Assessment and 'third generation' distance education

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ABSTRACT

The convergence of computing and telecommunications technologies has created a range of new possibilities both for the communication of knowledge and for social interaction. The application of these technologies in the context of distance education has been characterised as creating a 'third generation' in terms of media and technology use. Computer mediated communication (CMC) has been seen as one of the applications of technology with the most far reaching implications for teaching and learning in distance education (Garrison, 1997). CMC enables distance learners to engage in collaborative learning and discursive interaction with peers and tutors in a variety of communicative settings. However the potential of the technology to deliver a more discursive and collaborative learning process has not always been achieved. Course designers are seeking to build constructivist pedagogy into the learning process so that students will perceive the use of computer mediated communication as essential for the achievement of the desired learning outcomes of the course. There are implications here for how students are assessed. These are explored primarily with relation to continuous assessment. Key features of continuous assessment in the context of second generation distance education are identified and these are used to review the findings of an exploratory study of the use of collaborative assignments and assessed CMC contributions in an introductory information technology course at undergraduate level. The paper concludes with a discussion of the degree to which these approaches offer a mix of benefits for learning quality and skill outcomes, with some costs in terms of reduced individual control over time and space freedoms for learning.

ASSESSMENT AND LEARNING

Assessment has been recognised as a driver of students' approaches to study in distance education no less than in campus based settings (Rowntree 1987; Heywood 1989; Morgan 1993). In those forms of distance education which integrate continuous assessment with course study, assessment is both a vital opportunity for student learning as well as a process of judging the performance of students and assigning grades (Thorpe 1987). Experienced tutors who mark students' work are also teaching and motivating students, not merely grading them. The student experience is that through doing assignments they discover what they know and can do, and also where their knowledge or abilities are weaker. The assignment task may stimulate them to revisit earlier study and motivate them to engage in depth with the subject matter of their course (Godsell and Miers 1994). It is not until students start to work on their assignment that they know whether or what they have learned from their studies.

It follows from this that we should give assessment no less attention than the design of teaching and learning environments, when we consider the effects of technology on distance education. These effects have been driven by the convergence of computing with telecommunications, in what has come to be called 'third generation' distance education (Garrison 1985, 1997; Nipper 1989). Garrison links the term specifically to the technical characteristics of communications technology (Garrison 1997, p. 9). However he also identifies computer mediated communication (CMC) as central to third generation distance education: '...the characteristics of CMC and computer conferencing in particular represent a new generation of technology for learning at a distance.' (1997, p. 5).
The precursors of third generation distance education can similarly be identified by their characteristic use of the technologies available. Second generation distance education offers limited forms of communication, via post and telephone. Advanced versions of second generation distance education can also offer integrated audio and visual media with text and provide effective tutorial support via face to face, telephone and correspondence interaction. By contrast, first generation ‘plain old correspondence teaching’ uses text only and very occasional written communication between student and tutor.

These successive generations of distance education are often assumed to mark changes for the better in educational systems (Jonassen et al. 1995, Khan & McWilliams 1998), and certainly in distance education. This is not surprising given the success of CMC in supporting interaction between learners and between learners and course tutors (Kaye 1992). However, in-depth analyses of electronic learning environments identify weaknesses as well as strengths in the amount and quality of student participation, and these present challenges for effective course design.

Mason (1994) for example has identified a persistent problem of low participation by a proportion of students in many circumstances. Users often fall into three ‘camps’, roughly equal in size. There is the enthusiasts’ group who log on frequently and dominate interaction. At the other end of the spectrum are those who may lurk and read, but seemingly cannot be persuaded to participate directly. In between is the group who need some encouragement but who do use the system effectively and in moderation.

Nipper (1989), among others, has also noted, that while home-based learners are interactive users of CMC, social users dominate and educational focus can be swamped by chat. He and others also record the vital role of tutors in creating an environment which persuades novices to use the medium and use it effectively (Davie 1989; Fabro & Garrison 1998).

Computer mediated communication as one of the essential elements in third generation distance education is also affecting assessment in terms of what can be assessed as well as how. In part this is a result of the way in which course designers have used assessment as a means of influencing student use of CMC (Collis 1998; Wilson & Whitelock 1998). The quality of students’ involvement in CMC has been changed by this means, as has their experience of assessment.

The focus of this paper is on the impact on students’ study experience of the use of CMC in association with continuous assessment. These issues are explored through evaluation of innovative assignments on a course currently in presentation at the OUUK. The course concerned is an interesting example of both third generation teaching methods CD-ROM resources, networked computing and CMC - combined with second generation scale of provision. Around one thousand students study the course every year, many following study of either the Technology or the Social Sciences entry course. It was the first OU course on a mass scale to innovate with computer supported collaborative working and electronic submission of assignments. This brings continuous assessment into the foreground as the context for technology application and enables exploration of the effects in terms of the quality of students’ experience and their learning outcomes.

