Networked Learning: Some Issues in Implementation at Southern Cross University

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Abstract

Recent advances in educational delivery technologies based primarily upon telecommunications and interactive multimedia give rise to opportunities for the development of new models of teaching and learning at a tertiary level. An integrated delivery model, Networked Learning, is being developed which seeks to provide a core of electronic services supplemented by appropriate traditional services such as face-to-face or tele-tutorials or paper based information based upon the students' geographical location. Many of these ideas are being trialed at Southern Cross University in Australia. Whether a fundamental change in educational delivery patterns can be achieved is dependent on a number of success factors including support from the highest levels of the organisation, resourcing, faculty and student training and student access issues including gender and resource availability.

Keywords

networked learning, distance education, access, equity, gender, computer mediated communication.

1. Introduction

A new model, "networked learning", has been developed for institutions which seek to service students at a variety of physical locations and across a range of ages and life experiences but which is squarely based on existing foundations in both on- and off-campus teaching and learning. The model is discussed in Debreceny, Ellis, and Chua (1995) and draws its design methodologies from a number of "interrelated factors" including:

- desired educational outcomes which closely follow the models put forward by Bates (see Bates, 1993; Bates, 1994a; Bates, 1994b) who sees that in the 21st century work and learning will be inseparable;

- the need to train graduates in the life-long skills of information discovery, acquisition and analysis and university education will need to increasingly focus on “learning how to learn” and “learning where to learn from”;

- the cost pressures on universities where supporting multiple methods of educational delivery will be increasingly unaffordable as will, for that matter, a number of institutions developing very similar sets of educational materials ;

- the cost pressures on students where more than one formal period of study will be typical during the working life and increasingly these periods will need to be balanced with work and family commitments meaning that extended full-time on-campus study will be unaffordable as will commitments to night-time face-to-face study;

- ongoing educational technology cost reductions both at the level of the institution and student population;

- extraordinary growth in the quantity and quality of information tools, particularly those found on the Internet.

There has traditionally been a clear distinction between “on campus” and “off campus” programs. In the Australian context, “off campus” has meant a heavy reliance on printed instructional materials supplemented by telephone access to staff, teletutorials and residential workshops although the importance of workshops has diminished in recent years due to the cost factor it places on students. Distributed video lectures along the US model has not been popular in Australia due to cost and perhaps for cultural reasons. Computer mediated communications is only just beginning to establish a significant presence in Australian distance education. The relatively recent arrival on the higher education scene of Open Learning Australia has, however, brought with it a wider range of delivery approaches including radio and television (Juddery, 1994; Pritchard, 1994) and the Federal Government has funded the creation of Open Net and more recently EdNA (Educational Network Australia).

Distance education approaches have had, however, very little impact upon teaching and learning delivered face to face on campus. In some institutions courses are delivered “off campus” in distance education mode and “on campus” in face to face mode with the only link being a common unit outline, examination and perhaps assignments. The “networked learning” model sets out to bridge these methods and take the best features from each. Figure 1, reproduced from Debreceny, Ellis and Chua (1995), shows a graphical representation of the roles of traditional on- and off-campus teaching and learning and contrasts it with networked learning.

