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INTRODUCTION
This paper describes the use of an online learning environment which has been established for postgraduate students studying an Open and Distance Education Specialism in the Masters in Professional Education and Training Program at Deakin University. Online conferencing through the conferencing software FirstClass, has been used in this specialism since 1995 and was an integral part of the program in 2000 with students studying online in five units of the specialism throughout the first semester. A detailed evaluation of the use of computer conferences for all units established with FirstClass software was undertaken as part of a project, Learner Centred Evaluation of Computer Facilitated Learning Projects in Higher Education, which was funded by the Commonwealth government Committee of University Teaching and Staff Development (CUTSD). As the Open and Distance Education specialism is being revised and new units are written, the information gathered in this evaluation is being integrated into the pedagogical planning and the technological decisions being made about the design of the new masters program.

The postgraduate students studying in the Open and Distance Education specialism use computer conferences as their main communication process for group interaction. All units have electronic discussion of ongoing tasks and activities with the aim of engaging students in learning interactively. Computer conferencing had been integrated into the teaching of this specialism in a range of ways. Within the structure of the specialism, a continuum of interactivity and intensity of conferencing had developed through the differing assessment requirements from 1) required intense interaction to 2) some online task requirements to 3) no required online presence. This resulted in wide differences in unit message frequencies, student participation rates and requirements of online teacher presence. Student evaluation comments supported the interactivity of the online environment and the new Masters of Professional Education and Training in Flexible, Online and Distance Education has responded with a design for a manageable student-centred conferencing environment through its assessable activities and its course requirements for online participation.

INNOVATION IN EVALUATION
Over the last decade, computer conferencing has been acknowledged by researchers as an effective interactive medium for students studying together at a distance (Mason & Kaye, 1990; Harasim, 1995; Stacey, 1998; Salmon, 2000) and has become a widely used pedagogical tool as the internet has become accessible to many. Evaluations have been undertaken regularly using traditional evaluation methods such as interview, survey, focus group etc. but more recently the use of the online environment as a research tool itself has begun to be explored by researchers (Stacey, 1999; Lazar, Tsao & Preece, 1999; Pettit, 1999). Following this model, we used the medium as our evaluation tool,
constructing online focus groups, analysing online conferences and using email for individual follow-up.

Though we had previously used the online environment to discuss and reflect on the evaluation comments of the students learning in this environment, both formatively and summatively, no overall attempt had been made to rigorously evaluate the online learning processes and outcomes in this specialism. The acknowledgement of this need prompted the interest of the teaching team in participating in the Australia wide CUTSD funded evaluation project, with evaluation support provided by our mentor, Mary Rice. Our involvement in the project was an impetus and support for our team in evaluating and researching our computer conferencing. This project was an ASCILITE (Australasian Society for Computers in Learning in Tertiary Education) initiative to encourage evaluation of technology-facilitated learning with a strong focus on student learning rather than technology-related issues. (See Phillips et al, 2000). Development of a detailed evaluation plan was facilitated by a project mentor and was based on a learner-centred framework adapted from Alexander and Hedberg (1994) and Bain (1999).

At the most intensively interactive end of the continuum was a unit about theory and issues of technology and teaching in open and distance education called Teaching and Learning with Computer Mediated Communication. This was developed in response to students’ growing interest in the theory and practice of teaching in a virtual medium. Students were required to use the FirstClass environment to communicate and to access and share resources, both those provided and those they have researched and evaluated through searching the World Wide Web. They moderate discussions about issues of online learning, and work in collaborative groups for an assessed task on researching the theory and process of collaborative learning online. Another unit, Media, Text and Technologies in Open and Distance Education, also required intense online interaction (which constituted part of the assessment), though extensive print resources also supported the unit.

Methods of data collection

We used multiple methods of evaluation which triangulated the students’ individually expressed perspectives with content analysis and frequency statistics. Most innovative was our use of the conferencing medium as our evaluation tool. We calculated interactivity rates through message tallies and analysed individual student and teacher interactivity this way.

