Educational Applications of Computer Conferencing

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Abstract: Ten different educational functions of computer conferencing have been iden-
tified at the University of Guelph. Each requires different skills from teachers and learners
and each achieves a different educational purpose.

Student conferencing behaviour was examined at the level of simple attendance, as
well as for rate and type of active participation. Given adequate orientation and training
along with a compelling reason to use the system, students will participate despite incon-
venience of hardware location; whereas convenience of hardware does not seem to compen-
sate for inadequate training or a marginal reason for system use. Rate of activity tends to
rise with academic level. Academic level has a pronounced effect on the type of student
interaction. Differential status of participants does not seem to lower the rate of commen-
tary, but can cause conferees to become guarded in their remarks.

Recommendations for successful academic conferencing emphasize the importance of
training prior to implementation and of providing several forms of printed and on-line assis-
tance during the academic conference. In particular, those experimenting with academic
applications of CoSy at the University of Guelph foresee adaptations of the moderator's role
in facilitating the various educational functions of computer conferencing.

The following paper is based on applications of the CoSy conferencing system at the
University of Guelph. Conferencing situations were established to support education for
undergraduate and graduate students. They were used in conjunction with on-campus and
distance education modes. Some conferences were directly course-related, while others were
educational but independent of course work.

The paper addresses the following three objectives:

> Objective 1 - To define a range of functions that computer conferencing can
> fulfill in support of education;

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Objective 2 - To identify influences on student behaviour and assess their respec-
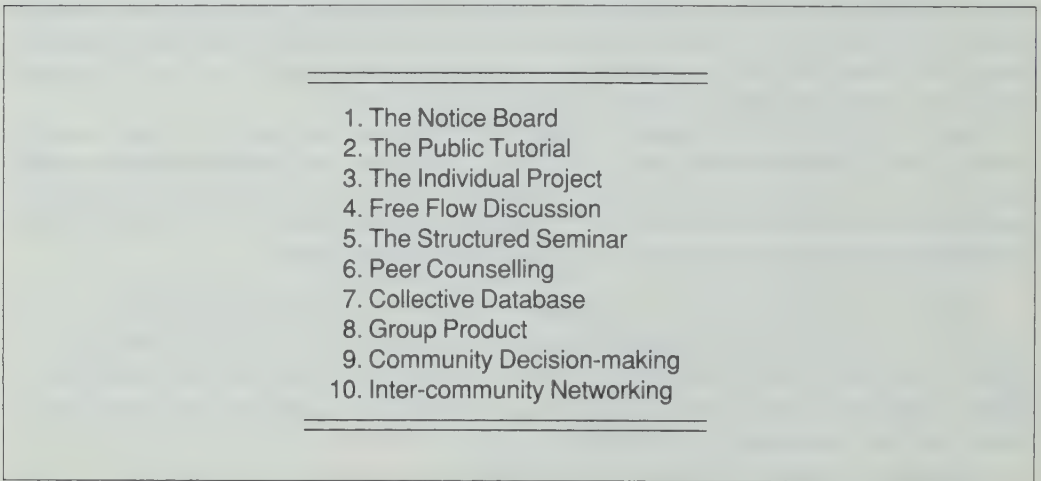tive impact; and

Objective 3 - To propose guidelines drawn from experience for successful use of
computer conferencing as an educational medium.

TYPOLOGY OF EDUCATIONAL FUNCTIONS

Educational techniques are structured activities for engaging learners with their object
of learning. Computer conferencing is a medium of interaction that accommodates a variety
of structured activities and thus is remarkably versatile in the educational functions it can
fulfill.

Ten distinct uses of conferencing are identified here, each of which serves a separate
educational function. Where one course may use its support conference to fulfill only a
single function, another course may incorporate several functions into a complex conference
with various topics serving the different purposes. Functions are listed more or less in order
from least to most difficult to implement.

FIGURE 1. *Educational Functions of Computer Conferencing.*

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

The Notice Board

Conferences may fulfill the same function as announcements made in class. For
example, the instructor can advise about office hours, advance reading for classes, due dates
for assignments, material on reserve in the library and important points to review for
exams. The electronic notice board is permanently displayed, printed, dated, equally
accessible to those who attended class and those who missed. It is also interactive thereby
allowing for clarification of announcements. For administrative details, the on-line notice
board offers advantages over the teacher's class announcements or hand-outs, and the
students' phone calls or visits to the professor's office.

The Public Tutorial

It is generally accepted that if one student has a problem of understanding or

interpretation then a number of others will likely share this problem. Accordingly, conferences have been used as a forum to answer questions, clarify issues and expand on material presented in-class in order to benefit not just the inquirer but all conference readers. When points are raised by a student on-line, the faculty member is undoubtedly more inclined to produce a detailed discussion knowing that it won't be necessary to repeat this same explanation many times during subsequent office visits from other students.

