Instructors’ Orientations towards Computer-mediated Learning Environments

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Abstract

This naturalistic research study illuminates six instructors’ experiences with computer conferencing and documents how these instructors understood computer conferencing’s relationship to themselves, their students and its educative process. The study findings reveal that instructors’ varied personal philosophies of learning were foundational in delineating their relationship with the technology but that other aspects, such as recognition of students’ learning styles, the instructors’ own repertoire of preferred pedagogical strategies, and the discourse patterns privileged by CMC, were also important influences in their understanding of their computer conferencing practices.

Purpose of the Study

This study uses naturalistic enquiry to explore the experiences of six CMC instructors, and more fully identify emerging issues that appear relevant to research in this field. Specifically, the primary research question is, “What are the experiences of instructors in CMC learning environments?”

To provide a tentative framework for exploring the research question, I envisaged a three-part conceptualization of the instructional experience: participant understanding of self as instructor, of learners, and of the CMC educational process. I developed initial, exploratory questions within each part to guide my own understanding of the topic and provide a potential source of follow-up questions for the interviews.
Introduction

Learners in a formal CMC-based educational environment use computer hardware and software and modems or Internet connections to participate in text-based, generally multi-participant dialogue at times and places that are convenient for them. This electronic communication usually takes place asynchronously; that is, contributions by some participants may not be read or responded to by others for a few hours or days. Learners can participate in a variety of activities, like electronic discussions, question and answer exercises, or other group activities for part or all of an applicable course. They can also communicate privately with their instructors or other learners, and can transfer assignments and other data electronically. CMC is distinct from other types of electronically-enhanced distance learning experiences like video and audio conferencing, which use electronic technology to provide same-time (synchronous), multiple-point communication among learners.

Mason (1994), Collins & Berge (1995), and (author) (1998) classified CMC into three components: electronic mail, computer conferencing and Informatics or Internet resourcing. Within the CMC environment, computer conferences in particular can facilitate group-based and time- and place-independent learning. Mason (1992), who has written extensively on CMC, noted that much of the research on CMC environments has consisted of descriptions of actual applications, or comparison of learning outcomes using computer conferences and other types of instruction, generally classroom-based interaction. This has not contributed to our understanding of the pedagogical aspects of this form of instruction. She pointed out that this approach was also problematic since only questions most conducive to investigation by conventional research methods were studied. Findings arising from these questions were then assumed to constitute the whole educational experience.
Burge (1994) argued that

for the current stage of distance education . . . we ought also to research what happens “on the ground.” That is to say, we need to study the conditions, events, and consequences as experienced by learners and ourselves as practitioners. When such enquiry uses the naturalistic paradigm, with its qualitative methods to generate rich descriptions of various phenomena (Denzin and Lincoln, 1994), we may increase our understanding of people’s experience with one important area of distance education, that is, the use of communications technologies. (p. 20)

In researching learners in a CMC environment at a US college, Eastmond (1995) also advocated a constructivist orientation to describe computer conference experiences from the point of view of learners. He concluded,

In sum, what has been needed [is a] probing examination of adult distance students using computer conferencing, using multiple types of qualitative data, that endeavor to “thickly describe” these students’. . . points of view. (p. 189)

This study has been undertaken because the need for a probing examination and rich description of emerging themes and issues that are personally-meaningful to participants appears to apply equally to instructors in the CMC learning environment at this time.

Background Literature

Conceptions of the distance education process appear to have changed as the technology has evolved. Some writers (Garrison, 1989; Shale, 1990) suggested that the ability of new telecommunication technologies to facilitate interaction among students and between students and instructors revolutionizes the nature of the educational transaction at a distance. Students are able to exercise more control over their learning experiences and construct shared meaning and group-based knowledge through the dialogue that ensues. This assertion was questioned by
Holmberg (1990), who proposed that the educational transaction at a distance has evolved with the introduction of interactive telecommunications, but has not been revolutionized. To him, CMC does not change the fundamental nature of distance education, which is still characterized by learner autonomy and independence, and not group learning and collaboration.

Other literature discussed more pragmatic features of the CMC environment. To these writers (Bates, 1995; Collins & Berge, 1995; Davie & Wells, 1991; Gunawardena, 1992; Harasim, Hiltz, Teles, & Turoff, 1995; Harasim, 1996; Jonassen, Davidson, Collins, Campbell, & Banaan-Haag, 1995; Kaye, 1989), the main advantages of CMC are its textual nature, the anonymity it affords, its potential to provide collaborative learning experiences while still enabling some types of learner independence, and the improvements it brings to the socio-emotional aspects of learning at a distance.

However, various writers also noted that CMC does have drawbacks. They (Bates, 1995; Collins & Berge, 1995; Eastmond, 1995; Mason & Kaye, 1990) found that the absence of familiar social cues, the asynchronous nature of the medium, and problems using text-based input are some factors that could negatively affect the quality of student learning experiences. Technical difficulties and hardware limitations also cause frustrations and inhibit communication among participants in some instances. Finally, despite claims for the egalitarian nature of the medium, some writers (Bates, 1995; Gunawardena, 1992) observed that discriminatory practices still occur among computer conference participants.

The literature also proposed that CMC instructors perform various functions, such as helping students to acquire (or construct) knowledge, assisting learners in understanding and taking greater control of their learning processes, providing emotional support and motivation, and performing a variety of administrative and organizational functions. Some writers (Ahern,
Peck, & Laycock, 1992; Davie, 1989; Davie & Inskip, 1992; Murphy, Cifuentes, Yakimovicz, Segur, Mahoney, & Kodali, 1996; Rice-Lively, 1994; Seaton, 1993; Tagg, 1994) suggested that certain types of instructor skills become relatively more important in the computer conference environment (for instance, meta-commenting, weaving, and socializing), that the role of the instructor as subject-matter expert diminishes, and that the medium is inherently democratizing. This in turn, it was argued, changes the nature of the instructor-student relationship from an authoritative to a more egalitarian one.

