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Reflecting on Learning: Using Electronic Mail as a Teaching/Learning Tool

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Abstract
This paper reports on the impact on 1st year preservice teachers of the introduction of part delivery of a compulsory education unit via electronic mail. At the start of an academic year all of the 220 people enrolled in the course were connected to the University's electronic mail system. Two questionnaires were developed to collect information and these were administered randomly at the beginning and end of the teaching semester. Other data were collected from follow up interviews.

The greatest benefit identified by the respondents for being connected to electronic mail was direct access to their tutor. The greatest problem identified by the students was getting on the system through the formal university procedures. The data also show that younger students develop greater confidence in using the system than mature students and that male and female students use electronic mail to serve different purposes. Students who had relatively little or no experience on computers before the unit tended to avoid using electronic mail and computers as resourcefully as their more experienced peers. Interviews elicited how the introduction of e-mail impacted on student learning

Introduction

Six key areas of change have occurred recently in the Tertiary Education sector and affect directly the learning experiences of students. The six areas of change are:

1. an upsurge in numbers attending institutions (University and TAFE);
2. changing patterns of study, often by choice, to part time or distance models, ;
3. a requirement for students to access facilities, information and staff at ‘non-regular hours’;
4. changing beliefs about the nature of teaching and learning;
5. support by Federal Government to the principles of open learning as a means of increasing equity and access to learning (Baldwin 1991; Johnson 1990; Johnson et al. 1992); and

6. an acceptance and 'enthusiasm' for computer-based technology as a medium for meeting the needs of learners (Ryan 1994).

The Education Faculty at the University of Tasmania, as with other faculties, has had to contend with all the above changes. In 1994, it was anticipated that some 240 First Year students would be enrolled in the Bachelor of Education and Bachelor of Human Movement Studies programs in 1995. This represented an increase of 30% in student numbers when compared to 1994 enrolments. All 240 students were anticipated enrolments in Education 1, a compulsory core-education unit. As a direct response to the pressures anticipated with increased enrolments and the changing nature in general of student enrolment patterns (see above) the Education 1 staff made a decision to pilot

the introduction of electronic-mail (e-mail) as a student learning and communication tool.

Electronic mail (e-mail) is the name of the process through which messages can be sent electronically from computer to computer over phone lines or electronic communications networks (Naiman, Dunn, McCallister and Kadyk, 1992). It provides, as Angelo and Cross (1993:327) suggest, "a simple, immediate channel through which faculty can pose questions ... and students can respond".

With increased access for staff and students in higher education to computer-based technology, new opportunities have arisen for students to submit work, that they otherwise would have had to submit traditionally, through electronic mail (Angelo and Cross, 1993). A number of innovative programs have been implemented in the education sector, including international cross-campus communication and learning projects such as the Australaskan Project and Computer Pals (Beazley 1987; Beazley 1989), and in distance education (Phillips 1990; Ross, Smith and Morrison 1989). Whilst academic and administrative staff in higher education have embraced e-mail as an essential communication tool, its use in the delivery of regular course content and processes has been relatively much slower.

However, given the nature of change in general in contemporary mass tertiary education (see above) and the anticipated increase in student numbers in Education 1, the staff made a decision to pilot the introduction of e-mail as a means to assist in course delivery and communication. The reasons for this decision were:

- Staff involved in the teaching of Education 1 were all familiar with the benefits of e-mail as a means of facilitating communication;
- computer laboratories for Education students were available;
- facilities for students to be registered as e-mail users were available;
- numbers of students enrolled in the program had increased with the

delivery of the Bachelor of Education being only located at Launceston;
- students entering the program needed to become adept at using computer technology for their own learning and for their future teaching positions;
- the unit Education 1 was based on a philosophy of learning that Experience + Reflection = Growth (Posner 1993:20);
- the imperative to engender a self-directed model of learning; and
- the need to begin to introduce the precepts of open learning to students enrolled in a full time, face-to-face 'class-oriented' mode of delivery.

