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Paul Else

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Abstract
As most academics know, universities are changing. Higher education has been 'opened up' in order to make it more readily accessible to students and in the process, it has become part of a standard education rather than an accessory to it. The present state is one of transition where universities are 'seeing' increasing student numbers, a reduction in academic entry levels (Garcia, 1997), competition between institutes for the 'better' students, and increased student expectations (based on incurred cost). All of these changes are taking place in the absence of comparable increases in resources.

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Introduction

As most academics know, universities are changing. Higher education has been 'opened up' in order to make it more readily accessible to students and in the process, it has become part of a standard education rather than an accessory to it. The present state is one of transition where universities are 'seeing' increasing student numbers, a reduction in academic entry levels (Garcia, 1997), competition between institutes for the 'better' students, and increased student expectations (based on incurred cost). All of these changes are taking place in the absence of comparable increases in resources.

Independent, but concurrent with these changes is the increased availability of personal computers with multimedia capacity. This has meant CD-ROM teaching materials have become more available and of better quality. Hence, changes in higher education have coincided with the advent of multimedia computer technology. Not surprisingly academics confronted with the educational dilemma associated with the changing face of education have looked to these emerging technologies for help. However, any assurance of economies in teaching using multimedia materials is not necessarily a reality. Multimedia materials require the latest computing hardware resulting in a simple shift of resources within universities, and faculties and their member schools and departments are forced into futile cycles of computer acquisition. What is often overlooked in the attempt to provide adequate computer facilities for students is that many of these same students have access to multimedia computers outside of the university. Therefore, an economical alternative to 'in-house' computer acquisition is to make software available for these students while continuing to maintain access to computers within the university for students without this option.

This paper reports on a simple study conducted at the University of Wollongong within Biomedical Science where more CD-ROMs rather than computers where made available to students. The CD-ROMs, Brainstorm (Neuroscience) and Medpics (Histology) were previously in use in these subjects but in this study they were made available for loan through the main library system. The study assessed: (a) where the CDs were being used (for example, University or home); (b) the type and availability of computers to individual students; (c) borrowing profiles; and (c) the opinions of students about access to CDs through the library system.

Project

Background

Prior to this study, students in Neuroscience (BMS252) and Histology (BMS 102) had access to multimedia programs through a shared faculty computer laboratory (Health and Behavioural Science and Science). The computer lab had 19 Mac/Power Macs with CD-ROM capacity. Several different units used this computer lab, including 300 physiology students for essential prescribed tutorial, and for assessment work used as an alternative to some practical based experiments. The computer lab was open from 8:30am to 7:30pm. Students in Histology had access to five histology CD-ROMs, available from the Biomedical Science office, for use in the computer labs from 1–4hours (depending on demand). Brain-Storm was available to Neuroscience students on the hard disks of these computers. A description of:

(a) the computer requirements of each CD-ROM package;
(b) the unit using each CD-ROM;
(c) the use of the package in the each unit; and
(d) the number of students associated with each unit

is provided in Table 1.

A major problem for the Neuroscience and Histology students (that is, 180 EFTSUs) was getting access to the computers in the shared faculty computer lab. This project was initiated in an attempt to alleviate the situation by acquiring extra copies of Brain-Storm (5 copies) and Medpics (10 extra copies) CD-ROMs (rather than new computers) and moving the lending of the CD-ROMs to the library system.

Design

To start, the project required:

(a) the goodwill of the publishers of the CD material;
(b) the co-operation of the library; and
(c) approval by the human ethics committee.

Both publishers (Mosby Multimedia-Brain-Storm and µMicron BioSystems-MedPics Histology/Pathology) although still developing their ideas on library systems and CD-ROM borrowing were forthcoming in granting permission for the use of their CDs in this study. The library was also generous in supporting the study as approved by the human ethics committee (approval #HE96/43).

Lending of both CD-ROMs was limited to the closed reserve desk. Initially an overnight video style loan was envisaged but this changed to a two day loan for convenience. At that stage the loan needed to be treated as a normal item ie a two-week loan and a manual change of date by the staff at the counter was

Table 1 Basic descriptors of CD-ROMs and associated units

CD-ROM	Computer compatability	Unit	Semester	Student number	Use in unit
Brain Storm (Mosby)	Macintosh with 4 MB Ram, CD-ROM with driver software, System 6.0.5, 13" colour monitor and 12 MB of HD space	Neuro-science (BMS 252)	Autumn (I)	100	Not directly examinable. A companion to approx. 20% of examinable material in the unit
Medpics Histology/ Pathology (µMicron BioSystems)	Macintosh II & up – colour compatible with 4 MB Ram, 2 speed CD-ROM driver, System 7 PC Windows, 386SX, 33MHz with 4 MB Ram 2x speed CD-ROM SVGA monitor	Histology (BMS 102)	Spring (II)	80	Used in a practical exam worth 8% of final assessment

required due to some inflexibility in the library's computer system. Since that time the library has introduced a 3 day loan which suits the requirements of this type of borrowing and negates the need for a manual change of date.

Results and discussion

Analysis of library borrowing records showed Brainstorm (Mac only) and Medpics (Mac and PC compatible) CD-ROMs were used 71 and 186 times respectively over the entire semester (teaching + study and examination periods). The true number of students using the CD-ROMs can be expected to be much greater than this since librarian staff noted that many groups borrowed the CD-ROMs for their joint use.