Other writers (Harasim & Johnson, 1986; Riel & Levin, 1990) insisted that the most important and definitive characteristic of the instructor – that of authority figure – remains unchanged in the CMC environment. This view cannot be dispelled because CMC instructors generally continue to exert varying degrees and manifestations of influence over students in order to discharge their perceived duties as teachers. In particular, they still usually perform evaluative functions, such as assessing computer conference participation and course assignments, and determining final grades.

Several observations arise from this literature review. Chiefly, there seems to be differing perspectives about the relevant learning processes that occur in the CMC environment. Various writers tend to characterize CMC as a means to develop specific competencies or higher-order cognitive skills, a means of knowledge construction within learning groups, or as a way to provide social and other personal benefits to isolated students which were previously difficult to achieve. On a more practical level, there appear to be some discrepancies regarding appropriate instructional practices. Importantly, there also seems to be few attempts to link views about the chief ends of learning to these more pragmatic observations about practice. The CMC literature often appears to be informed by underlying, unstated beliefs about learning
theory which influences the way CMC is experienced, described and investigated. In the final
analysis, and as Kaye (1989) noted, perhaps the perceived usefulness of and experiences with
CMC depend not only on instructional content and learner characteristics, but also on the
particular educator's perspective (p. 11).

Some excellent descriptive work has been done on the various perspectives of the CMC
experience, but primarily from the point of view of individual students (Burge, 1993;
Rice-Lively, 1994; Eastmond, 1995). There appear to be few descriptive studies which focus on
the CMC experience from the individual instructor’s perspective, and that study the
interrelationship of learning theory and actual instructional practice in the medium.

This study illuminates some of these perspectives, by describing the experiences and
thoughts of various CMC instructors about what they do and why they do it, and by reflecting on
their accounts.

Research Method

The second domain of learning proposed by Habermas (1971) – the practical –
emphasizes the construction of knowledge through relationships. Knowledge construction is a
process that gives meaning to our personal worlds through dialogue with others, and is
associated with the constructivist (or interpretivist) paradigm. This paradigm forms the
underlying orientation for naturalistic enquiry (Guba & Lincoln, 1982), the research method used
in this study.

Three general sources were used to gather information for the study. First, and to
provide possible entry points for conversation and references for examples, I reviewed
transcripts of instructor messages in all computer conferences for one course per instructor as
well as applicable course outlines and limited amounts of instructional material to obtain a better understanding of the structure and content of the instructors’ courses. Second, I developed field notes and a diary. Third, multiple in-depth, unstructured interviews were conducted with participants who could talk knowledgeably about their own experiences with and understandings of CMC learning environments.

Participants

I interviewed six instructors in this study — two women and four men. The instructors were selected purposively from those who taught in two CMC-based graduate-level programs. I chose instructors with diverse backgrounds, perspectives, and experiences, who expressed an interest in the research topic, whom I knew personally, and who were willing to be interviewed. All of the instructors but one taught exclusively at the graduate level at the time of the interviews. Over the last two years, computer conferencing was the principal teaching mode of all the interviewed instructors.

The instructors’ educational backgrounds included various specializations in psychology, sociology, adult education, and organizational behaviour. Their length of employment with their university at the time of the interviews ranged from five to over twenty years. Four of the instructors were tenured faculty members. One instructor was a non-tenured faculty member, and one taught under contract.

Review of Computer Conference Transcripts

Owen (1982) noted the importance of using multiple data sources in naturalistic enquiry (p. 13). Henri (1991) suggested that conference transcripts could provide a “gold mine of
information concerning the psycho-social dynamics at work among students, the learning strategies adopted, and the acquisition of knowledge and skills” (p. 118).

Initially, transcripts of some instructor and learner messages from the applicable computer conferences were to be used for similar, but instructor-centred, purposes.

In practice, the sheer volume of this undertaking was daunting. To limit the review of computer conference transcripts to a manageable amount of work, I chose to read conferences in only one course offering per instructor. Even on this basis there were about 5,000 messages to be read in a total of 22 conferences. There were 685 instructor messages in total that I reviewed.

I made notes about various aspects of the messages, including content in some cases. I also counted the relative number of contributions by instructors compared to students. Although I was able to get some sense of the instructor’s intent and the context of the CMC discussion, the unstructured interview process, with its ability to dynamically engage the instructors in dialogue about what they did and what they perceived, was a more robust and useful research vehicle in the end, in my opinion. However, the conference transcripts did flag some issues for follow-up in the second-round of interview questions.

Field Notes, Diary, and Other Documentation

In the diary, I recorded thoughts about potential underlying issues, themes or connections that occurred to me as I reviewed the literature or talked with each instructor, or which arose as I reflected on the contents of the interview and computer conference transcripts. The diary also served to document the progress of the research. As well, I kept field notes of the interviews and other matters which arose in the course of the interviews – information about the dates and
places of interviews, my impressions of the instructors after each interview, and the circumstances surrounding a particular interview process, for instance. These information sources were useful in analyzing the instructors’ accounts, and some of the thoughts that I recorded in them were also incorporated into the findings of this study.

Gathering information “on-site” was difficult because of the virtual nature of the CMC environment and the dispersed locations of the instructors. However, I used e-mail to communicate informally with the instructors, and to keep up with developments that might be of interest to my study. E-mail also allowed me to keep the instructors updated about the study’s progress, and seemed to enable me to extend my time as a participant in this (virtual) setting. I found that these exchanges were efficient, to the point, and often useful.

The Interview Process

Each of the instructors was individually interviewed and taped on two separate occasions. A total of twelve interviews, each lasting between 60 and 90 minutes, was conducted between April and August, 1996. While the first round of interviews were in-person, all but one of the second-round interviews were conducted by telephone.

I found the telephone interviews to be more productive for several reasons. By the time they took place, I had analyzed the initial round of interviews extensively, had a better sense of the particular instructor's point of view, and could ask more probing questions. The lack of face-to-face contact allowed me to make more notes without distracting the participants. It also seemed to allow a franker and deeper exchange of views, because we could concentrate on our words. We were not as self-conscious about appearances, and did not have to be concerned about maintaining eye-contact or providing other non-verbal cues. The instructors were more
familiar with me and the interview format by that time, and had been able to think about their comments made in the first interviews in the meantime. Finally, I sensed that my personal relationship with each instructor had deepened as a result of the first round of interviews. The instructors seemed more comfortable.