Methodology

This study sought to answer the following research questions:

- In what ways do students enrolled in Education 1 access and use e-mail?

- What problems and benefits do students enrolled in Education 1 encounter when using e-mail?

- What sources of assistance are used by students enrolled in Education 1 to access and learn to use e-mail?

- What background factors, if any, of students enrolled in Education 1 affect e-mail use and access?

- In what ways can e-mail be attributed by students to their learning?

- What implications for teaching and course delivery can be identified from the data?

Data collection methods were designed to allow researchers to identify, in a formative and longitudinal manner, student perceptions of e-mail use, gauge the reasons why students contact staff using e-mail, and evaluate the impact of e-mail on student learning. Three surveys and follow-up interviews were conducted throughout the academic year to collect data.

The sample for this study were the 240 First Year Bachelor of Education and Bachelor of Human Movement Studies enrolled in Education 1. Two different paper-based questionnaires were administered to students, one at the beginning of the teaching semester and the second at the end of semester one. E- mail messages from students to academic staff over semester 1 were also archived to identify and analyse student:staff e-mail communication patterns. The first survey was distributed to the total group (N=240). Respondents were asked to complete the survey and return it to their tutors. The number of respondent was 82, representing a response rate of 34%. At the end of semester 1, 41

respondents were randomly selected during a lecture to participate in the survey. The number of responses to the survey was 41, representing a return rate of 100%. Ten students were randomly selected to participate voluntarily in a final survey and follow up interview and the end of semester 2. In the first two surveys, student background data (gender, age and previous computer experience) was sought.

Results

Background data on students was sought to identify possible groups of students who may be placed in an 'at risk' situation because of their lack of prior computer experience. Of the 82 respondents in the first survey 59% (n=48) were female and 35% male (n= 29). In the second random survey of 41 students 61% (n=25) were female and 37% (n=15) male. Of the 10 students in the final survey and interview, 8 were female and 2 male. Similar profiles were identified in terms of the age of respondents. At the time of the first survey, 78% (n=64) were under 21 and 22% (n+18) were aged 21 or over. This ratio was exactly the same in the second survey, when respondents were asked to indicate their age when commencing the course. In the final survey and interview, 3 of the 10 students were, at the time of commencing their course, over 21 and the remaining seven, under 21.

Of the 82 respondents to the first survey, 47% (n=38) believed that their previous computer experiences prepared them to use e-mail in the course, whereas 51% (n=43) did not believe they were prepared to use e-mail. There was no discernible difference when the sex of respondents was used to compare the perceived adequacy of previous computer experience. Respondents indicated that 43% of male (n=12) student and 49% of female (n=23) students considered they were prepared by their previous computer experiences to use e-mail. In comparison of the age of students, of those aged 20 and under 56% (n=35) considered they were prepared, whereas 17% of those aged 21 and over considered they were adequately prepared. All of the three respondents in this group were male. No female student aged 21 or over, indicated that they considered themselves to be sufficiently prepared to confidently use e-mail.

Sources of Assistance

Respondents were asked to indicate from a supplied list the sources of assistance, and nominate additional sources, used to access the e-mail system. At the beginning of the semester, 65% of assistance provided to students to get on to the e-mail system, was provided by Education 1 staff, 17% by ITS. (Information Technology Services at the University) and 18% through other means. Generally, this was through friends or other students and staff in computer laboratories. There were changes to assistance patterns over the semester. By the end of the semester, 73% of assistance was provided by Education 1 staff, with students more likely to go to their tutor for assistance than at the beginning of the semester. Support from ITS remained constant, whilst other support

forms decreased to 13%.

Confidence Levels

Initial perceptions of confidence levels were self-reported by respondents on a six point scale, ranging from 1 - not confident, to 3 - confident, and 6 - very confident. The purpose of this scale was to ascertain if differences, based on the background variables of the study, existed. In the second survey, respondents were asked to self-report perceptions of confidence on two six point scales. The first was their recollections of initial level of confidence and the second, current levels of confidence. Data was again compared based on the background variables of the study.