1) We established voluntary online focus groups as our means of gathering evaluation commentary, both formative and summative where students were requested to respond within electronic conferences that were established for the project within each unit conference. As not all students seemed willing to post comments publicly, these questions were also emailed to those who had not participated in the focus group conference.

2) We used online observation of communication and learning process through retrospective analysis of conference message archives through which we analysed communication and learning processes. This involved calculation of frequency and distribution of message use, and representative analysis of conference message content to determine strategies used by student in learning online.

3) We established a summative online discussion three months after semester ended in which all participating students were asked to comment on a summary of early analysed findings which were posted on a short term computer conference set up for this purpose.
RESULTS OF PROJECT

Results of method 1: online focus groups

We studied a total of 67 students over five courses. Thirty students participated in the online focus groups throughout the semester, distributed as shown below (see table 2). The focus group evaluation responses showed that the majority of students had been using the Internet for a few years and were often self taught or had had little formal training. Many used computers and online communication in their work and as a resource base for information. Computer conferencing was new to most students and some students did make the point that learning to use the FirstClass conference was a new process for many of them which initially made them feel insecure and uncomfortable. They thought that a structured process of learning steps was helpful as a course began. Most saw the potential of the online conference as an interactive interchange of ideas between participants. The students from the course with least online requirements saw the value in structuring discussion questions and the students in the most interactive courses were appreciative of that structure as a way of making them engage more actively with the content of the course.

The students with structured online interactive tasks described working harder than in other distance subjects as they were accountable to the group and engaged more with reading and reflection on a wider range of resources than they would have consulted alone. They were unable to just do the minimum amount of work for the assessment when they are asked to contribute to an ongoing discussion. Even in the unit with no structured tasks, maintaining a focus on the unit and its issues through the conference was considered very useful as it stimulated thinking and new ideas and raised different issues. Students thought that early orientation towards the unit was facilitated by online discussion and that online participation was a useful discipline.

Table 1. Distribution within evaluation project

<table>
<thead>
<tr>
<th>Continuum of interaction requirement</th>
<th>Required online semester interaction</th>
<th>Required online tasks</th>
<th>Interaction encouraged not required</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total students</td>
<td>21</td>
<td>9</td>
<td>37</td>
</tr>
<tr>
<td>= 67</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total focus group participants</td>
<td>18</td>
<td>2</td>
<td>10</td>
</tr>
<tr>
<td>= 30</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total conference messages</td>
<td>1960</td>
<td>97</td>
<td>157</td>
</tr>
<tr>
<td>= 2214</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Many students described the motivation for learning that the group communication provided as the group developed and they enjoyed the interaction that reduced their usual isolation in distance learning. They had a sense of community -particularly in the sharing of resources. The flexibility of access and times of study were seen as an advantage and they valued the shared resource base. Web resources have increased to such an extent that a group process of research and commentary on web sites provided students with a much better resource base than they could find themselves. They saw the different perspectives provided by different students as an advantage to their learning as it took them out of their own more limited view of the subject (often with difficulty). In the most interactive unit students found that the other participants challenged their ideas and provided new thinking. Most students recognised the value of this although a few students elected to work independently on their assessment.
The disadvantages they identified included the increased time spent on the subject. However this was an element that the students usually saw as a choice and as a self-management issue. Some distance students complained that they chose to work at a distance as they preferred their independence and the ability to work at their own pace and did not learn well in groups, though they could still see the advantages of the medium in their learning. Those with less interactive requirements and experience still thought that social learning interactions are only partially, and rather inadequately, replaced by online participation and they were dubious if online was the sole medium of delivery.

Overall they found FirstClass enjoyable, easy to use, responsive and reliable and it was a positive and enjoyable experience. However they saw the role of the lecturer as conference facilitator, regular interacting online, as essential to the maintenance of activity and focus.

Results of method 2: online observation

The differing requirements for online interaction in the five online courses resulted in a wide range of message frequency (see table 1) as well as in differing message content. The archives of conference content were used for two differing studies of content analysis by two of us. In the first analysis study, learning strategies of students were analysed through the use of a previously developed framework and in the second study, a focus on the social presence factors that are involved in establishing highly interactive conferences were explored.