First we need to review briefly the centrality of continuous assessment for student learning in distance education and then to explore the potential for change offered by third generation communications technology, specifically CMC.

ASSESSMENT, LEARNING AND DISTANCE EDUCATION

Assessment is a term used in different contexts to refer to rather different types of activity (Heywood 1989). It can be used to refer to:

- evaluation of the quality and effectiveness of individual teachers and educational institutions
- identifying the capabilities of individuals for the purpose of selection
- the process of judging students’ learned outcomes and assigning grades to individuals based on these outcomes.
My focus in this paper is on the last, the process whereby students complete tasks on which their performance is judged and grades assigned and communicated. As Heywood and many others have asserted, assessment is integral to the learning process and also one of the practices which can have the most far-reaching unintended consequences. Tasks which are misconceived may undermine achievement of the explicit learning goals which are the objective of the whole activity. Students who experience failure or disappointing grades carry negative emotions about their experience into their future learning. Like hanging tomorrow, assessment 'concentrates the mind wonderfully'. This 'concentrating' effect is true both for those whose role it is to set assignment tasks and mark them, as well as for those who must complete them and submit to being assessed.

Taking the teaching role first, Heywood posits a systems approach to the design of assessment and asserts:

...if the objectives of assessment are to be achieved and feedback introduced, instructional procedures will have to be designed to meet the objectives of assessment. Assessment is therefore an integral part of curriculum and instructional design, not an afterthought, as is so often the case...Curriculum design, assessment and evaluation begin at the same point. That is the understanding and expression of what it is we are trying to do. (Heywood, 1989, pp. 20-3 passim)

These general points about the importance of assessment apply whatever the mode of study. In a distance teaching institution, assessment has if anything an even sharper focus in the students' experience, given the physical distance between students and between students and the accrediting institution. At the OUUK, the details of assessment differ according to the course, but continuous assessment is central to virtually all. A course credit is achieved typically by submitting anything from four to eight assignments over a 32-week period of study, concluded by the sitting of a three-hour examination. Although there are variations, the norm is for continuous assessment and examination each to count 50% towards the final course credit. The submission of assignments throughout course study is thus crucial from both the course team and the student perspective. Assignments are formative in that feedback from a tutor influences future course study, and summative in that the grades count towards the final credit.

For the course team and for the tutor, continuous assessment creates a series of snapshots of the success of their teaching, measured in terms of student performance on each assignment. The assignment allows the tutor to see how effectively the student has been studying the course materials, and to respond with detailed comments. Grading alone is not an adequate response to student assignments, and the purpose of comments is to create a written dialogue with the student, as well as to correct and amplify the student's answer. One of the purposes of continuous assessment has always been to assist in the development of the student's learning, and not solely to grade what has been achieved (Roberts 1996).

From the student's perspective, workload peaks cluster around the submission of assignments, and for them too, the assignment exchange is a vital moment for checking progress. Students in second generation 1 distance education typically have only the occasional tutorial and telephone contact as an opportunity for conversation about what and how they are studying. The feedback from a tutor is therefore vital, both because it comes from an authority figure and counts towards their achievement of a credit, and because they have few such opportunities to check understanding and have comments on their progress generally.

PACING, FEEDBACK AND LEARNING QUALITY

From this discussion, three key issues emerge in a form specific to continuous assessment in the distance education context -pacing, feedback and learning quality. Pacing is created where continuous assessment requires that the student use what has been learned, by completing an independent piece of work at various points throughout the study period. The effect of this pacing is both mechanistic and enabling in relation to learning.

Pacing is mechanistic in that it puts externally generated constraints on what to study and when, and these constraints reduce choice for the student but provide helpful pressure to achieve a certain amount of study by a particular point. Without such staging posts, many students would not be able to manage the scheduling of their own learning. Pacing also enables learning in the sense that work for an assignment requires that the student process and integrate a coherent understanding of the material learned thus far, building on what has been learned before and preparing for what is to be studied thereafter.
Feedback is crucial not only from a constructivist perspective on student learning but also in relation to student motivation. Many students begin study with some doubts about their capacity to achieve a credit. A poor grade on the first assignment can be enough to lead them to decide to drop out. Conversely, strength of motivation to continue, even to overcome considerable obstacles to study, can follow from getting several good grades on assignments. Motivation is also affected by the quality of the comments received from a tutor. Effective personal communication between student and tutor provides tangible contact and a link with the social world of those who have expertise in the subject area of the course.

Both pacing and feedback therefore directly affect whether and how effectively students study and learn. Assignments by their design can also affect what students learn since they are an opportunity to direct students attention onto specific content areas and to practise particular skills, whether of problem solving, calculation, analysis, synthesis or communication. Assignments have the potential to go much further than a behaviourist style testing to check that the student can reproduce accurately what has been input via the teaching. They can be designed to embody a constructivist approach to learning.