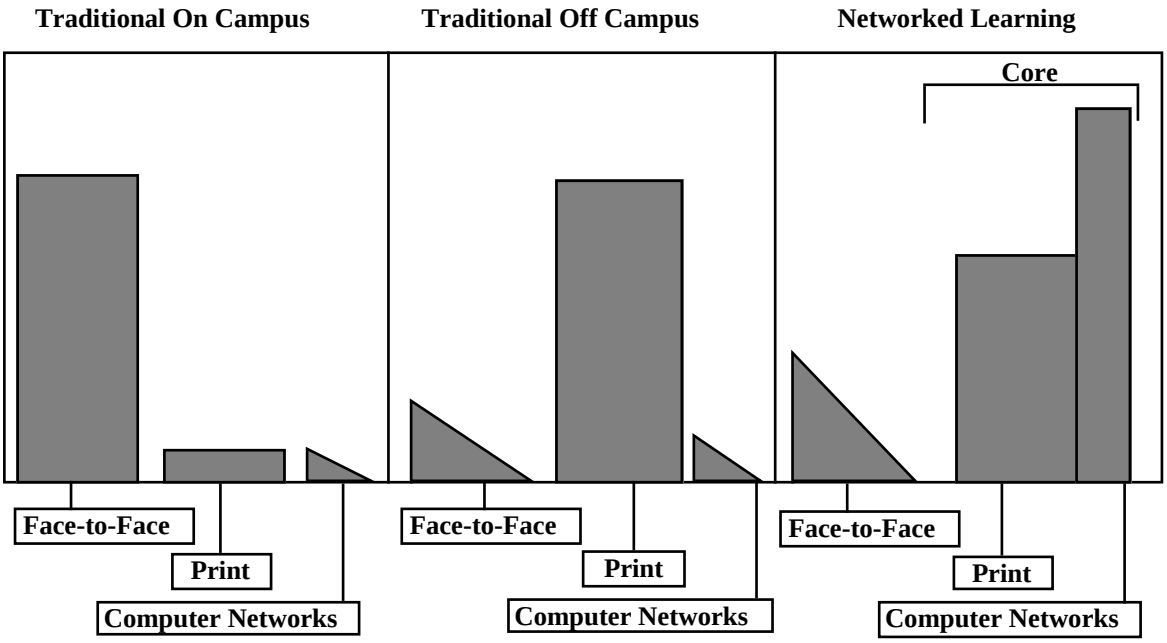

Figure 1. Networked Learning

Debreceny, Ellis and Chua (1995) note that:

> The width of each bar is a relative indicator of cost and the height is a relative indicator of importance of delivery method. In the traditional on-campus mode, emphasis is on face-to-face delivery, supplemented by limited amounts of print material. In some programs there may be an element of network connectivity, represented by the triangle. In the off-campus mode, print is the main mechanism with levels of face-to-face activity and network connectivity ranging from nothing to of minor importance. In the networked learning model both network connectivity and print play a primary role. These are supplemented by varying degrees of face-to-face activity at a variety of locations.

A consequence of this model is the blurring of the current distinction between on-and off-campus students.

The model moves the focus of education from strongly teacher centred to strongly student centred and from low technological inputs to high. The traditional linear presentation and teaching model moves to a "hypertext" model where students can seek out knowledge from a richer and more extensive environment from both within and outside the educational institution. Students can navigate through the course material at a pace which suits their learning styles. The Networked Learning model can be used to encourage a high degree of collaborative learning and knowledge integration and creation.

Networked learning approaches do **not** downgrade the role of face to face teaching and learning but move them to a higher plane of interaction. It is clearly more productive, if the educational outcomes outlined above are accepted, to have less regular but more intensive face to face sessions than the stilted, unidirectional face to face teaching that characterises much of higher education. Further, the Networked Learning model seeks a much more important role for both face to face and computer-mediated group communication than is the case for traditional distance education.

2. How do we get there?

Networked learning will not be straightforward to implement. It requires substantial change in the manner in which institutions approach both on- and off-campus education. There are a number of "critical success factors" that must be considered in its implementation including national information infrastructure investments, access to networked information resources and change to course design.

A critical success factor in optimising this model is the alignment of student expertise, attitudes and resources with those of the educational institution as it proceeds to implement a Networked Learning model. This requires the institution to be constantly sampling the learning tools available to their students and potential students as increasingly learning tools will be provided by both the institution and the student. Similarly, it requires the institution to take a proactive approach to train students, and staff, in the use of these technologies. Factors such as the age groups of students, experience, background, access to technology and attitudes towards different types of study are all important. The critical role of gender must also be taken into consideration in this process.

3. Southern Cross University

Southern Cross University is a "new" university that must balance its commitment to its own geographical region as well as to students and learners around Australia and overseas. The student community is also highly disparate, including: school leavers undergraduates, mature entry undergraduates both on- and off-campus, graduates who are upgrading to professional postgraduate degrees after a number of years since graduation and who are typically off-campus and research postgraduates both on- and off-campus

The university in its inaugural year of 1994 undertook the development of a University Plan, which it is hoped will not be another document which will gather dust in some long forgotten corner of the institutional memory but will be an active guide to institutional, academic and infrastructural planning and development.

The University is styling itself as the "university without walls". The plan draws attention to it sees as the "likely long-term shifts" in the University's operations over "the next few years". It notes:

- All programs will most likely be developed for both electronic delivery and independent study;
- There will only be a small number of electronic libraries;
- The socialising and dialectical roles of the University will come to the fore;
- Staff and students will carry out much of their knowledge acquisition work from home;
- The academic teaching-and-learning staff role will shift from lecturer to resourcer and facilitator of learning; and
- The University will develop an extended faculty network.

The University Plan then shows an understanding of the implications of new technologies and new patterns of learning and how they **might** be implemented. It now requires actual implementation of the plan - a much more difficult task than the writing thereof.

4. Matching Personal and Institutional Resources

The concept of students coming to a campus and bringing with them only their books, paper and pen is already changing. Students come now not only with their books, paper and pen but also their computer, CD-ROM and modem. And, of course, many students do not leave their own home or office to "come" to higher education. Students will utilise some of their own technology and some of the institution's. Further, they will come to higher education with a set of pre-existing skills and attitudes towards educational technologies which will impact on the ability of the institution to effectively incorporate these technologies into its programs.