Analysis 1

Table 2. Frequencies of learning strategies

<table>
<thead>
<tr>
<th>Frequently used &gt; 5 occurrences</th>
<th>Infrequently used 5 or &lt;5</th>
<th>New strategies identified</th>
</tr>
</thead>
<tbody>
<tr>
<td>Analysis</td>
<td>Recalling</td>
<td>Social strategies:</td>
</tr>
<tr>
<td>Generating</td>
<td>Diagnosis</td>
<td>Introducing Strategy</td>
</tr>
<tr>
<td>Application</td>
<td>Translation</td>
<td>Encouraging Strategy</td>
</tr>
<tr>
<td>Linking</td>
<td>Categorising</td>
<td>Information sharing</td>
</tr>
<tr>
<td>Comparing</td>
<td>Imaging</td>
<td>Other resources:</td>
</tr>
<tr>
<td></td>
<td>Cognitive monitoring</td>
<td>Sharing resources</td>
</tr>
<tr>
<td></td>
<td>Deliberation</td>
<td>Response to others</td>
</tr>
<tr>
<td></td>
<td>Anticipation</td>
<td>Sharing in imagining a resource</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Administrative questioning</td>
</tr>
</tbody>
</table>

Peter: I was partially interested in the sorts of learning strategies students used in engaging with First Class and, as a system of nomenclature, used the categories developed by Marland, Patching and Putt (1992) for the analysis of student engagement with textual distance education materials. This analysis by searching each transcript of student input, making a classification of each contribution, and then I had a colleague check her interpretation of the contribution. We were able to arrive at agreement quite readily but, where we did not agree, we discussed the contribution until we did arrive at an agreed classification.
What the data showed was that students made high use of strategies that linked material from different parts of the course together, applied course material to real issues they had to contend with in their workplace, and that enabled them to compare different concepts as they understood them. Analysing course material and other student contributions to elicit further meaning was also common, as was their generation of further questions from the course material. Although use was made of such strategies as categorising, translation and imaging, these strategies were used less often. Hardly used at all were strategies associated with the planning of their work in the Unit and the selection of material they identified as more important for assessment purposes. Social interaction was a common feature of their contributions, and was generally part of other contributions that included other learning strategies.

**Analysis 2**

Elizabeth: I analysed the conferences of my most interactive online course in which interaction and collaborative online resource sharing were required to investigate the effect of my role in establishing social presence online and in modelling techniques of social interaction in the conference. The total group (17) in this course interacted online and generated 1281 messages. I focused on the development of social presence as a modelled and learned process during the first month of the main introductory conference where the whole group established their online relationships before breaking into small groups. I integrated the social presence categories developed by Rourke, Garrison, Anderson and Archer (1999) into my analysis framework and also analysed two later periods (weeks 7 & 12) when small group conferences had been developed.

My role as teacher in establishing a secure learning environment and modelling socially accepting processes of interaction was shown to be a major factor in increasing the frequency of social presence factors in the whole group conference. Students in the second week of semester followed my direction and practised using aspects of the software while providing personal contextual information. When small collaborative groups were developed to continue group discussion and tasks, the social presence factors continued to be important in the communication of the group, with high frequencies of analysed factors continuing to appear within messages and even rising towards the end of the semester.

**Summative online discussion**

In the discussion we set up for all participants in all the courses to discuss the evaluation project results and provide their final comments, 15 students (9 female, 7 male) as well as we three teachers participated. The month long conference generated 94 messages, 59 of which were from students and occurred 3 months after the units under evaluation had been studied and the project participants had taken other courses, which had been taught in a variety of ways, with and without computer conferencing. This resulted in some comparative reflections that were a rich source of data. The discussion was started with a summary of the findings that had been developed from a selection of responses to the focus group questions and assignment data, similar to the results described above. These were posted for comment and the main points that emerged from the conference are summarised below.