The Individual Project

The *conversation* mode has served as a conference-between-two for situations such as rewriting a term paper, guiding an independent reading course, or thesis writing at a distance where close supervision is neither possible by direct visit, nor convenient and affordable by telephone. In one sense on-line supervision is slower than direct spoken consultation, but it can also be more thoughtful and the exchanges more productive for the amount of contact time.

Free Flow Discussion

Free flow discussion is a type of conference used by both students and teachers to continue and supplement the interaction begun in class. It extends a virtual meeting place over time so that people can pursue ideas between classes after they have had time to read further and reflect on issues. For example, it has been used successfully for speculation on a *futures* theme, and may work best when it is no more formalized than conversation in the local coffeeshop or pub. However, it need not be aimless or inconclusive since any participant can focus attention on a series of comments and test group consensus.

The Structured Seminar

The *structured seminar* is a conference in which sub-topics have been matched to units of course material. This is particularly useful when distance students are involved, or if individuals will be covering material at different times. The structure permits participants to access early topics in the course and thus reactivate discussion on them without having those themes lost in intervening material.

Peer Counselling

This type of conference is primarily for student-to-student interaction and provides a place for giving support and advice on academic matters such as exam preparation, administrative details concerning fees or registration procedures, existential crises related to thesis proposal writing, and the general disadvantages of being a part-time student. While peer counselling has been observed interspersed in conferences with other purposes, it is an important enough function to merit a separate topic in a course conference, or separate conference for the student body of a department.

Collective Database

Computer conferencing can facilitate the creation of a collective database such as a student listing of journals, annotated bibliography, directory of sources for scholarships or a calendar of events. The conferencing system provides a means to both solicit and collect the offerings from individuals. Information can either be left on the system as conference messages or can be transferred to a word processing file where it can be sorted, edited and

formatted. From here it can be returned to the system as a long but organized input or be distributed in paper form.

Group Product
A conference system can facilitate course related group work such as case study preparation, team presentations and project development. It can provide a forum in which to pursue the analysis of the problem, coordinate individual efforts and proceed with review and revision. Used in conjunction with a word processing package the conferencing system can enable the preparation of group papers.

Community Decision-making
An open forum established for all faculty, staff and students can address more than minor decisions such as a date for the department picnic. It can discuss management of audio-visual equipment and the reading room, procedures for comprehensive exams and thesis defenses, curriculum topic additions and deletions or preferences among nominees for visiting faculty. Especially at the graduate level, shared decision-making is beneficial for all and appropriate to building a true academic community.

Inter-community Networking
Linkages have been attempted between similar academic groups at different universities in an attempt to promote common research and scholarly interests. This seems to work best among people who have already established some degree of mutual familiarity through shared study, on-site conferencing or exchange of papers.

INFLUENCES ON STUDENT
CONFERENCING BEHAVIOUR

As with traditional modes of learning, student behaviour in course-related conferencing can be examined at the level of simple attendance (logging in or not) and for the quality of participation they exhibit once present.

Initial Participation of Students

Students log into course conferences in direct relation to the strength of two factors:

1. They have to be able to (accessibility); and
2. They have to see a reason to do so (perceived benefit).

Accessibility
For the student, accessibility is comprised of several things: reasonably located equipment, familiarity with a short list of essential commands, and a grasp of the conceptual model of computer conferencing. Between hardware convenience and software comprehension, the latter seems to be the more decisive influence — underlining the necessity for pre-enrolment training; while the importance of convenient access to hardware has been seen to vary with the second influence, perceived benefit.

Perceived Benefit
    Enthusiasm or curiosity on the part of a faculty member will not necessarily transfer to students who have pressing demands on their time and learning capacity. Intrinsic motivation does exist in the form of enjoyment of conferencing and desire to use the system; and students who have already had a successful experience of conferencing tend to be voluntary users at the next opportunity. But external motivators are usually necessary when a course is the first exposure to the conferencing medium.
    One incentive is to make certain that important information such as the answers to assignments, the domain of a quiz, or the response to an in-class question, is available only on the conference. This will at least encourage students to follow the conference in a read-only manner. A more compelling incentive for active participation is to assign a portion of the final mark to conference contributions. If a course conference does not offer some unique benefit, then students will not even go next door to a terminal; yet a part-time graduate student was known to drive 20 miles to a terminal in order to conference regularly with the supervisor of his individually tailored reading course.