In the initial survey, 27% of the respondents (n=21) reported relatively low levels of confidence in sending and receiving e-mail. Seventeen percent of male (n=5) and 34% of female respondents (n=16) rated 1 or 2 on the level of confidence scale. These results can be compared to the levels of confidence of male and female students, where 83% of males and 66% of females considered they were confident to use e-mail to send and receive messages. There were little differences between groups, when the ratings of students age 20 and under were compared to the ratings of students aged 21 and over.

When levels of confidence were compared at the end of the semester, some changes to the above patterns occurred. At the end of the semester, there was negligible difference between levels of confidence of male and female students, but there were based on the age of students. Students aged 20 and under increased in levels of reported confidence (from 70% to 87%) whereas the confidence levels of those students aged 21 and over fell (from 72% to 67%).

Contact Patterns

Respondents were asked to indicate those groups of people (from a supplied list) they had contacted using e-mail, and add the details of other contacts made that were not included on the list. In survey 1, the most common contacts were the respondents' tutor in Education 1, peers in their tutorial group and peers in other tutorial groups (see Figure-1a). Even though male students were outnumbered in the survey, they tended at the beginning of the semester to use e-mail more than their female peers. However, over the semester, the use by female students of e-mail increased in relation to the use by male students (see Figure-1b). These patterns reflected a growth in confidence as respondents began to electronically "reach out" and establish "electronic grapevines".

Figure 1a: Contact Patterns According to Sex (Questionnaire 1)

Figure 1b: Contact Patterns According to Sex (Questionnaire 2)

Use Patterns

Apart from indicating those people contacted via e-mail, students were asked to indicate the reasons that e-mail was used when making these contacts. Figure 2a indicates usage patterns and shows that students used e-mail for a variety of purposes. Whilst males indicated that they use e-mail more often than female students on a pro-rata basis, female students used the facility more than males to chat to others and make course and administrative queries.

Figure 2a: Use Patterns According to Sex (Questionnaire 1)

Two academic staff in the Education 1 team archived in electronic mailboxes all e-mail messages sent to them during the semester. A total of 134 messages were received by the two staff from students. Messages were categorised and are displayed in Figure 2c. Students contacted staff primarily to complete reflective tasks, to indicate that they had started using e-mail, to generally chat, seek practicum information and to seek answers for course queries.

Figure 2b: Use Patterns According to Sex (Questionnaire 2)

Figure 2c: Academic Staff Archives for Semester 1

Benefits and Problems.
Students were asked in each survey to rank in order of importance a number of items as to their potential benefit to students and potential problem. In both surveys, students indicated that the greatest benefit was access to their tutor and the capacity to contact other students. The most significant problem in the first survey was getting on to the system, followed by attaching documents, sending messages and receiving messages. These four areas were the most important problem areas in the second survey. Access to computers and printers at the University was also identified as a problem.

Discussion
A number of areas of this study merit further discussion and consideration of the implications of the findings, particularly in reference to higher education institutions . Discussion of the results has been focussed on (a) prior computer experience of students, (b) assistance patterns used by students to access electronic mail, (c) confidence levels of students in using e-mail, (d) e-mail use and contact patterns, (e) perceived benefits and problems associated by students with e-mail involvement, and (f) perceptions of students on

learning through the use of e-mail.

Prior Computer Experience

As a result of data analysis, it would appear that the Education 1 team incorrectly assumed that younger students (those under 21) would have used computers more than their peers aged 21 and over, prior to entering University. In fact, there were many students from both groups who did not consider themselves to be experienced computer users, even in the area of word processing, and that within each group there was, in terms of prior computer experiences, a range of student capabilities. As such, there were students in each group who had not used a computer at all to assist with prior studies, let alone used e-mail (as was the case with the majority of students). In light of the overall numbers of students with limited prior computer experience, the data demonstrated that the group with the least prior experience was female students aged twenty one and over.