Overall, the students were very positive about the results reported and saw many advantages in learning online and raised some useful issues for improvement. They confirmed the results summary as accurate and raised issues that included access problems, as well as a need for proficiency in English to fulfil teachers' expectations of reflective and deep thinking expressed in messages. They expressed a need for print material to backup online reading to provide flexibility for learning away from the computer. However the students were convinced that conferencing was worth the effort with responsibility and accountability to the group helping their learning and engaging their interest and teaching them resource access skills. Issues of establishing social presence and the need for other additional communication technologies layering the conferencing such as phone, meeting, or synchronous chat, were seen as essential for avoiding misinterpretation of messages. An ongoing need for teacher presence was supported unanimously with the lecturer's interaction seen as essential for a conference to be effective.
OUR RESPONSE TO THE EVALUATION DATA

These units were evaluated prior to a major revision of our units with each of us responding to the evaluation data by incorporating many aspects learned. Our individual responsive comments follow.

1) Elizabeth:

In *E-Learning in Flexible, Online and Distance Education* and *Media, Text and Technologies in Flexible, Online and Distance Education*, more student-led discussion have been structured into the new design, with web based online resources and print and audio resources (also to be available digitally), supporting the interactive online environment. The previous intensity of my time online, though designed to provide a flexible needs based curriculum, had in fact reduced the flexibility of the medium as a pedagogical environment, with an overload of teacher and student interaction required to establish the course structure each semester. Analysis of the nearly 2000 messages, a rate much higher than other units, showed that during the first half of the semester my presence online averaged at up to 12 hours per week per unit spent on conferencing alone. Given the administration, preparation and assessment load that also needs to be added to a teacher's responsibilities, such teacher time could easily become an overload and I have already developed strategies to reduce my online teaching time with more student directed discussion and through revised tasks.

In the semesters following the teaching of these units, I have developed more structured evaluation strategies using the online conference which have provided invaluable data that has changed practice even as the units proceeded. Use of Brookfield's (1995) critical incidents analysis as a form of formative evaluation discussion particularly provided useful ways of encouraging student reflection. Different styles of evaluation formats, refined during this study, have resulted in a more consistent and participatory evaluation response from students throughout the semester. In redeveloping these units, I have begun to respond to many student suggestions, from a need for more specific training in FirstClass skills to integration of different media such as video and teleconferencing to supplement the establishing of social presence online. Student support for many aspects of the course structure such as the use of collaborative groups has confirmed their importance in our online pedagogy.

2) Terry:

Another unit evaluated was *Critical Issues in Open and Distance Education* which required students posting tasks to the conference for discussion and which structured two main discussion points in the semester as well as encouraging other informal discussion. I required participation, but in providing flexibility for students, those students not participating online were disadvantaged by losing the commentary and feedback of their fellow students. There were two such students in the unit. One did not have a computer (assignments were handwritten, which is very unusual these days) and the other had Internet connection limitations which enabled email, but made FirstClass conferencing impossible. In the first case, the student did not participate at all in the online work, and it probably negatively affected their performance (which was poor) in the unit. The other student emailed contributions to me and I then posted them to FirstClass and then after about two weeks, copied the comments from FirstClass back to email and returned them to the student. This proved to be substantially useful, but not an adequate replacement.

This unit is ceasing and some of its substance will unfold in a new unit entitled, *Foundations of Flexible, Online and Distance Education*. In keeping with University policy and contemporary good practice in distance education, this new unit will make even more extensive use of online means. However, good distance education practice also shows, as the experience on, and evaluation of, *Critical Issues in Open and Distance Education* confirms, that appropriate media selection is important. Therefore, this new unit will build on online media strengths (interactivity, multi-media functions, data storage, searching and access capacities) at the same time as using the strengths of other
well-established media, especially print and audiocassette (and/or CD). *Foundations of Flexible, Online and Distance Education* will require participation to ensure the class interaction is valued, effective and significant for the students.

The evaluation showed that students contributed substantially around their assignment work and helped each other with comments and suggestions. In the future, as both students and we as teachers become more adept at deploying the latest conferencing software, more sophisticated group learning and assessment tasks will be used to enable students to be more creatively interdependent in their learning and, of course, their own educational practices (as this is invariably their occupation).