Students learn by reconstructing meaning for themselves and by integrating new ideas and skills into existing knowledge and abilities. Assignments are central to this because they require that students process actively what they have learned. They are thus a vehicle for learning, another means of ensuring that the learning goals of the course are achieved, and not merely a check on learning done. Laurillard (1993, p.49) has reminded us of Rothkopf's term 'mathemagenic', meaning productive of learning, and that is essentially the function of continuous assessment in distance education and the kind of activity that they should embody.

MEDIA, TECHNOLOGIES AND GENERATIONS OF DISTANCE EDUCATION

The discussion so far has assumed a version of distance education that has been characterised as 'second generation' (Garrison, 1985; Bates 1995). Although the specification of what constitutes each generation of distance education varies according to different authors, there appear to be two guiding considerations. The first is the diversity in media and technologies used, and the second is the nature of interactivity that is enabled by the use of these media and technologies.

Bates' distinction between media and technologies is important here. Media are generic forms of communication associated with particular ways of representing knowledge (Bates 1995, p.31) and Bates lists five as most important for education: face to face, text, audio, television, computing. As he also notes, these media can be delivered in a variety of ways by different technologies. Thus text can be delivered via print-based technology or via the computer, with the possibilities for interaction transformed by computer-based versus print-based delivery.

It is important to remember these distinctions between media and technology, and the capacities for carrying complex human interaction which are delivered by different combinations of media and technology. The idea of different generations of distance education is one way of encapsulating these combinations and the experience we have of encountering successive waves of technological developments, each enabling some new way of doing things in our own field. However, it has also come to carry with it more than a mere neutral categorisation of the introduction of new ways of doing things. It is seen as embodying a realisation of ever more interactive and student-centred systems of education and training where 'more interactive' must be synonymous with 'better'. Bates for example, comments that the three generations have been characterised as 'a progressive increase (from first to third generation) in learner control, opportunities for dialogue, and emphasis on thinking skills rather than mere comprehension.' (Bates 1995, p. 23)

However, Bates is careful to distance himself from the assumption that more advanced technology automatically means better learning - better because more interactive, more dialogue, more feedback, and so on (Bates 1997). It may be true in some instances that better learning is the result of use of new technology, but it is surely dangerous to assume in advance that it will be so (Anderson & Garrison 1995). Bates (1997) also reminds us that the 'old' technologies are not necessarily 'passive': it all depends how they are used. He draws attention to the different qualities of interaction that are engendered by different contexts. Text-based learning is not necessarily passive, and can generate interaction between text and individual student. However this is clearly different from the social nature of interaction between students which is made possible by CMC (Bates 1997). Both kinds of interaction are important in effective learning, and this is an important reminder not to downgrade the potential of old and familiar technologies through comparison with digital media.
THE POTENTIAL OF CMC FOR DISTANCE EDUCATION

The convergence of telecommunications and computing offers distance educators an enormous potential advantage over the two-way communication possible in the best of second generation systems. Asynchronous CMC enables all members of a group to be in touch, to use email, bulletin boards, conferencing and news groups to communicate with each other, with faculty and tutors, and to store and access information in new ways. Leading authors in this field have argued that this is no mere replication of the conventional classroom, but a new form of social interaction which makes different demands of both the learner and the facilitator of learning (Collis 1998).

CMC has been well documented in terms of its potential for discussion and learner support (Kiesler 1992; McConnell 1992; Marttunen 1997). McConnell (1992) for example has outlined its application to a masters program in Management Learning where students used CMC to discuss assessment criteria, exchange feedback on drafts and to facilitate each others' learning. He demonstrates how CMC can facilitate a constructivist approach to learning, where students interact via CMC as well as face to face in a residential university setting, with both environments being mutually supportive. Marttunen (1997) reports a successful attempt to teach university students argumentation skills, using CMC for both tutor-led seminars and student-led discussions. Students were required at minimum to write a least two messages each week in order to pass the course, which lasted six weeks. Outcomes for both methods were superior to those for conventional self-study. Although there is a need for caution since the CMC groups were volunteers, this quasi-experiment does provide more confirming evidence about academic skill development where CMC and assessment are linked.

However, the introduction of electronic communication in the circumstances of a mass system of higher education operating solely at a distance presents a very different environment from the small scale, closely observed and managed context of a residential setting. As Kiesler (1992) has asserted, technology's effects are mediated by social and cultural environments which have produced very divergent outcomes. Experience in distance education has confirmed that the acclaimed interactivity of third generation technologies depends on a context of imaginative and careful course design if it is to be achieved successfully (Kaye 1992, Jonassen et al. 1995).