Sources of Assistance

At the time of the first questionnaire, 97% of respondents were connected to e-mail, and by the second questionnaire the connection rate was 100%. There were three important changes as to whom students sought assistance from in the two surveys. These changes were associated with increased assistance by academic staff and the difference in assistance used by students dependent on their age and sex.

The results of the first questionnaire showed that of the 80 respondents were connected to e-mail, 11 had used more than one source of assistance and, by end of semester 1, 52% of the 41 respondents had used more than one source of assistance to become connected. Primarily, Education 1 staff involved in the teaching the unit were used as source of assistance or people the students found who could provide assistance. This last group consisted of peers in the course who had managed to get on, or other people in computer laboratories, who were approached to provide assistance.

Over the semester, students became more likely to use more than one source of assistance to learn to use all aspects of e-mail. Students tended to seek assistance increasingly from their peers or the Education 1 team. There was a relative decrease in approaches for assistance from Information Technology Services (ITS). This latter shift is of concern in two ways. Firstly, ITS had the charter as a service provider in this area, that is, to provide training courses to assist students get onto e-mail. Secondly, additional assistance became more likely sought from academic staff. This presented an increased time demand on academic staff, counter to one of the reasons for the introduction of e-mail, that being, to reduce the student-lecturer face-to-face contact time. However, these patterns of assistance may

reflect in the eyes of students the sources of assistance that were most likely to provide the support they needed.

Mature age students tended to use formal channels of assistance more than younger students; these being ITS and Education 1 staff. Younger students used ITS initially at the same levels as the older students, but then became more likely to seek assistance from their peers. Female students initially were more likely to make informal approaches for assistance, that is from peers and other people, whereas males were initially more likely to approach ITS and Education 1 staff. At the end of semester 1, female and male students were more likely to approach peers and Education 1 staff than ITS staff. What became apparent, is, especially with younger female students, that e-mail access was tied to an ability to establish and use a peer 'grapevine'. This pattern of establishing co-operative support was preferable to seeking support individually. This support network needed to occur before interactions with 'adults' were sought, particularly from academic staff.

Confidence Levels

Students were asked to rate, on a six point scale, their level of confidence in using e-mail in both surveys. There was little difference in the confidence ratings of younger and older students at the time of the first survey, but by the end of semester younger students reported higher levels of confidence (approaching statistically significant) than those of the mature age students.

Males reported higher levels of confidence than female students at the beginning of the semester. This difference was almost statistically significant, but by the end of semester female levels of confidence had risen to the level of male students. However, female mature age students did not exhibit the same increased levels of confidence. This, when tied to reported low levels of experience with computers

identifies this group as the group lowest in confidence and in computer use, thus being the group most 'at risk' in accessing and using e-mail as a learning tool.

Use and Contact Patterns

Differences between groups were identified in the study with the way in which groups used e-mail to make contact with others. The activity that most students engaged in, especially female students, was 'general chat'. Males, with their higher levels of prior computer experience, reported a tendency to seek sources of information and use computers as an 'exploratory tool', for example, contacting administration and accessing the Internet, more than female students. Whereas, the first priority of female students appeared to be with the establishment of a 'network' or 'electronic grapevine'. In this sense, female students seem to have transferred traditional communication patterns into an electronic mode. However, as e-mail use and confidence levels

increased, female students began to ‘explore’ as frequently as the males. However, the mature age females again demonstrated a reduced circle of contacts, reflecting their lack of computer skills and low levels of confidence.

Benefits and Problems

Students identified that the greatest benefit to using e-mail was the ease of student access to academic staff for responses regarding course information and administration queries. The second major benefit identified by students was with the establishment of an electronic grapevine to share academic information and requirements easily and quickly. This grapevine became extensively used to enhance the social life of student groups and provide a support network which could be accessed anytime. Initially, e-mail was used 'formally', much like an ‘electronic typewriter’, but over the semester it became more like a telephone; that is the communication became casual in tone. Typing errors in messages became tolerable as the speed of communication became more valued than its appearance.