Prior to the first round of interviews, I had sketched out several broad kinds of questions that I intended to use to initiate or maintain dialogue during the course of each interview. Topics included personal background, reasons for interest in CMC, impressions of their students, and particularly good or bad experiences with the medium. Other questions were informed by my review of the literature. These were related to strategies that instructors used to enhance student learning experiences at a distance and to control or guide interaction, the effect of computer conferences on teaching styles, and workload comparisons between computer conferencing and other, more traditional distance- and classroom-based teaching duties. My initial questions were broad and open (e.g., “Could you tell me about your educational background?”). Responses to these questions formed a basis for more focused discussions during the second set of interviews.

By nature, I tend to listen more than I talk. I found that my comments during the interviews were generally limited to posing initial questions, interjecting with encouragement, summarizing and clarifying the instructors’ comments, and asking follow-up questions. The instructors did most of the talking, but usually near the end of each interview I tried to summarize some of my thoughts on the major themes we had discussed, or differing points of view we had jointly explored. I solicited the instructor's feedback on these.

After each interview I felt a sense of accomplishment (and fatigue). The unstructured nature of the interviews seemed to allow the instructors to open up and discuss experiences that
were personally meaningful to them. It seemed at times that these thoughts had been pent-up within them, and that the interview process allowed them to finally talk to someone about their experiences or related issues that deeply interested or concerned them. A few instructors voiced these sentiments after the interviews had ended. After each round of interviews, the discussions were transcribed by me or a typist. The transcripts were checked against the tapes of the original interviews to verify their accuracy and sent to the instructors for verification.

**Data Analysis**

I began the interpretation process after the initial interviews with the first two instructors were completed. Their interview transcripts were reviewed and divided into units of thought ranging from one sentence to a few paragraphs in length. The interview/page numbers and summary descriptions were added to each of these units of thought. These were rearranged into a broad, preliminary outline based on initial themes and patterns suggested by the information. New, broader categories of experiences arose from this process, which informed the first-round interviews with the remaining four instructors.

This process identified gaps in individual instructors’ accounts. General questions related to these areas were incorporated into the second-round interview with the applicable instructors, along with my impressions from my review of computer conference transcripts of their on-line courses. New categories of meaning emerged during the analysis of this second round of interviews. The transcripts of these interviews and individual, detailed summaries of the individual instructors’ accounts were reviewed and approved by the participants as applicable.
The transcript analysis process was time-consuming. However, it provided me with an incentive to review the transcripts shortly after each interview, and also to begin the writing process early. As noted in Glesne and Peshkin (1992), these are advisable practices in naturalistic enquiry (p. 149). The detailed analysis as well made me more familiar with the content of the interviews. When combined with the use of the computer conference transcripts, field notes, and diary described earlier, this process helped me to think more deeply about important aspects of the instructors' experiences.

**Significant Aspects of the Instructors’ Accounts**

Aspects of the six instructors’ accounts that I considered important are presented within three categories of meaning: perceptions about communication processes that occurred in the CMC environment, teaching techniques employed by the instructors, and the effect of CMC on instructional experience. The instructors and their graduate programs have been given pseudonyms. Randy, Doreen, Mike and John taught in Program 1 and Heather and Allen were Program 2 instructors.

**Communication Processes in the CMC Environment**

In general, the instructors expressed a wide variety of perspectives about three aspects of the communication processes that they observed in the CMC environment – the value of the group communication and collaborative learning processes, the value of individual student contributions to the computer conferences, and the relative frequency of student interaction in computer conferences compared to the traditional classroom.
Group communication and collaborative learning processes. All the instructors agreed that the CMC learning environment was superior to the print-based, telephone-supported model characteristic of distance education undergraduate programs because of the increased opportunities for instructor-student and student-student interactions. They saw these interactions as more desirable at the graduate level, but for different reasons.

Some instructors considered computer conferencing to be central to the distance learning process because it promoted learner-centred learning and the creation of group knowledge among geographically-dispersed students. Others considered electronic interaction to be less important, but still useful. Randy, for instance, considered computer conferencing to be oftentimes unnecessary, but important at other times, depending on the desired learning outcomes under consideration. In his opinion, CMC enabled students to share work experiences, or to learn to communicate with each other on a professional basis at a distance. As a result, he saw computer conference participation primarily as a means for students to develop interpersonal communication skills and to exchange information informally. However, these were less important learning outcomes than mastery of course content. He considered individually-submitted course assignments rather than group interaction to be the primary means for students to acquire (and demonstrate) this knowledge, and viewed one-to-one interpersonal communications through personal e-mail or telephone conversations as more often helpful to this process. As a result, Randy generally used these forms of one-to-one communication rather than computer conferencing to interact with students.

Doreen also viewed group work and collaboration facilitated by computer conferencing to be relatively unimportant to many aspects of the learning process. She was sceptical of the educational advantages of CMC cited in the literature, particularly the ability of CMC to
facilitate relatively unstructured, group-based knowledge construction. Like Randy, she considered it necessary to have a clear understanding from the outset of the learning objectives of the course from the outset, and viewed computer conferencing as only one of several possible means to achieve these. Although she devoted a significant amount of time to computer conferencing (too much initially, she believed), she also provided alternative means of communication (fax, telephone, e-mail) to accommodate her students' varied learning styles and preferences. She did not require computer conference participation, nor attach a high grade weight to this activity because she considered these to be somewhat coercive instructional practices.

John considered computer conferencing to be necessary for interaction and the creation of new knowledge at a distance, though he expressed some reservations about the CMC medium in general, and the conferencing system used in Program 1 in particular. He was sensitive to the desires of some students to learn independently by not participating in the computer conferences discussions, but still believed that the interaction provided by CMC was vital to the overall distance learning experience. It enhanced individual understanding and encouraged group knowledge construction in his view, even though he had not been able to successfully incorporate group-based assignments into his conferences primarily because of personal time constraints. He believed that group work was inevitably unproductive in those cases where participation was required. He also found that he was less able to encourage group-based learning in his computer conferences because the communication limitations of the medium tended to make spontaneous interaction more difficult. In contrast, Heather considered the asynchronous group communication processes enabled by CMC to be a superior form of learning
because it allowed for time- and place-independent interaction among students, while at the same
time facilitating collaborative learning processes.