The earliest uses in the OUUK adopted a low risk strategy where students could opt in if they wished, and crucial areas such as assessment were avoided. Initial low take-up by students persuaded course teams to allocate some continuous assessment marks for effective contribution to course conferencing. Wilson & Whitelock (1998) have compared the results of these strategies in terms of the recorded online times of both students and tutors. There is evidence that differences in course design and content lead to varying amounts of online study by students. The authors also note that even on a course where tutor hours outnumbered those of students by roughly three to one, some students still expected quicker online responses from their tutors. Tutors who logged on only once or twice a week, or weekends only, were perceived as not sufficiently responsive by some (Wilson & Whitelock 1998, pp. 29-30).

Current use of CMC is now much more ambitious, with over 30,000 students studying courses where networked computing is supported. Course teams are seeking to achieve the potential of CMC for greater interactivity and skill development through building it into course design not only in the form of conferencing, but also as a required element in tasks submitted for continuous assessment. One particular example will be discussed in the remainder of this paper, as a case study where students' participation in CMC and computer supported collaborative working was essential if they wished to gain a course credit.
THIRD GENERATION' ASSESSMENT

The Open University has provided networked learning for very large numbers of students since 1988 - the first year of presentation of an undergraduate course on information technology. In its revised current form, this course - Information Technology and Society (THD 204) - requires students to use printed units, video, a CD-ROM for resource-based learning, email and computer mediated communication structured as part of their 'local' student group and also national conferences and bulletin boards. Students have also been required to submit contributions to conferences as part of their assessment, and to work collaboratively via CMC on a task, submitting their assignment to their tutor electronically. This course can be seen as an example of third generation distance teaching and an instructive case through which to explore the implications for student learning of the mutual impact of CMC and assessment.

The course team have used CMC to create opportunities for information technology (IT) skills development and for team working, and thus to meet the current demand for these skills to be developed by undergraduates. One of the most frequent criticisms that employers make of higher education for example, is that its graduates do not leave university with abilities in team skills (Harvey et al. 1992). This presents a particular challenge to distance education which has placed a high value on independent rather than interdependent learning and if anything, made a virtue of the inability of distance learners to meet often. CMC however now offers not only an additional technology through which discussion can occur, but the possibility of delivering new learning goals, such as IT skills and team working, which are in high demand.

The focus for team working for students of THD204 is created round two of the eight tutor-marked assignments for the course, 03 and 06. These require students to work together in ways outlined below.

SKILLS DEVELOPMENT AND COLLABORATIVE LEARNING, THROUGH CONTINUOUS ASSESSMENT USING CMC

During the first few months of the course, students are introduced to the communications software, FirstClass, and for those new to CMC, encouraged to practise their use of the system. By the third assignment, they are familiar with this and should be able to read and contribute to their local tutor group conference.

For Assignment 03, students are required to discuss an issue relevant to the effects of IT on education and training. They are required to select between three and seven of the messages they contribute to their local tutorial conference and to submit this as part of their assignment, for which 60% of their marks are allocated. Students are marked on the coherence of their comments and on the extent to which they facilitated the discussion process. The remaining 40% of marks are allocated for completion of a report on the quality of the discussion in their local conference, evaluating its content and including aspects considered important which were not covered.

For assignment 06, students must go further and work together via CMC in small groups of between three and six members. Students are given a fictitious newspaper article to read and required to provide a critical assessment of the issues raised, styled appropriately for the audience of their choice. Groups can be formed by students themselves or by tutor allocation. The task set has both group and individual elements. The group element accounts for 30% of the marks set and requires that the group discuss the article via computer conference in the sub-group, in order to allocate a different theme for each student to work on. Students submit electronically two pieces of writing drafted by the group as a whole for their assignment - a 350-word summary explaining their choice of theme and audience for the report, and a 300-word conclusion. Each member of the group also has to write an individual critique (1200 words) of the article, based on the theme or issue negotiated with the group. Seventy per cent of the marks are allocated for this individual element.

The success of the strategy depends on the design of the tasks for each assignment and on the skills students develop, with the support of their tutor, for achieving goals as a team. A qualitative study of students' reactions to these two assignments was undertaken and is discussed below.
STUDENTS' EXPERIENCE

A qualitative study of a sample of students studying the course during 1995 was undertaken. Three out of the 13 OU regions were selected, providing a contrast in urban/rural density, and covering nine tutors in all. The three regions were London, North Region (based around Newcastle) and Northern Ireland. Half the students in each of the three regions were selected randomly and interviewed on two occasions. The sample of 30 students was interviewed after assignment 03, with dropout by two students reducing the sample to 28 for interviews completed after assignment 06. On the first occasion, students had received their marked 03 assignments with feedback from their tutor by the time of the interview. On the second occasion, the timing meant that a few had yet to receive their marked assignments.