Initially students reported that the major problems they faced were associated with accessing and using the e-mail system. However, over the semester and as use and confidence levels increased other problems were identified. These problems included access to computers, the system being overloaded, discs crashing through ‘maltreatment’ in pencil cases and ‘forgetting’ e-mail passwords. Notwithstanding, a number of students expressed a continued need for face-to-face contact with academic staff and disillusionment with the impersonal nature of e-mail communication, especially if it was used to replace contact with staff.

Interviews

The interview process with students elicited similar results to earlier survey data and allowed the researchers to clarify and probe in detail the perceived effects of e-mail on student learning and reflection. The students reported that they considered e-mail to be another form of communication. In their own words, 'it was like a telephone'. Some students reported, when first using the computer, that they found themselves talking aloud to the computer as if it were a person.

In the initial phases of learning how to access and use e-mail, students reported learning to be of a technical nature. Access to the system was usually gained informally through students who were more computer experienced or from Education 1 staff or other support staff that students found out about. Learning at this stage was limited to finding out where computer labs were, who could help them learn the system, how to send messages and how to configure the system. This

stage needed to be successfully passed through by students before they could sense some sort of educational benefit. Once on the system,

students reported amazement at how quickly e-mail worked and at the ease at which they could use it.

There is no excuse for not using it.

However, not all learning at this stage was of a positive nature to students. All ten students expressed in interview dissatisfaction at the support and level of service supplied by Information Technology Services (ITS). Passwords provided to access the system did not always work or would work in some labs and not others and training was inappropriate, as the instructions and language used by ITS staff was too complex for students to understand. This often left students feeling frustrated and inadequate.

Maybe they don't know what the word serve-us means.

I'm not sure whether they (ITS) are there to help us (e.g buy disks) or whether I was interfering of being a nuisance.

Are ITS a help provider?

Asked to consider how e-mail impacted on their learning, students reported that it made impact in a number of ways. Firstly, having access to lecture notes before a lecture allowed time to listen during lectures, rather than hurriedly writing notes.

We could relax and really listen and take more in ...

Secondly, students reported using e-mail to reflect and communicate with a range of peers as well as their tutor. Some contacted peers at other campuses to "compare notes" about courses. The ability to use the "Nickname" facility on the e-mail program made this type of communication easier. Learning was attributed to getting feedback from each other and tutors and from having the opportunities to think and respond about teaching.

Ideas from my friends came through and helped me with my concept of teaching

It was because we had to, we thought and wrote down and shared with our friends and we got feedback

The questions made you really think about being taught at school, and good and bad teaching

The importance of immediacy of feedback from tutors and peers arose during interviews. Students termed such slow responses as Snail Mail . If responses were not provided relatively quickly they lost, in the eyes of students, impact and relevance. However, clear advantages were seen by students in reflecting via e-mail rather than in reflecting

face to face in that they could be more honest, have more to say, and not worry about having to look at the reactions of others to a reflection. Reflecting via E-mail saves students time and provides them with access to people that they otherwise would not have.

Its like writing a letter as more time is available but there is no messy paper and pens.

It gives you the opportunity to think and plan what you are going to say.

Not all students were found e-mail such a positive experience. Communication to these students was a direct process with people rather than through machines. As a result, they expressed concern that machines were replacing people.

Implications and Conclusions

Australians enjoy the second highest rate of personal computer ownership. The number of households in Australia with personal computers ranges from 35% in the ACT to 18.8% in Tasmania. On average 25% of Australian homes have a personal computer (Australian Bureau of Statistics 1995, cited in the Advertiser, 11 January, 1995: 10). This rate of personal ownership is second only to the USA.