Alan stated that his conception of the role of the instructor had changed from that of
knowledge expert to learning facilitator as a result of teaching in the CMC environment. He
considered himself as more of a co-learner who jointly explored and discussed issues with his
students. Interaction was obviously essential to this process. Similarly, Mike considered
group-based and experiential learning to be central components of the adult education process.
He believed that discussion and dialogue were necessary for authentic learning to take place in
any educational setting because this facilitated group knowledge building and perspective
transformation. However, like John, he had been unable to incorporate much group work into
his students’ on-line activities essentially because of the instructional time required to do this.
In his opinion, collaborative activity was limited by overall conference and course workloads of
both the instructor and students.

Although Mike thought that CMC was an improvement over traditional
correspondence-type homestudy models, it was still less effective than face-to-face instruction
because it lacked immediacy, discouraged debate, inhibited thoughtful comment, and made
misunderstandings difficult to rectify. He experienced more meaningful discussions when he
taught in the classroom, in part because non-verbal cues of acceptance and tolerance could be
communicated among participants even though they expressed significantly different points of
view. He felt that more difficult or controversial areas could be explored more productively in
the classroom because the instructor could focus the discussions, limit digressions, and correct
fundamental misunderstandings of concepts or others' points of view when they occurred.
This view was contrary to most of the other instructors who noted that they experienced more open discussion on-line because the medium provided anonymity, students were able to carefully construct and revise their comments before submitting them to the conferences, and misunderstandings could be more easily highlighted and addressed in a textual medium like CMC.

Mike also found that dominant yet subtle social, political and economic ideologies that informed students' perceptions could not be challenged as easily in the on-line environment. The inability of computer conferences to facilitate a social type of adult education – that is, the transformation of understanding about these dominant perspectives and the consequent enablement of groups of learners to initiate socio-political change on a local level – was problematic. For him, the value of asynchronous, electronic student interaction was limited as a result.

Other instructors did not consider this to be a significant shortcoming of the medium. Randy, for instance, did not believe that he needed to challenge students’ perspectives to be an effective educator. Rather, he thought that identification of expressed learner needs and acquisition and assessment of related, specific skills or competencies were more important instructor functions. In his view, it was inappropriate to assume that transformative learning was needed or desired by adult learners, or even if it was, to presume that adult educators could legitimately or successfully undertake the task. He stated,

What is the goal of education? I don't think we know enough about [learners] to really address that question and so I would tend to say that unless we can define exactly what [transformative learning] is and I feel comfortable with trying to teach students that way, then I would tell the students that they should perhaps seek their “instruction” from someone else. If the students want to learn very specific skills, then I would be pleased to help them. That's not to say that I don't value these other things, it's just that I don't know how to deal with them. I can design an
environment that gives students resources to be more self-directed learners. If you give them access to the Internet and other tools and teach them how to use the Internet, etc., then you've given them a tool that they perhaps use in being a life-long learner, for example. But to teach them [alternative perspectives associated with transformative learning] – I'm not so sure we know enough about it. (Int. 2, p. 16)

The value of individual student contributions to the computer conferences. Perceptions also differed among the interviewed instructors about the value of student contributions to computer conferences. Some instructors considered the quality of interaction to be higher in computer conferences than traditional classroom settings because students were able to think, research, and spend more time-on-task as a group. John, Heather, and Alan, for instance, saw free-flow conversation as valuable, though they believed that interaction needed to take place in a structured environment to keep discussions focused and allow students to think more clearly about individual issues.

Other instructors were unsure about the educational value of student interactions. Doreen stated that though the ability of students to contribute to on-line discussions often had socio-emotional value or otherwise appealed to students, its usefulness as an instructional tool was limited. She felt that student-student interaction often exhibited characteristics of “the blind leading the blind” because she perceived student comments to be inaccurate or lacking in content in many cases. More importantly, though, she felt that the learning outcomes associated with interaction were often neither definable nor measurable against specified learning outcomes.

Both Doreen and Mike noted that students “spoke” but did not appear to adequately “listen” or be willing to read more than brief comments on-line. This view was not generally shared by the other instructors, who noted that the quality of student comments was generally
higher in the CMC environment than what they had experienced as classroom instructors or graduate students.

**Frequency of student interactions.** Several of the instructors commented about the comparative quantity of interactions among students in computer conferences compared to the traditional classroom. Alan and Heather felt that the frequency of on-line interaction was significantly greater in the electronic environment. Others like Mike felt that interaction was greater in the classroom. Some instructors saw computer conferences as encouraging otherwise shy students to participate because their voices could be more easily “heard” in the computer conference environment, and because physical or other personal characteristics that sometimes inhibited participation were absent or less-obvious. Alan noted more widespread participation in the computer conferences than classrooms, but attributed this to the voluntary suppression of “loud” voices: more-vocal participants could better control their impulses to immediately respond.

Some instructors did not find significant differences in the levels and patterns of student interactions between the on-line and classroom environments. Doreen and John noted that some students preferred to participate frequently, and others not at all. Most students preferred to sit back and observe before contributing. Doreen also found overall participation rates to be about the same, but noted that negative or positive effects on individual students could be obscured without more detailed study of this issue.

**Conclusions about communicative processes.** On the whole, the instructors expressed significantly different views about the value of group communication processes that occurred in the computer-mediated environment, the relative levels of student interactions that occurred in
their conferences compared to their experiences in the classroom, and the educational value of individual student contributions.

Some instructors felt that CMC group communication processes were less valuable because the associated learning outcomes were undefinable, or less important. Others considered interaction to be essential for learning to occur, though within this group, there were some who thought that inherent limitations of CMC restricted its usefulness as an educational medium. Some instructors criticized individual student contributions in general as being superficial and uninformed, or ignored by other participants. Other instructors, though, considered student postings to be valuable means of peer learning.