The interviews were semi-structured and carried out by telephone using an interview schedule covering topics such as the frequency of contribution to the conferences, attitudes to electronic versus other forms of contact between students and tutor, perceptions of the impact of the assessment process on CMC use and vice versa. Students' responses were probed for reasons and reactions underlying their use of and attitudes towards electronic communication and the extent to which they felt that the objectives of the course had been achieved. All interviews were recorded and analysed in relation to the main themes explored.

Selected findings from these interviews are introduced in relation to the issues already identified of pacing, feedback and learning quality. In addition, issues of individual control of learning and skills development are also discussed. The article concludes with a discussion of the implications for distance education course design suggested by this exploratory study.

PACING AND CONTROL

One of the claimed benefits of open and distance education is the flexibility it offers for study whenever and wherever the student prefers. Both assignments which were evaluated required contributions to group conferences and to group activities which were time and place dependent, since virtually no students had access to a portable machine. Individuals were thus constrained more than usually to make contributions during a set period when the conference was active, and their individual performance to some extent depended on the performance of others in their conference.

This certainly created a stronger pacing element than that engendered simply by having a cut-off date for return of completed assignments. Students had to work on their assignment during the specified period and were less able than normally, to either work in advance of the pace, or to make up for lost time if they got behind or if their group did not work together well. Their control over the timing and outcome of their studies was in that sense reduced.

The issue of timing was also affected to some extent by the fact that assignment 06 had a cut-off date of August/September, but clearly students may plan holidays at any time during the year and those who needed or wanted to get ahead of schedule suffered from the group nature of these assignments. The following comments are extracted from student interviews and illustrate the points made:

'I was going on holiday so I had to start it (TMA 03) off before I went. I was still waiting before I left for other people to get going.'

'At first it was slow going with no-one contributing until the last minute. It was a bit off-putting. I was expecting everybody to contribute right at the very beginning. I found nobody had contributed anything when I logged on each day.'

Delays such as these meant that on TMA 03 where the individual needs to submit a summary of the whole conference, students have to decide when to assume that the conference is over and to draft their summary. One student made this suggestion:

'IT was OK, but it would have been better if there was a definitive cut-off date for contributions for those people who are organised and like to get things out of the way rather than work up to midnight the day before. You couldn't comment on what people had written because by that time you had already written your summary.'
Problems of this kind had not been entirely resolved by TMA 06, and about half (16) of those interviewed felt somewhat hampered by group members 'disappearing', whether because of holidays or work commitments:

'No-one wants to contribute. There are 13 messages on the conference and eight are mine. Only two of us have contributed anything yet.'

'One guy seems to be in charge. Six weeks later no-one has really responded. I think in the next week it will be frantic.' (10 days to cut-off date)

Occasionally however, the asynchronicity of conferencing was recognised as an aid to flexibility, as in this comment:

'One person has been on holiday but he is able to catch up more readily due to reading the threads of the conferences.'

The interest in using new technology was balanced by concerns over the extra time it took, sometimes exacerbated by the limitations on place created by computer-based study.

'The course is a time stealer. I was doing something on Netscape and had to spend three hours sorting a virus out. Other courses you tend to set off on a route march down the units and pop out the other end.'

'CMC slowed things down. I find allowing for two hours work in the evening can be swallowed. I am in six or seven conferences and feel obliged to read all the messages in case you are missing something. It uses up an awful lot of time for really little return in TMA terms. You may be gaining in overall skills but it is not definable and you are only marked on TMA s.'

'The time constraint is much heavier than when I started out. Other courses I could take a book and go and read it somewhere. With this course I tend to have to be back in front of my computer in my own home. If that is not convenient I find it a real time constraint.'

The evidence therefore suggests that, until all students have access to portable machines, third generation distance education reduces the time and place independence of second generation distance education. Students experience a more intensive pacing of their studies, and have reduced control over the timetabling of their work for assessment. Burge (1994) has also reported CMC effects on students' interpersonal needs for control in relation to decision making. However Burge uses 'control' in the sense of decision making about using personal power, influence and authority within the discursive context of CMC. The control issue relates to the cognitive demands created by the pace and load of messages which students must process and respond to. Those students who find effective strategies for handling this 'maintain a commitment to inclusion with peers and with the focus of discussion' (Burge 1994, p. 35). Those who do not, demonstrate a range of less positive orientations, including reading only of conferences, or even abandonment of involvement. There is also evidence in this study of the pressures on students created by CMC and the differences between students in terms of finding effective strategies for handling the changes in communicative demands made upon them.