A clear understanding of these relationships is important for the planning of educational programs and institutions must sample them on a regular basis. As a first step in this process at Southern Cross University a survey of a significant cross-section of students was undertaken. The survey is introduced in Ellis, Debreceny, and Hayden (1995). Some 2,203 questionnaires were distributed to on- and off-campus students in the Faculties of Arts; Health Sciences; Education, Work and Training and Business and Computing and a total of 916 were returned. Response rates for on-campus students are difficult to establish as the questionnaires were distributed in the respective classes would have missed those students who did not attend that particular class. The response rate for off-campus students was a heartening 39%. The returns represent 14% of the total University population of 6,465 students.

The student body is very diverse. Firstly, the gender balance shows, interestingly, a majority of females who comprised 57% of the sample student population. The age structure is bi-modal with school leavers constituting 43% and the 35 to 49 group making up 41%. A significant proportion (58%) of the student population were part-time and most of these are in employment.

Virtually all of the part-time students would be studying at a distance from the campuses of the University. Yet, despite the geographical distribution of the students, they were within a short distance of an existing University or TAFE or libraries with only 38 students not being within an hour's drive of one of these facilities and conversely 42% of students being within only 10 minutes drive of an educational centre.

5. Access and use of Educational Technology

The development of sophisticated telecommunications based educational technologies will fail if there is not a match with the technology used in the home and workplace. The survey showed that some 74% of all had access to a personal computer in the home. The proportions for on-campus students was 70% and for off-campus students, 82%. For those students who were in employment, 87% had access to personal computers in the office and a very high proportion (85%) of these are allowed to use them for study purposes.

While access to a computer is a pre-requisite for successful networked learning approaches, the attitude of students to the technology is also important. Only 13% of students do not use at all or are not confident in the use of computers whilst 20% said that they were very confident. Interestingly, a high 34% say that they are "reasonably" confident in using computers.

Clearly, if the use of educational computing technologies is built upon pre-existing computer usage, it is more likely to be successful. Table 1 shows the student usage of a variety of packaged software. The domination of the spreadsheet and word processing packages amongst the usage of packaged software was evident. Some 28% of respondents saw themselves as "power users" of word processors and only 6% had not used a word processor. It we see successful use of educational technologies as being built on a range of software, there is however some concern to be expressed in this table with significant proportions not having used databases, educational software such as CD-

ROM encyclopedias, games and desktop publishing programs. Usage of software is dominated by the word processor and to a lesser extent, the spreadsheet.

	D/base	Desktop Pub'g	Educatnl	Games	Spread sheet	Word Proc
Never used	40%	50%	46%	27%	25%	6%
Used rarely	20%	16%	17%	23%	17%	5%
Use-not confident	18%	15%	11%	13%	18%	12%
Use-confident	14%	11%	16%	22%	25%	46%
Power user	2%	2%	3%	8%	9%	28%
Unknown	7%	6%	6%	6%	6%	3%
Total	100%	100%	100%	100%	100%	100%

Table 1. Use of packaged software

We also asked about student typing skills. If students do not have adequate typing skills they will not be able to effectively use a variety of tools including email, on-line database services and particularly real-time communication services where reasonable typing speeds are necessary. Only 1.4% do not type but nearly 50% are only two-finger typists which is hardly a good foundation for successful use of information technology.

Clearly, use of networked learning approaches will require students to have access to the network, usually by modem connection. For those students who have access to computers in the home some 25% already have modems while 38% of those that have access at work have modems. We asked those who had access to computers in the home whether they intended to acquire modems and just over half indicated that they did intend to do so. Clearly students are not yet perceiving the value of a modem, which is to be contrasted with the CD-ROM which we will consider below.

We then asked students for their usage of communications software and found that only 10% said that they were confident in usage of this type of software and an overwhelming 71% had not used this type of software at all. A second key technology to which access will be important is the CD-ROM. We can see that the World Wide Web in particular can readily be interfaced with a CD-ROM. Of those who had access to computers at home, 29% had a CD-ROM and for those who had access in the work environment the figure was a surprisingly high 35%. More than 70% of respondents who had a computer at home, intend to acquire a CD-ROM drive within the next three years.

In summary, we have a picture of a student population which has access to computing at home and for those who are in employment, access to computers in their place of employment. Only a tiny proportion do not use computers. The signalled purchase intentions show that a large proportion of those that have computers have decided to acquire a CD-ROM and a much smaller proportion, modems. A substantial minority have either or both technologies already which indicates a good foundation in hardware to support networked learning approaches.

There are some clear warning signals, however. The existing use of software by students is restricted and some of the foundation for a successful transition to intensive usage of information technology is lacking including exposure to communications software and typing skills.