Several of these differences in experiences may be linked to how individual instructors teach. This issue is examined further below.

CMC Instructional Techniques

The instructors’ descriptions of what they considered to be more important on-line instructional techniques have been grouped into the following areas: encouraging student participation, clarifying information, handling conflicts, compensating for the absence of non-verbal cues, summarizing and weaving practices, and pacing.

Encouraging student participation. The instructors held differing views about the appropriateness of encouraging student participation in the computer conferences. For instance, Randy preferred not to prompt students for input, while Heather, Doreen, and Alan actively encouraged students to participate.

Heather described a number of methods she used to encourage participation. She publicly encouraged students, supported and praised students when they did make contributions,
and wove and summarized conference contributions extensively. Alan also used a wide variety of techniques to encourage collaborative learning and sustain group interaction. An appropriately structured electronic learning environment was an important means to facilitate this, he believed. Databases in his courses were designed to involve students early and often in collaborative learning activities. He linked performance on assignments to demonstrated familiarity with the on-line discussions, and re-directed personal e-mail from students to the computer conferences. He was the only instructor who required submission of group assignments.

Some instructors observed that there were often tradeoffs when student participation was encouraged. Although John believed that interaction among students could create new knowledge, he was reluctant to draw non-participants into the computer conference discussions because he believed that students should be able to participate only if they wished to do so. In a broader sense, Randy noted that the introduction of new forms of technology like CMC could be viewed as enabling because these facilitated interaction among students. However, CMC also limited student participation in other ways because it erected barriers to access for potential students who did not have appropriate equipment.

**Clarifying information.** Mike thought that it was difficult to deal with misunderstandings and to clarify concepts in computer conferences because of time delays, the difficulty of following various conference threads, and the lack of visual feedback from students. Others, though, considered that misunderstandings occurred just as frequently in the face-to-face environment because visual cues of understanding and comprehension could still be mis-read.

In John’s view, it was easier to resolve misunderstandings on-line. He could make more timely interventions because the interactions occurred less rapidly than in the classroom.
Students also had a permanent record of instructors' clarifications. Other instructors noted that in many cases, the problem was self-correcting. Misunderstandings and confusion decreased as participants learned to refer to specific prior message numbers, or incorporate actual quotes from relevant postings.

**Handling conflicts.** In general, conflict was not common in the instructors’ conferences. The instructors used various means to handle conflicts when these arose. Heather and Doreen preferred to send private e-mail to students in an attempt to decrease misunderstanding or bad feelings. Randy, John, and Mike tended to wait for students to intervene before attempting to resolve conflict. Alan stated that he encouraged minority views, and as a consequence appeared more tolerant of conflict within his courses.

**Compensating for lack of non-verbal cues.** Certain instructors found that the lack of non-verbal cues in the CMC environment changed their instructional practices and made interaction more difficult. John preferred to use non-verbal cues like physical proximity and eye contact to guide and facilitate interaction in the classroom. It was more difficult to encourage interaction and monitor engagement levels because of the absence of non-verbal cues and other physical manifestations that might indicate boredom on the part of some students, for example. Mike also noted that instructors were unable to assess problems with student comprehension due to the medium’s lack of non-verbal cues. These instructors found that they could not adequately compensate for such limitations.

Alan, however, did not consider his instructional techniques to be essentially different from those he used in the classroom, despite the asynchronous nature of the CMC medium and consequent lack of non-verbal feedback. He stated that the techniques he used in the classroom to encourage discussion and draw out students were essentially the same.
Summarizing and Weaving Practices. The instructors also discussed their summarizing and weaving practices in the conferences. With experience, John stated that he preferred to be less-directly involved with the conferences and decreased his summarizing and weaving activities accordingly, primarily because of time constraints and personal cost/benefit considerations.

Randy as well did not consider it particularly important to summarize and weave conference contributions, but for a different reason. Since he considered the assignments to be the chief means for students to integrate course content with their personal experiences, he preferred to respond in the conferences to individual student comments rather than summarizing the discussions.

Mike stated that he tended not to summarize and weave conference discussions because the instructional material provided sufficient content and structure for the course, in his opinion, and because he believed that the personal value derived from interaction came primarily from the act of constructing contributions. Because Alan used group projects more extensively, he found that summarizing and weaving activities were more often carried out by the group members themselves.

On the other hand, Heather and Doreen took a more active role in weaving and summarizing conference topics, and spent a considerable amount of time assessing the quality of student contributions. Heather found that her weaving activities increased with experience, and viewed this as an important instructional technique.

Pacing. Several of the instructors talked about techniques they used to pace their students. Doreen and Randy deliberately controlled the pace and sequence of on-line discussions by withholding information about how to join the next conference or by suggesting
that students move on to the next conference topic, for instance. This provided more coherence to the students’ learning experiences, they felt. Heather allowed students to contribute to various conferences at any time to facilitate the varied personal needs of her students. However, she found that student progress through the conferences was still governed somewhat by group dynamics and the structured nature of the learning material. Both Heather and Alan provided additional instructional material as the course proceeded and as aids to dialogue. This practice governed student progress somewhat. Alan, John and Mike used deadlines for assignments as pacing techniques.

Conclusions about on-line instructional techniques. The instructors appeared to use different techniques to handle certain teaching situations. The techniques employed often appeared to depend on their views of the appropriate role of the instructor – in handling conflict, encouraging participation, and summarizing conference contributions, for instance.

Not all instructors viewed certain issues as problematic. For instance, some of the instructors did not find it difficult to clarify misunderstandings or compensate for the absence of non-verbal cues in the electronic environment. Other instructors, though, found that they could not develop appropriate alternate instructional techniques to counteract these perceived shortcomings.