**TUTOR FEEDBACK AND DIALOGUE**

Student conferences were not formally moderated and the tutor role specified by the course team stated that the tutor 'is not expected to play a major role in the discussion on this TMA beyond guiding that discussion'. Clearly some tutors chose to be much more interventionist than others, and the very positive comments from all students in one region reflected the fact that their tutor had done more than others to ensure that conferences got started and achieved their goals. As with other aspects of course presentation, a good tutor can make a very considerable difference to the experience of students. Many authors have commented on the importance of the moderator role in conferencing and the need for tutors to learn new skills and approaches if they are to take on this role effectively (Fabro & Garrison 1998; Mason & Kaye 1989). The positive comments about tutor role in this study typically noted that an appropriate contribution was made regularly and to good effect:

'The tutor came in (the conference) when he should i.e. when the conversation was wandering off topic.'

'Yes he's good. If you put a question into the conference he normally gets straight back.'
By contrast, students whose tutor had a 'hands off' approach were much less happy:

'His contributions have been sadly lacking to our conferences throughout the year. Not as much as I've seen in other conferences.'

'I think there could have been a bit more advice. Not only is this a new method of teaching it is also a completely new method of learning. A lot of people really do not know what to do.'

'All fairly ill at ease. We want to think we are doing it right but we would have liked more guidance. The tutor said that he would come in if we were going off track, so we must be doing OK, but some reassurance would be appreciated.'

Students do not see guiding as merely informing them when a discussion goes off track but confirming when things are going well and making positive contributions. This is especially true for the inexperienced student. The good tutor is always available and dropping into conferences regularly.

The tutor's role in providing effective feedback via the assignment process had not been affected by the conferencing aspect of assignment 03. Here students seemed to have the usual range of positive or negative reaction, depending on how full the comments were -an issue which is always relevant and not specific to the involvement of new technology.

There were some teething problems in using the software for the electronic submission process required in assignment 06. More than one attempt had been required to ensure that the tutor received all parts of some student's work, and the process of returning the marked assignment to the students had also been subject to delays. Almost half the students interviewed had not received their marked assignment at three weeks after the cut-off date. However the system has since improved and turnaround times of seven days or less are possible.

Students otherwise seemed not to experience any positive or negative aspects about their tutor's feedback which could be specifically linked to the use of electronic submission. The numbering system for marking script-related points had worked to their satisfaction. There had been difficulties for about half the students around the group aspects of the work (covered below) but those students who felt they had born the brunt of the work because of inactivity by others, were pleased that tutors acknowledged their effort in the marking of their script.

SKILLS AND COLLABORATIVE WORKING

A number of issues cluster under this heading -the setting up of groups, group dynamics and working arrangements between participants, perceived benefits and disadvantages of working together.

Setting up groups

For TMA 06, groups were set up at different times, with between three and six members each. About half (15) joined groups set up by students and the rest were allocated to a group by their tutor. Some of the student organised-groups resulted from students who had already been in contact, whether through tutorials, self-help conferences, previous courses or other reasons:

'I formed a group with two others who I had known on T102. (Technology Foundation course).'

'Some of us had already set up our own self help group. There was seven of us originally and six of us got together'.

Some students were invited into or joined groups where they did not already know the people concerned. Where a tutor set up the group, this was sometimes a result of absence of initiative from the students themselves, as these two comments suggest:

'The group was very slow to set-up. We didn't get our group set up until the end of August. The tutor set it up. We've had so few tutorials that I don't know if anyone knew anybody. The tutor could have put us together earlier.'
There are eleven in our tutor group. Six who know each other banded together. I was off-shore at the time and it was left to the tutor to suggest that the other five got together. It leaves the other half feeling slightly rejected.

Group work for assignment 06

There appeared to be no standard approach to completing the group task, each group going about things in its own way. Task organisation was sometimes orchestrated by a student acting as an informal moderator, sometimes by group interaction. In some groups, students worked as individuals with little consultation or collaboration. Some groups organised timetables. Some communicated only via the conference, whereas others met face to face and/or telephoned each other as well as using CMC.

The moderator has been good. He has been enthusiastic and retained our interest. He prioritised what needed to be done and decisions have come about by an evolutionary process.

We have taken the organisation in turn. We had a group face to face meeting. Then I posted the minutes on the conference. Someone else has come up with a draft summary that we’ve all commented on and the same for the conclusion. No one person has taken the lead. In general everyone’s worked hard. There has been no problems with holidays.

Where the group process did not work as well as this, individuals were forced to pick their theme (for TMA 06) and to get on with it, leaving late comers to choose from the topics remaining, whether they would have chosen these or not.

Time was passing by and there was very little contribution from other members of the group so I just picked the theme that I wanted to do and got on with it. Other members of the group followed. There hasn’t been any real group work yet.

Groups who had face to face meetings appeared to have a better idea of the direction they were going in and had made more progress than those who were just communicating on the conference:

We weren’t getting far on the conference but when we met at the pub we sorted out course themes and how we would do the introduction and conclusion.