Influences on Type and Rate of Conference Activity
    Getting students to come on-line is only the first of the teacher's new hurdles -- similar to earlier programs of educational outreach that had to actively enlist reticent populations. Once on-line, the student may act as a *read-only* participant, never venturing a comment. To some extent, individual participation is determined by the personality, degree of confidence and level of interest in the subject matter of each student, much as in the classroom situation. However, observations reported on nearly 20 academic conferences indicate that student conferencing behaviour in general may be influenced by academic level, curriculum area, and relative status of conference participants as illustrated in Figure 2.

FIGURE 2. *Situational Influences on Observed Conference Activity.*

Academic Conference Observations		
Situational Influence	Rate of Participant Activity	Type of Educational Activity
Academic Level	√	√
Curriculum Area	--	?
Relative Status of Participants	√	√

Note: √ = apparent influence; -- = no apparent influence; ? = unknown influence
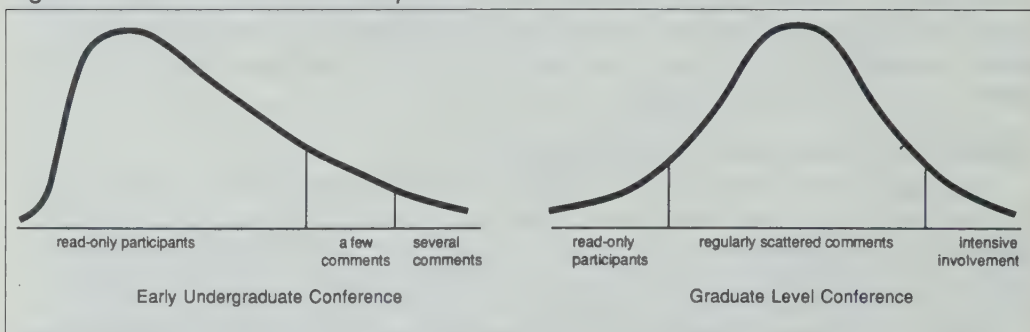
Academic Level
    With the progression from introductory courses to senior undergraduate to graduate

courses, class size can dramatically decrease from a full theatre of several hundred to a small seminar of a dozen or less. At the same time, Perry (1970) has claimed that a progression in cognitive maturity takes place whereby student thinking tends to move from: 1) "give me the right answer," through 2) "we all have different and equally good answers," to 3) "there must be some criteria for judging relatively better answers." Class size and cognitive maturity combine in academic level to produce a noticeable influence on both the rate of conference activity and type of educational function it fulfills.

Rate of conference activity naturally varies among students in a given class, but the distribution curve of student participation also tends to change with advancing academic level as illustrated in Figure 3.

Figure 3. *Rates of Student Participation.*

| read-only participants | a few comments | several comments | read-only participants | regularly scattered comments | intensive involvement |

Early Undergraduate Conference   Graduate Level Conference

With early undergraduate conferences the majority of students are likely to be read-only participants, while a small proportion add one comment or question, and an even smaller number become actively involved. For more senior student populations where faculty expectations are higher, course evaluations encourage demonstration of individual creativity, and student dialogue is part of the learning process, the rate of participation more nearly resembles a normal distribution. The majority of students will be likely to contribute regularly, while the exceptions are read-only or intensely involved.

The nature of educational activity on conferences also tends to vary with academic level. Typically a large introductory course has a rather simply structured conference in which the input primarily originates with the instructor. The teacher acts as the information provider and the students act as the information consumers. There is a definite feeling of vertical organization with problems being addressed upward and advice coming top down. With graduate level courses the conference becomes a vehicle for the type of student interaction that often occurs outside class. There is a greater feeling of control and ownership of the conference and an increased sense of responsibility for its success. At this level peer counselling and the higher functions of conferencing as defined earlier, begin to occur.

Curriculum Area

Adoption of electronic communication has been uneven across colleges at the University of Guelph. To date the College of Family and Consumer Studies leads with 40% of its faculty at least having membership on the system. The Ontario College of Agriculture has 29% of its faculty signed on, College of Social Sciences 25%, with Physical Sciences at 20%, Arts at 14%, Biological Sciences at 12% and the OntarioVeterinary College 8%. Within those college averages are contained some departments with no faculty using

interpersonal computing, and one only, the Department of Rural Extension Studies, with 100% of its faculty (and graduate students) on-line. These figures report only a recognized membership on the system; regular usage for mail or managerial conferencing is undertaken by a combined average of only 14% of the faculty and administrative staff. Since administrators contribute a much higher proportion of their membership to the combined average than do faculty, experimentation with teaching/learning applications of conferencing is being pioneered by a very small number indeed.

For this reason, it has not yet been possible to compare equivalent populations of students across the various curriculum areas. But observations to date suggest that there is not an appreciable difference between the rates of typical undergraduate conferencing behaviour across curriculum areas. What may vary and has yet to be ascertained is the type of conference function that is used in the several curriculum areas. Some curricula simply may not allow for evaluation of opinions and the student dialogue which makes that possible.

