine whether learning or the co-creation of knowledge occurred. Of the models that have been developed for interaction analysis, Henri's (1992) model holds the most promise. However, since existing models for content analysis were not well-suited for the analysis of a constructivist learning

environment, Gunawardena, Lowe and Anderson (1996) developed a constructivist interaction analysis model to examine the social negotiation and knowledge construction that occurred in an online debate. They critically examine interaction analysis techniques, and based on a new definition of interaction they propose for the CMC context, develop a model for the analysis of interactions in a computer mediated constructive learning environment.

Developing an appropriate framework for evaluating collaborative learning via computer conferencing is an important aspect of the design process. It is also an area in which further research is needed.

Conclusion

This paper has discussed issues and challenges in the design of collaborative learning experiences through computer conferencing and pointed out areas of concern from the perspective of the socio-cultural context of the Indian subcontinent. The paper offers suggestions for overcoming these challenges and provides guidelines for practice based on several computer conferences that have been conducted nationally and internationally. The need to change traditional roles from teacher-centered to learner-centered learning is emphasized with the challenge to design collaborative learning based on constructivist principles. The importance of the role of the moderator/facilitator is emphasized with guidelines provided for moderating computer conferences. The paper concludes by addressing the need to develop new paradigms to evaluate collaborative learning mediated by computer conferencing. The issues addressed in this paper begin to build a body of knowledge about the utilization of CMC for collaborative learning.

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