We had a couple of face to face meetings where we sorted out topics. The moderator wrote the summary and we commented on it.

We’ve had an email discussion and one face to face meeting - it helped. Having said that, if we had to start from scratch at that meeting, we wouldn’t have got anywhere. The communication on the conference previously gave us a baseline to work from.

There are only three in our group and we work quite close together, so we had a meeting in a pub which we reported in the conference. One of the group has had a lot of technical difficulties. If you start to rely on conferencing as a medium of communication and you can no longer use it, it is very difficult to do group work.

Perceived benefits and disadvantages

Nearly all students felt they had gained something from the group conference discussion compared with individual assignments. Only two students said they had gained nothing at all from the group conference. Many students had never experienced working with other students before this course. They enjoyed the exchange of information and different points of view. One student said that though he was not a ‘group person’ he had enjoyed the input from other people. Some students learned directly from the experience of others, and students unsure of their own progress or ability were encouraged from the communication of other students with similar problems:

I gained a kind of confidence from the feedback from other students on my contributions. Also there is good information to be had out there. The problem is combing through the rubbish to find it out.

You appreciate other peoples’ viewpoints. It makes you think about different arguments and the issues that you’ve missed.
Almost half of those students interviewed during completion of assignment 06 were enthusiastic about group work as a way of learning from others, building confidence, working towards a common goal and experiencing something new. Students were also asked after completion whether the assignment had achieved the aims set out for that assignment and their responses are shown below, against each of the aims. The main reason for negative reactions, where this is clear, is given in brackets.

<table>
<thead>
<tr>
<th>Aim</th>
<th>Yes</th>
<th>No</th>
<th>Reason</th>
</tr>
</thead>
<tbody>
<tr>
<td>To integrate social and technological issues</td>
<td>18</td>
<td>5</td>
<td>too much social science</td>
</tr>
<tr>
<td>Develop your critical skills</td>
<td>15</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td>Evidence to support your argument</td>
<td>20</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Peer group learning</td>
<td>14</td>
<td>9</td>
<td>groups too small/ lack of input</td>
</tr>
<tr>
<td>Demonstrate your skills in electronic communication</td>
<td>20</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Practise negotiation, delegation and cooperation</td>
<td>16</td>
<td>7</td>
<td>lack of group input</td>
</tr>
</tbody>
</table>

These findings are very positive, particularly in relation to development of skills in argumentation, electronic communication, and the group collaboration aspects of the assignment. Well over half felt that peer group learning and negotiation/delegation/cooperation had been achieved. The main disadvantages perceived by students generally arose from conferences where students were inactive or had poorly developed skills. Nearly two thirds of those interviewed during TMA 03 for example were disappointed with the type or quality of interaction - 'no thread', 'disjointed', 'no debate', 'no interaction' and 'did not flow' are typical comments.

'It is quite difficult because you are relying on other peoples' involvement. Everyone seemed so involved in using quotes from the CD-ROM that they lost sight of the holding of a conversation or debate.'

'It took a bit of getting used to. People were posting messages and there wasn't much follow-up. What I found most difficult was keeping a conversation going. I got high marks due to ending comments with questions.'

'It was a bit slow. I had to wait on other people to respond. I am a single mother at home so I have time to log on all day. Maybe I expected too much from others?'

During later stages in course study, more positive perceptions developed as students worked on assignment 06 and collaborated rather more effectively via CMC. Some of the early reactions reflected the steep learning curve involved in using CMC for the first time. It would be unrealistic to draw firm conclusions based on the use of CMC for very short periods of a few weeks. While interviewing for Assignment 03, it became clear that some students would have preferred an assignment requiring practice in conferencing to come at an earlier stage in course study. The assignment had forced them to learn how to use the conferencing system and to make contributions rather than only reading. As a result many students began to appreciate the benefits of conferencing and discussion with other students. Subsequent presentations of the course have moved the date for this assignment earlier in the course, to take account of this point.
The importance of continuous assessment in distance education has been identified in relation to three major issues: feedback, pacing and the quality of learning generated by the assignment process. These issues derive from 'second generation' distance education, in which individual students study and are assessed largely on the basis of independent learning (Holmberg 1986). CMC offers a radical departure from this model, because asynchronous interaction opens up the possibility of peer group collaboration, information skills development and more tutor and student contact. Courses delivered using computer networking and CMC can be evaluated both in relation to the three issues which characterise assessment in second generation distance teaching and also in relation to the new possibilities offered, notably collaborative working, skills development and enhanced peer and tutor interaction.