Status of Participants

Rate of participation in conferences increases with a feeling of security on the part of participants not only in regard to subject matter, but also in relation to the group. This feeling can be marred by the presence of high status participants other than the normal faculty member. With student conferences at any level it has been noted that the presence of outsiders of a high status has an inhibiting effect.

One of the phenomena of conferencing is the capability of sitting back and observing without having your presence known (except on the listing of registered participants). On the part of a peer this is acceptable behaviour and can be seen to be the result of shyness or some such factor. On the part of a superior it is more likely to be regarded as judgemental observation of unknown intent.

Consequently both the lowest and highest status participants have shown reticence to log into optional conferences. Reluctance has been expressed by system members of high institutional status to join a conference when even their read-only participation might inhibit the discussion.

For conferencing to achieve its democratizing potential, attention will have to be given to ways of mitigating the undersirable effects of differential status among participants.

RECOMMENDATIONS FOR SUCCESSFUL
ACADEMIC CONFERENCING

We discovered with the introduction of slides, filmstrips, films and videocassettes into the classroom that there was as much to learn about preparing students for the activity and debriefing them afterwards as there was about actually using the medium. The same holds true for incorporating the computer conference into a course. It requires as much attention before implementation in the course as during. This section highlights several important points of intervention.

Preparation for the Student Participant

Intelligent, accomplished and valuable students are still arriving at the university with no experience of mediated communications. If we wish to optimize their training for an academic conference, it should be a thorough orientation to the medium that includes basics

of the machinery, the system commands and the conceptual model of conferencing.

Effective training requires small-group or even individualized attention that includes a practice hands-on session at the keyboard for each participant. No written instructions can anticipate all of the minor technical details that the novice user will encounter and can find seriously daunting. The presence of an instructor or experienced peer guarantees immediate assistance and feedback.

It should be remembered that a computer conferencing system is not only a tool but also a medium of communication. Although the unique potentials of the medium and the individual's style in using it emerge through experience, a student's cultural assimilation into conferencing will be made easier if direct reference is made to conventions of messaging such as writing in readably short paragraphs, acknowledging the contribution of other participants, and indicating affect in parentheses (groan) (sigh) (chuckle!).

On-going Advice and Assistance

In addition to pre-conference training a variety of assistance is recommended for success-ful conferencing. Written documentation should be available in several forms including the full manual, a step-by-step sample session, and a short list of the most commonly used commands.

On-line assistance can be provided as a feature of the software where a *help* command brings additional instruction at every possible juncture. On-line assistance can also be elicited through a system wide conference open to all system members and serviced by technical staff. One very successful approach has been to include in every academic confer-ence a separate subtopic for dealing with technical problems. This can be serviced by the instructor/moderator, a teaching assistant, or other class members. Student participants enjoy sharing their new expertise with others and may in fact have more to offer other new users than longtime system members who really can't remember too well what it was like to be intimidated by conferencing.

Students at a Distance

Technical training will be most difficult for students working in isolation and the number and variety of problems that can be encountered should not be underestimated. A solitary novice user getting no response from the system may not be able to diagnose whether the problem is located in the machinery, the system, or their own actions. If they have no local technical advisors they must contact the host institution. If they are located in a different time zone from the sponsoring institution telephone contact becomes more problematic.

A suggestion arising from experience is that no distance student be considered actually registered for a computer conferencing course until they have made contact with the faculty member using the system as proof that they will be able to participate.

Preparation for the Instructor-Moderator

University faculty often discover the hard way that instructing requires another domain of skills beyond their subject matter expertise. By comparison, the move from classroom teaching to conference moderating is not such a major adjustment. It is an extension of the personal and social psychology of learning. It is also, however, a new medium with unique characteristics, and teachers should be assisted to achieve a degree of personal skill, familiarity and ease with the system prior to using it with their students. In theory such

professional development can occur in a small group, but experience indicates that those who have mastered an area of expertise prefer to do their groping with a new skill in an individualized tutorial, and even there the tutor needs to use tact and patience.

Moderating Academic Conferences

Situational leadership theories tell us that effective leadership means responding to the particular requirements of people in various circumstances. Similarly, people who have trained as educators realize that there are specific and varied techniques for achieving different sorts of educational outcomes with various kinds of learners. The distinctive character of the ten educational functions described here strongly suggests that specialized moderating skills will emerge for successfully conducting each type of conferencing activity.

REFERENCE

Perry, W. (1970). *Forms of intellectual and ethical development in the college years.* New York, NY: Holt, Rinehart and Winston.