The Effect of CMC on Instructional Practice

The instructors also discussed the effect of CMC on other aspects of their instructional practices. These were reflected chiefly in their views about the relative emphasis on printed instructional material, personal time management, and the effect of the electronic classroom on traditional instructor authority.
Emphasis on printed instructional material. All of the instructors provided significant amounts of printed reading material. Most instructors provided these at the start of their courses, though Alan provided electronic learning material at various stages in his courses. However, the relative emphasis between the instructional material and computer conferencing varied among the instructors.

Partly as a consequence, the number of computer conferences per course also varied. John, Randy, and Doreen each had four topic-specific conferences. Mike had seven instructor-led conferences and a small number of student-led conferences. Heather’s course had 14 computer conferences, including student-led, small-group discussions. Alan used about ten group-based activities, but also required submission of group-based projects. Most of the other instructors preferred or allowed individually-submitted assignments. Some instructors like Doreen also included discussion questions in their conferences.

Impact of CMC on instructor’s time management. The instructors made several general points about the effects of CMC on the organization of their time. Many instructors found that significant amounts of time were needed to initially design and develop a CMC-based course. This was not fully offset by reduced instructional time once the on-line courses commenced.

Most of the instructors observed that though the asynchronous nature of the environment gave them time flexibility, the overall amount of time needed to effectively facilitate computer conferences and perform related administrative duties was significantly greater than in a classroom environment, primarily because increased levels of student participation lengthened the amount of time needed to read and respond to text-based messages. For instance, John considered the time demands of a CMC-based course to be two to three times higher than those of a conventional classroom course.
Time demands on the instructors were more onerous because assignments were more
difficult to mark on-line, though various marking methods were employed. Some instructors
sent electronic feedback about assignments to students; others provided feedback on printed
assignments, which were then mailed to students. A few sent both e-mail summaries and more
detailed written comments on the marked-up assignments. Several of the instructors continued
to use the postal system or faxes to communicate with students about their assignments.
However, the difficulties of navigating through various parts of the electronically-submitted
assignments, maintaining an overall sense of structure, and inserting comments quickly were
common complaints among the instructors. Though electronic feedback could be sent quickly
to students, it took longer to produce this feedback. Most of the instructors noted that the
continued conflict between marking demands and other professorial duties also impaired their
abilities to provide what they considered to be timely feedback to students (usually seven to ten
days). The potential of CMC to significantly reduce assignment turnaround time was limited by
 technological and workload constraints in most cases.

Further, all the instructors had at least one assignment in their course which gave students
broad latitude in their chosen topic area. Consequently, marking time was substantially
increased because of the unique nature of the assignments submitted and the individual
consultation time that was required beforehand. In spite of this, the instructors did not plan to
eliminate these individualized assignments because of the perceived educational benefits to the
students.

To reduce their overall workload, some instructors were able to reduce their teaching
duties in undergraduate homestudy courses. In other cases, class sizes were eventually reduced,
or course structures altered to reduce the frequency of instructor-student interactions. Most
notably, Doreen found that she rapidly approached “burn out” in her initial CMC experience because of the significant amounts of interaction that she designed into her computer conferences. As a result, she significantly reduced her on-line participation in subsequent courses.

These views were not unanimous, however. Alan found that instructional time demands were not significantly different from those in the classroom. He also felt that the flexibility afforded by CMC counteracted any additional time demands because instructor responses could be slotted into a predictable daily routine, or performed in otherwise slack periods of the day.

Effect of CMC on traditional instructor authority. In common with some of the literature (Harasim and Johnson, 1986; Davie and Wells, 1991), Doreen, Alan and Heather felt that the computer conferencing environment seemed to naturally decrease the instructor’s relative importance in the learning process. Authoritarian instructor/student relationships were replaced with more egalitarian ones. They found that students rather naturally assumed more responsibility for their own learning in the computer conference environment. However, Randy thought that this phenomenon resulted more from program philosophy and design than from any inherent attributes of computer conferencing.

John, though, disagreed that instructor-student relationships were more egalitarian in computer conferences. The textual nature of the medium and his inability to write in a “chatty” manner contributed to the perpetuation of formal, authoritarian relationships in the CMC learning environment, in his opinion. Mike also noted that students seemed to challenge his opinions less in the electronic environment, perhaps because the lack of non-verbal cues made it difficult for both the instructor and students to convey a sense of goodwill and acceptance while disagreeing with a stated position.
Conclusions About the Instructors’ Accounts

The instructors’ accounts varied significantly in the three categories of meaning described above – views of the communication processes used in the electronic environment, various instructional techniques employed, and the impact of CMC on instructional practices. The following section reflects on these variations, and suggests some underlying influences which may affect instructors’ perspectives.

Reflections on the Findings

During the interview process, and later as I wrote and thought about the various instructors' stories, I was struck by the diversity of the CMC instructors' practices and perspectives. I initially concluded that differences in instructors’ perceptions of their computer conferencing experiences arose as a result of fundamental differences in educational philosophy and learning theory which informed their instructional practices.

The Relationships of Learning Theories to Instructors’ Described Experiences

The described experiences of the six instructors seemed to be significantly related to personally-held views of learning. One group of instructors (Alan, Heather, John and Mike) appeared to hold views about the nature of the adult learning process which were essentially constructivist or dialectical in nature. They regarded the learning process as primarily an “among-learner” phenomenon\(^1\) – that is, adult distance learners needed to be able to critically analyze instructional content and engage in dialogue with instructors and other learners in order

\(^1\) The terms “among-learner” and “within-learner” used in this section to characterize two views of the learning process appeared in the ICDE95 conference “Interaction.” See
to create individual meaning, validate their learning experience, and construct group-based knowledge even though separated by time and distance. A medium of interactive communication (CMC in this case) was therefore necessary for this type of learning to occur.

As a result, these four instructors tended to structure their computer conferences to encourage greater student participation. For instance, Alan and Heather had significant amounts of group-based learning activities in their courses. John awarded a significantly greater overall grade weight to conference participation to encourage dialogue. Alan and John re-directed private e-mail to the conferences to focus discussion within the group. Mike required students to set up and moderate their own conferences, and was supportive of increased student participation as a means of constructing group-based knowledge and facilitating transformation processes.