6. Gender Issues

The different approaches of females and males to information technology are well known. A number of studies (notably those in Martin and Murchie-Beyma, 1992) have shown that males and females approach the task of computing in different ways and that gender was a significant predictor of

computer attitude. Females were found to show less confidence in their abilities on the computer, although their attitudes appear to be positive. Moreover, males were shown to overwhelmingly spent substantial amounts of time each week on the computer compared to females. If we look at the access to computers in the home, there are clear differences between the genders with 69% of women having access as compared to 81% for men.

This trend is continued if we review purchase intentions by gender. Even given their lower existing access, only 39% of women intend to acquire a computer within the next three years as compared with 45% for men. We then reviewed those that had **no** computer in the home and found, again, that women had lower expectations of acquiring a computer.

The above finding is not surprising in the light of ethnographic studies (see Bernstein, in Martin and Murchie-Beyma, 1992) which reveal that while men approach the computer with a passion, women tend to see computers as only a tool to complete a specific task. That is, the non-essentiality of computers in their work or living. This would colour women's attitude to the acquisition of computers and accessories in the home. Looking at the important issue of access to the network, we can see that for those that have personal computers in the home, almost twice as many males (31%) as females (19%), in percentage terms, have a modem.

Female students had a much lower comfort level in using computers than did male students. While 14% of students said that they were very confident in using computers this was less than half of the male response rate of 29%. While 4% of female students did not use computers at all the equivalent for male was less than 1%. Again this is not surprising and confirm studies that reveal that attitudes and perceptions of the sex-appropriateness of the computer formed in the middle and high schools are carried into adulthood (Aman, 1992; Clark, 1992) had warned that if the computer continued to be perceived as a mathematical, male-appropriate tool, the number of women in computer science would continue to be small. Part of the women's attitudinal differences to computers is due to society's stereotyping of computers as a male sphere of influence and are avoided by women because of pre-existing habits of sex segregation (Lockheed and Frakt, 1984).

Yet some of the pre-requisites for women to use information technology do exist. Women have much greater ability to type, which is an important pre-requisite to intensive computer usage, with 15% assessing themselves as fast touch-typists as compared to 2% for males. Women were also much more organised when it came to the acquisition of this knowledge with 41% having attended formal typing classes as compared with 14% for men. Studies have acknowledged higher computational skills by women (Klein, 1992) while at the same time women's attitudes to computers undercut such important attributes as computational and typing skills in the use of information technologies.

It is clear that women students have less access to technology, lower confidence levels and yet in some ways a higher degree of conceptual foundation than male students. It may well be that what we are seeing is the result of a school education system where female students were taught "office systems" or like subjects which portrayed them in supporting roles to managerial and technical staff who would be male. Computers are seen as being "techie" and "male". When the two technologies are combined and become an essential technology for the delivery of education and the acquisition of knowledge, women students seem to defer to sex-stereotyping of this knowledge domain as more male-appropriate. They have yet to connect that use of such technologies require as much computational and "office-like" skills as "techie" abilities in order to complete the transition to a more comfortable use of information technology.

A number of the women students in this study are also studying in health sciences both on- and off-campus. The latter group are senior nurses who are upgrading their qualifications and skills by distance education. Many of these students are relatively poor and find access to information technology expensive as compared, for example, to the students in the MBA program. All is not

doom and gloom, however, with 45% of women students saying that they were “reasonably” or “very” confident in using computers.

7. Conclusions

This study depends on a survey that is largely quantitative. Many other research studies have pointed out certain slants arising out of gender and access issues in relation to its use (Burton, 1987, Martin, 1992). What this paper has shown is that such slants are indeed confirmed by a statistical analysis of the situation in an area in Australia. The survey used in this study has not incorporated ethnic and class issues. These issues are by no means insignificant and are interrelated with gender access issues, but within the format and time to do this survey it would have been extremely difficult to deal with these other variables. Such issues will be dealt with in later surveys. What this survey has highlighted, however, is the significant differences in terms of access and attitude in relation to gender.

Attitudinal changes are difficult to effect and gender stereotyped attitudes to information technology use need to be attacked early on in schools. Fortunately, the school systems in Australia has taken cognisance of this and there is now a strong commitment to ensure that girls are not disadvantaged in the development of it, especially in co-educational schools (NCET, 1994). Some school initiatives involve positive discrimination in favour of girls - for example, offering them access IT specialist tuition in the school of the future which was not available to the boys in their class. Such initiatives could lead to combatting women’s lack of confidence with regard to computer use later on in tertiary learning.

The challenges of implementing networked learning will require balancing technical and societal issues as well as managing the change in what are arguably highly conservative institutions of higher learning.

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