First, in relation to pacing, assessment tasks which require that students communicate electronically thereby constrain students to schedule their studies around specified time periods. There is potential for more intensive pacing in other words. However this more intensive pacing reveals the importance for distance students of being able to control when and where they study. For many students, it is likely to bring a reduction in control, where students wish to study at times and in places where access to a computer is not possible. Networked learning in fact has the potential to move distance education away from complete spatio-temporal freedom. Since students must complete assessment in order to gain a credit, students can in effect be constrained to interact with fellow students during a defined period and they must ensure access to a networked computer. If as some (Marsden 1996) assert, distance education, given its intrinsic nature, has exhibited 'a striking lack of interest in the nature of space and time', it is most certainly having to take such an interest now, given the potential for interactivity and collaborative working offered by CMC.

In relation to tutor feedback, the examples discussed offered a modest potential for improved feedback in that tutors can use electronic communication to pass messages on to a whole group more easily than postal communication allows. But the essential value of tutor commenting was not directly affected from the students' point of view, by electronic submission and marking on-screen, in the course discussed.

Although students did not comment on this, there has been an all round benefit in resolving the problem of legibility of tutor comments, which has hitherto been the single largest criticism from students about the quality of tuition (Roberts 1996). The tutor's message will not now suffer from all the vagaries of interpretation that follow from hand written script and carbon copied forms that characterise 'second generation' distance education.

There have also been developments in the format and software used to enable on-screen marking to achieve improvements in feedback in future. From the tutor's perspective, it is possible to copy messages that several students could benefit from, to each one on their assignment. Insertion of comments into the relevant place on the student's script is now also possible and the usability of the script for such purposes as examination revision, is likely to be improved.

In relation to interactivity and dialogue, the course discussed has demonstrated a positive advance, but one in its early stages and showing the limitations that will doubtless be overcome by experience and gradual improvement in future. Computer conferencing has been dogged by the relatively small proportion of students who take full advantage of its potential for interaction and dialogue (Mason 1994). The reasons for this appear to relate both to course design and to features of students , experience in using asynchronous technologies in distance education (Burge 1994; Gunawardena 1998; Fabro & Garrison 1998). In the context of distance education where many students are studying part-time, there are often too many competing demands on their time and in some cases students actively do not want more interaction with a tutor (Roberts 1996) or indeed with other students.

These attitudes are important because they are what experienced students bring with them into courses which do use third generation technology. They are not immutable however, and the evidence suggests that course designers can create a taste for more interaction -between peer groups of students as well as with tutors -which then becomes a requirement for future learning. Students who have had no experience of what new technology can offer however, clearly need time to develop skills of dialogue and negotiation which require more than a week or two to develop. Some of the early negative reactions to group working for example, will clearly be resolved as these ways of studying become more familiar and skills more established.
Although the extent of genuine group working on the assignment varied across the groups, new technology clearly did offer practical opportunities for the development of new skills. The participation in the process itself required a certain level of expertise in information technology, and some limited forms of group decision making and drafting were achieved. A large majority of those interviewed also felt that their ability to provide evidence to support their arguments had also been improved. New technology has thus opened up the possibility for distance education to do more to develop the skills of team working and effective communication which are desirable outcomes from higher education.

CONCLUSION

Assessment offers course designers an excellent arena in which to introduce new technology, because students pay high quality attention to assessed elements in course work. Whether mandatory or not, continuous assessment can be used to encourage participation in CMC and other computer-based activities which might otherwise be avoided. Effective opportunities can be created which enhance feedback on learning and develop skills of group work and using information technology which have not before been possible.

However, the preceding discussion is not intended to be an exhaustive account of the potential that new technology represents for assessment in distance education. There are some completely new possibilities, such as on-line assessment, which have not been touched on at all. On-line assessment, like collaborative working, is one example of the quite different kinds of activity that new technology can now offer as a possibility for student assessment. CMC can also offer improvements in existing forms of assessment through increased operational effectiveness in terms of faster turn-round of assignments, improved presentation of feedback and more efficient ways of communicating across a group of students.

The qualitative evidence from the case study discussed demonstrates that benefits such as these, as with all technology applications, are not automatically triggered by the technology. They depend on the effectiveness of the course design within which they are used, and on the social context. But in principle they offer improvements on existing features, notably dialogue, and opportunities for learning and demonstrating skills of collaboration and communication not possible in second generation distance education.

Effective group working however brings back into distance education the possibility that its famed independence from constraints of space and time is reduced, if only temporarily. Once all learners carry portable machines, new possibilities will again be opened up, with new benefits and costs. Meanwhile course designers cannot afford to ignore the preferred time and space structures with which their distance education students are familiar.

Both distance and dual mode universities currently face awkward decisions about where to invest in technology and force the pace for learners, and where to continue to offer a familiar experience which has proved robust and cost effective with large numbers of students. For these reasons the most effective solution for many will be to experiment in some areas and maintain established ways of working in others. We should ensure that assessment does not lag behind and that we explore the potential of innovative third generation technologies in this crucial area of students' experience.

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