Alternatively, Randy and Doreen did not appear to view “among learner” interactions as neither necessary nor sufficient conditions for learning, because they characterized learning as a fundamentally “within-learner” phenomenon. That is, while interactions among students or between instructors and students might be seen as desirable in some cases, and in certain instances improve the learning experience, they did not consider these interactions to be essential in order for more important forms of learning to take place. They appeared to view independence as an important learner attribute, and learner interaction with the printed materials and assignments as pre-eminent learning activities.

A major function of their computer conferences was to improve the quality of individually-submitted assignments or provide social and emotional support for students, in part because they considered the learning outcomes associated with most types of student-student
interactions to be undefinable and unmeasurable, and therefore of questionable value. As Doreen stated,

> It's perfectly true that a whole raft of human learning occurs [through student-student interaction]. The point is, if you're a teacher and you're trying to ensure some kind of learning, you can't be sure who's learning what at any given time. And, in fact, what they learned can as easily be wrong as right. . . . When we deal with these non-prescribed kinds of learning outcomes, all I can really say is, “Gee, I'm really pleased that it happened.” I don't know what to do when it doesn't happen, and I cannot take credit or blame if it occurs. (Int. 2, pp. 5, 6)

Consequently, alternate communication media (e.g., private e-mail, fax, telephone) were often used by Randy and Doreen to provide support and instruction to students, and computer conference participation was not significantly rewarded in the student grading process.

Based on the preceding analysis of the instructors’ accounts, it appears that variations in underlying educational perspectives significantly inform instructional practice and as a consequence, the instructors’ experiences of the CMC medium. Different, even conflicting instructional practices may be considered appropriate when considered from the perspective of the informing learning theory.

The literature makes some references to this phenomenon. For instance, Paulsen (1995) noted that computer conference instructors needed to identify their preferred pedagogical styles when designing on-line courses. Ess (1996) also commented that “CMC theories rely on largely implicit philosophical assumptions” (p. 2). He did not specifically discuss philosophical underpinnings of CMC in terms of educational theory, but rather in terms of democratic participation and related communicative acts. However, his comments and those of other writers do speak to the importance of identifying and examining the assumptions and beliefs that often implicitly undergird experiences of the electronic learning environment.
The instructors’ accounts also revealed other influences which could affect their instructional experiences. I identified these other aspects as willingness to accommodate students’ different learning styles, differing levels of facilitative and technical skills, difficulties with the CMC software, and patterns of discourse encouraged by CMC.

Impact of Students’ Learning Styles on Instructional Practice

Perhaps the best known adult learning model is that proposed by Kolb (1984), whose experiential learning cycle includes concrete experience, reflective observation, abstract conceptualization, and active experimentation. Learners, he proposed, start at different places in this cycle and move through its various stages throughout the learning process. MacKeracher (1996) also noted that adult learners will likely exhibit significant differences in learning needs and preferences.

Some of the instructors tried to accommodate students at different points in their learning cycles by providing varied types of learning experiences. For instance, Doreen encouraged both many-to-many and one-to-one communication, as she recognized that students desired group interaction at certain times, and preferred to interact solely with the instructor or the learning materials at other times. She summarized and wove various conference contributions as learning aids for some students in an attempt to spur interaction. She felt that this met some of the socio-emotional needs of her students as well as aiding cognition at times. On the other hand, and like Randy, she also interacted with students individually by e-mail, telephone, or fax if they desired, and used fairly specific learning objectives and goals in her course design.

However, the defining characteristics of the CMC environment – asynchronous, text-based communication – prevented individual student needs and preferences from being fully
accommodated in some instructors’ views. Mike believed that on-line group interaction was limited because the computer conferences did not provide the same rich learning experiences as face-to-face interaction. Though he considered CMC-based learning to be superior to the traditional print-based distance education model, he felt that CMC still limited the instructor's ability to use alternative learning strategies and ascertain student learning needs because it lacked non-verbal cues and the immediacy of dialogue. Like most of the instructors, his attempts at providing alternative learning experiences were also limited by personal time constraints. This in turn was exacerbated by the need for textual rather than spoken responses to students.

Some attempts at providing alternate means of learning were only partially successful. Heather, like many of the instructors, had not been able to design effective group-based assignments which she believed would enhance the learning process for some students. She took many steps in the initial weeks to develop individual student profiles and encourage conference participation, but also recognized that in spite of this, some students would just not make postings.

The Influence of Instructors’ Relative Instructional Abilities

The accounts in this study may differ in part because some of the instructors were more capable, energetic, experienced, and/or possessed more appropriate skills for teaching on-line. As Kaye (1989) noted, individual differences in computer and related skills among CMC instructors affect their perceptions of the usefulness of the medium (p. 15). For instance, Mike described a rather cyclical process he experienced. He noted that he was not an enthusiastic computer user in part because he tended to forget lessons learned from previous on-line courses. However, he forgot these lessons primarily because he did not want to use computers regularly.
The greater summarizing and weaving activities performed by some instructors also may be a function of their innate abilities in this regard, and their willingness to invest the time that the practice requires. This activity could in turn improve or at least change the dynamics of on-line discussions and the instructors’ resultant experiences. Finally, four of the instructors used one of the earlier versions of a computer conferencing software system at the time of the interviews, while two used one of the most sophisticated systems available. The relative amount of time required to become proficient on a particular conferencing system may have deterred some instructors from developing their on-line instructional skills as extensively as others. All of these factors could contribute to the instructors’ somewhat different experiences of the CMC medium.

The Pattern of Discourse in CMC

The discursive nature of electronic interaction may also have affected some instructors’ experiences of the CMC medium more than others. Kolb (1996) described the rhythm of e-mail as having

more of the feel and style of oral communication. E-mail messages are typically rapid and short. Topics get developed in several exchanges of shorter messages rather than in one exchange of long position statements. The liveliness of e-mail comes from this rhythm of communication. I do not have to work out my ideas in advance to the last detail, because you will ask questions and I will clarify as we go along. (pp. 15-16)

He also pointed out that the argument patterns of conversations are affected by the technology. He stated,

Discussions by e-mail often branch off without ever returning to bring the contributions or conclusions of the branched discussions into contact with earlier questions and earlier stages of the discussion. . . . E-mail encourages interruption; threads of discussion mutate and branch. (p. 17)
This rhythm tends to encourage some types of discussion and discourage others. Participants list points rather than develop full arguments, and provide brief rebuttals to equally brief quotes from previous messages.