However given this information and the results of this study, levels of computer ownership do not necessarily translate into computer competency. It is evident that many tertiary students surveyed do not have the necessary skills to use e-mail and other computer-based modes of course delivery. Staff should not assume that students under 21 have been adequately prepared upon entry to University to be proficient in the use of computers for the electronic delivery of course material. In addition, some groups of students are more clearly disadvantaged than others in equitably accessing and using electronic modes for course delivery. These students are predominantly mature age and female and are clearly an 'at risk' group.

The level of support and training provided by ITS to students in gaining access to e-mail services was perceived by students to be inadequate. Few students, and this was more an issue for female students than male students, found the service helpful. In fact, many learned to avoid it and sought out assistance from others to get onto the e-mail system. Relative few students took advantage of the service and preferred to use Education 1 staff, other Education support staff, or their computer-skilled peers. Interview data indicated that students perceived themselves, in their dealings with ITS staff, to be communicated to in language they did not understand. If students attended ITS training sessions, they reported frustration at finding

steps omitted in computing processes often leaving them feeling intimidated and inadequate. It was better to learn from someone who appeared to have the time individually to help others learn. Students who were novices in this area expressed a clear need to feel supported and their relative lack of skills understood by those helping them learn. Appropriate training should be provided that allows ample opportunities for student-student discussion and clarification and be "user-friendly" with step by step, precise and specific guides to computer operation.

Clearly in Education 1, specific training and support in computer skills, especially with e-mail, needs to be established for all students and especially those identified 'at risk' who require, and want, personal tuition. Whether this fits within the support role of ITS ought be clarified as students expect that sort of service from ITS and therefore expect ITS to fulfil a particular training and support role. Training needs to include the development of skills in how to; format discs to the Macintosh operating system, configure e-mail to send and receive mail, trash messages, set up Nicknames and Mailboxes (store messages), attach and send documents, and save attachments.

Two particular learning benefits associated with the use of e-mail by students were identified in the study in addition to learning to access and use the e-mail and internet system. There are direct benefits

reported by students to having lecture notes accessible on computer before lectures, and in using e-mail to reflect on learning to teach. These benefits now need to be explored in greater depth. Using e-mail to express ideas and reflect on teaching and learning provides students with greater reported levels of confidence to reflect but, this is not the case for all students. However, these benefits are valued by students. Developers of tertiary education courses could well benefit themselves in using course delivery models that accommodate these students' learning needs.

One unintended outcome from the use of e-mail identified in the study was the establishment by students of electronic grapevines. Such grapevines have been noted by other researchers (Ross et al. 1989; Phillips 1990; Carmichael 1995), and especially with female students (Ross et al. 1989). Using processes to share work allows students to access and be part of an ‘evaluative arena’ through which they can measure their skill development against others (McGill 1994). Electronic grapevines served to provide students with information, act as a skill norm, reinforce student learning, and be used as a ‘verifiable evaluative index’ (Brookfield 1986:44).

... successful independent learners ... reported that learning networks of fellow enthusiasts - networks in which knowledge was transmitted through oral encounters - were their most important resources in

developing their expertise (Brookfield 1986:43).

The electronic grapevines provided new opportunities for students to reflect on shared work. One critical aspect to the success of networking was the immediacy of staff and peer feedback. Staff need to realise that networks established during the initial stages of learning the system, will spread wider than tutorial groups and the university campus, will be highly valued by students, and offer an effective and immediate means of communication. Not only were the networks used for to complete course requirements, they were used to advertise "pub nights", novelty items (e.g. 100 things to do when you are bored) and "compare notes" with students doing Education in other campuses in Australia.

This study demonstrated that e-mail can be used as a vehicle to deliver part of an academic course to full time students and allow students to communicate readily with and submit work requirements to staff. Whilst many students who enter University consider themselves to be ill-prepared to undertake these tasks, many are able to confidently find the support necessary to learn to use the system and then use the system to provide support for each other. It is also apparent that some students, particularly mature age female students find this type of delivery alienating and that specific attention to their learning needs has to be considered, especially in the initial training phase.

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