3) Peter:

*Theory and Practice in Open and Distance Education and Non Formal Learning* encouraged online interaction but had no assessable requirements for online interaction which resulted in a much lower student participation rate. As these units are integrated into new units, and revised to encourage more active participation and discussion, the impact on design and pedagogy developed from content analysis of the evaluated discussions will be discussed. I have interpreted the results of my analysis to indicate that student use of First Class was at least partially motivated by a desire to share their circumstances and workplace applications, to interact with others to develop shared understanding, and to develop meaning through the socio-cultural interaction enabled by the technology (Trentin, 1999).

Reflecting on practice, and developing CMC usage further, in new units I am developing I have introduced specialised spaces within the First Class unit space to enable students with common workplace contexts to focus on issues specific to their area of application. For example, in the new Unit, ECV711 *Training for Diverse Learners and Contexts*, I have developed a set of scenarios for groups of students to engage with. Each scenario provides a quite different education or training problem that requires solution by the group of students engaging with that particular scenario. Students are expected to collectively develop their response to that problem, and provide their planned solution. The first delivery of this Unit will be in second semester 2001, such that at the time of writing it has not yet been tested. Additionally, participation in the scenarios is expected as part of a student’s experience in the Unit, but is not for assessment at this stage. However, I am interested in reviewing the ‘for assessment’ decision on the basis of the 2001 delivery experience.

An area of tension in the use of First Class, and the encouragement of students to engage more with it, is the management of my own time. While there is little question that the CMC experience is positive for students, and for me as their lecturer, it is nevertheless all-pervading. Unlike on-campus tutorials, discussions and seminars, I can’t so easily control the time commitment. There is no publicly agreed and expected start and finish time. Added to that is a student expectation that I will be active and involved on an almost daily basis. I have partially created that expectation but, at the same time, it would be difficult to lower my commitment. My routine is to enter each First Class Unit on a daily basis and provide comment, assistance, guidance, or just encouraging remarks. That can be time-consuming and in competition with other demands on my time. There are days when I go into First Class with a prayer that the students haven’t been too active overnight. I am also conscious of the possibility that, unless I engage in a meaningful and unit-related way, the interaction through CMC can become trivialised. Klemm and Snell (1995) have pointed to the ease with which CMC interactions can either become trivial, or never move beyond the trivial. My observation is that it would be easy for this to occur, particularly in an unstructured CMC environment such as is the case in my current Units. I have to constantly work to ensure my inputs are useful and relevant, and not just socialising. That is hard work to sustain every day.

Controlling that pervasiveness is difficult. Some colleagues control it by simply being unresponsive but, unfortunately, that is not me. I also have colleagues who are more active than I am, and who
require students to use First Class as part of their assessment. I sometimes hear those colleagues lamenting the monster they have created. I have no easy answer for this, but I am structuring the First Class exercises such that the student-to-student interaction becomes much more important than their interaction with me, or through me. The scenarios I have discussed above are a part of that strategy, and I will be evaluating that during semester two of 2001.

CONCLUSIONS

Through our evaluation we found that the whole body of students saw many advantages in learning online and raised some useful issues for improvement. Student feedback supported the use of online conferencing in encouraging a learning community and teacher presence was seen as central to this being established. Frequency analysis of messages showed that required online involvement generated a high frequency of messaging, also generating a high teacher time requirement. Our response to this has been to develop strategies that delegate more responsibility to students and provide more use of small group interaction and online scenarios. Patterns of communication showed that high teacher interaction encouraged high student response but in small groups this was devolved and required less teacher interactivity. Tasks designed for online discussion generated online interaction with a cognitive focus and content analyses pointed to the role and importance of the conferences for social interaction and administrative sharing as well as for a cognitive focus.

The final summative discussion of results confirmed the results gathered which gave us a great deal of insight into how effectively computer conferencing had been incorporated into our courses and the ways these differing uses were affecting student learning. The role of the teacher in structuring and establishing cognitive and social presence of students studying online was defined more clearly and the cognitive and social strategies students use to learn online are already impacting on the way we are revising and writing new courses in our postgraduate program.

REFERENCES