Similarly, several of the instructors in this study were frustrated with the brevity and superficiality of many of the students’ comments. Mike and Allen found that students did not debate ideas or raise arguments as readily or as fully as they did in classroom settings. Doreen also questioned whether electronic messages really formed conversations or merely resulted in participants talking past each other, and as a result whether the process of posting comments could be considered genuine interaction.

Heather had been disappointed by the lack of minority opinions in students’ comments, and their often unreflective nature in general. Though she had observed that students took more responsibility for their learning as the course progressed – by asking probing questions, for instance – she concluded that students tended to resist deeper analysis of issues unless encouraged to do so. In an attempt to overcome this tendency, she tried to introduce topical material into the conversations and wove links between the postings within the various groups.

The sheer volume of interactions also affected instructional practice in some cases. Initially Doreen was overwhelmed by the extent of conference participation and eventually limited her use of introductory questions to reduce the number of ensuing messages to a manageable level for all participants.

These somewhat negative characteristics of the current state of electronic discourse suggest the need for newer technologies which are better able to focus discussion and encourage deeper analysis. As Kolb (1996) noted, new hypertext capabilities and navigation aids in asynchronous communication technologies are needed to provide more appropriately-linked
discussions and allow for spontaneous and useful digression, yet help participants maintain the thread of linear arguments. In the absence of these new technologies, and without new understandings of the dynamics of CMC interaction, practitioners may need to examine and downgrade their expectations of computer conference conversations.

To this point, only the effects of “educational” influences on CMC instructional practices have been discussed – the impact of personally-held views about learning by instructors, varied learning style preferences of students, relative instructor competencies, and the discursive nature of asynchronous electronic communication. However, larger organizational influences may also affect instructors’ experiences.

The Effect of Distance Learning Organizational Structure on Instructors’ Experiences

CMC instructional experiences may also be informed by organizational factors. First, as suggested by Evans and Nation (1989) and Spencer (1997), underlying, dominant behavioural learning theories are imbedded in the textual processes of traditional distance education. These can still influence CMC learning environments and act to constrain instructional practice to the extent that printed or electronic instructional material is incorporated into on-line courses.

Second, CMC-based learning models can significantly affect several aspects of the fundamentally “industrial” distance education production process described by Peters (1983). The instructor’s descriptions in this study suggested that compared to correspondence-style distance education, electronic learning systems like CMC tend to de-emphasize division of duties, reduce average numbers of students per instructor, and increase levels of instructor-student interactions to different degrees. Depending on the structure of the applicable
program and the magnitude of these influences, instructional experiences will vary among individual instructors.

However, these tendencies also suggest that the introduction of CMC “deindustrializes” the distance education process in general. According to Peters’ model, and other factors being equal, this should increase instructional costs.

Significant evolution away from an industrialized, primarily print-based distance education models to asynchronous electronic models which provide increased interaction between learners and instructors may be impeded by additional financial costs unless alternatives are developed – for instance, those that support unstructured, fluid and direct student-to-student interactions, rather than formalized, ongoing, instructor-moderated interactions often found in computer conferencing environments. Alternative on-line sources of information also need to be made accessible to students, and traditional CMC instructional duties and practices also need to be re-examined to use instructor resources more effectively.

As educational institutions proceed into the next millennium, the realities of economics may yet limit the prevalence and effectiveness of new electronic learning systems like CMC despite the removal of many of the technological barriers that have inhibited development of these systems in the past, unless novel means of disseminating information and facilitating interaction are found.

**Lessons Learned from the Research Process**

Before I began this study, I expected that the descriptions of the CMC instructors’ experiences would tend to reinforce one another, not in the sense that I would find a great deal of underlying common ground among the descriptions (although I did expect this), but more in the
sense of what I had thought that a “naturalistic” process of enquiry would produce in the end –
important categories of meaning would emerge from the words of the instructors themselves
which would provide a rather integrated, rounded and complete account of the overall CMC
experience. I had generally expected that differences in their accounts might be attributable to
factors external to the instructors themselves – for instance, differences arising from the various
CMC systems used, the subject matter of the course(s) that each instructor taught, or their
relative amounts of experience with the medium.

However, now I think that an integrated, complete account of the CMC instructional
experience may not be possible. It is clearer to me that an in-depth study of various individuals’
subjective perceptions cannot constitute an adequate description of an objective whole. The
instructors’ descriptions appear to be informed by such different, fundamental beliefs about the
nature and purposes of adult and distance education that their descriptions are in many ways
irreconcilable. Naturalistic enquiry seemed particularly suited to this study because it enabled
me to extensively discuss, probe, and think about individual instructors’ accounts of what they
do as educators in the CMC environment, and to link these experiences to more fundamental
considerations, at least on a preliminary basis. Importantly to me, I also now realize that many
of the points of view expressed in the distance education literature are often informed by
underlying, unstated adherence to particular learning theories which influence the way CMC is
experienced, described and investigated by various writers.

The findings of this study suggest several areas for future research, which could be
conducted as either naturalistic enquiry within a constructivist paradigm, or as rationalistic
research. First, the influence of educational philosophy on instructional practice in the CMC
environment needs to be studied further. Second, variations in practices of relatively
inexperienced and more experienced CMC instructors could provide insight into the way that instruction is conducted in this environment, and the instructional skills that are developed as instructors interact electronically with students.

In this study, computer conference transcripts were not particularly helpful in the study of instructors’ experiences. A third avenue for future research could therefore involve observation of and dialogue with instructors as they participate in on-line sessions. These methods may provide more immediate information regarding particular thought processes and perceptions that inform instructional practices. Finally, the increased costs of providing on-line interaction and the implications of this for the way asynchronous, electronic learning systems may be developed and integrated into distance education in the future need to be explored further.

(9840 words, including abstract)

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