Figure 1

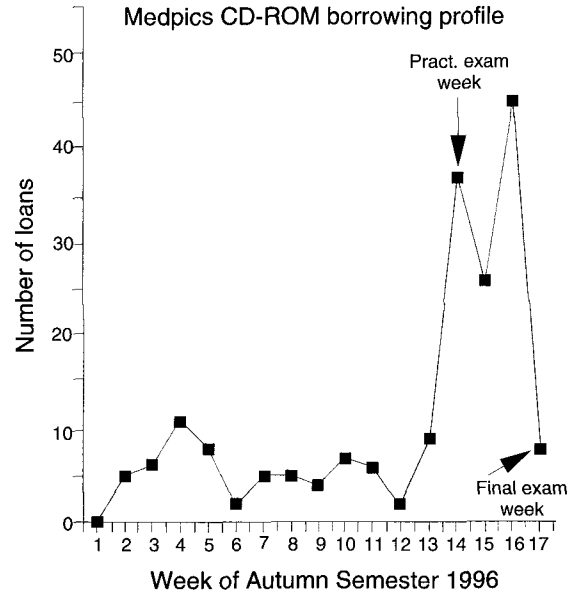

Table 2 CD-ROM use (# and %)

On-campus			Off-campus	
Library Computer Lab	Biomedical (Combined Faculty Lab)	Other Computer Lab Sites	Home	Other
20	10	4	21	3
35%	17%	7%	35%	5%

Table 3 Combined computer access for students in Histology and Neuroscience

	Macintosh personal	Macintosh other	PC personal	PC other
Macintosh Personal	17	2	4	3
Macintosh other		31	6	12
PC personal			59	3
PC other				29

A plot of the weekly borrowing profiles for Medpics and relevant examination events is shown in Figure 1 (due to the form of information provided by the library Brainstorm can not be similarly analysed). The borrowing profile for Medpics was relatively stable with an average 6 borrowing events per week for the first 13 weeks. This borrowing pattern was followed by two peaks of borrowing corresponding with examination periods.

A voluntary questionnaire (ethics requirement) placed on the CD-ROMs was used to determine where the software was used. A combined analysis shown in Table 2 (36 respondents) shows that the most popular sites for CD-ROM use was at home and in the library computer lab (mainly group use in this latter case).

Many of the respondents also indicated that they used the CD-ROMs at a number of different sites, both on and off-campus at different times.

This analysis shows (assuming it also reflects the general usage pattern of non-respondents) that as a result of making the CD-ROMs available through the library system, the percentage of students using the combined Faculty computer laboratory for CD-ROM use was reduced by 83% and use of other on-campus computers, was almost halved presumably resulting in a relative 'freeing up' of computer availability.

The ability of the students to use CD-ROMs off campus was reflected in the availability of computers to these students. The results of a census of computers available to the students in Histology and Neuroscience is shown in Table 3.

Of the 154 students canvassed 70% acknowledged having access to computers other than those on campus. The most common personal computers were IBM compatible PC's with 38% of students having their own machines (or family unit) and 11% having their own Apple Macintosh units.

Some students where found to be particularly well situated with both types of computers (plus indirect access). Of all students surveyed 39% indicated that they had indirect access to either PC or Macintosh computers through friends, work etc off-campus. This is likely to underestimate the true indirect availability of computers as some students only considered their primary computer and not other computers available to them.

Student opinion

For Brainstorm (24 comments received)

The main comments were on the 'excellence of the program' as a learning tool. Negative comments were associated with 'not enough copies available'. This was due to the library only wanting a few initial copies available with the promise to request more copies if demand required it. Demand did require it but a communication problem resulted for a period of time in staff at closed reserve restricting the loan period and therefore generating the comment '3 hours is too short a period of time, need 2–3 days'. Also, 'people where not returning it on time' causing access problems. Other comments reflected the fact that 'only available on Mac a problem'.

For Medpics (15 responses)

The responses to Medpics were similar to those for Brainstorm with the students acknowledging the 'excellence and usefulness' of the CD-ROM package as a study tool and the usefulness of access to the package through the library system. Some students requested more copies (more than the 12 available) and single shouts of 'it did not work on my computer', 'need to be able to reserve' and 'need it for a longer period of time'.

One student decided that Medpics was such a useful tool that he decided to simply keep it realising that a maximum fine of only $18 would apply. Subsequently he kept the CD-ROM for several weeks until identified and warned. This situation happened to a lesser extent in a number of cases and needs to be looked at in terms of restricting borrowing rights in such cases if financial incentives are not effective. Other students recognised that they could renew the item for two weeks if renewed at other library loans sites, other than closed reserve, since a manual change of due date would not occur at these other sites (the new 3 day loan should now correct this problem). Another problem included the return of the CD-ROMs through the library return chutes that resulted in them finding themselves placed in the Audio-Visual office rather than back at the reserve desk. The fact that the CD-ROMs were available for general loan resulted in some students lining up with friends to reloan the CD-ROM immediately upon return in order to regain its use.

Overview

Overall, the availability and lending of CD-ROMs through the library system appeared to be well accepted and liked by all concerned (with the possible exception of the hard working staff on the reserve desk who all remember these CD-ROMs). Students liked the system because they had increased options in terms of site use of the CD-ROM as a result of the extended loan period. The departmental staff appreciated the system because they were spared from lending out the CD-ROMs as this work was passed onto the reserve desk in the library.

This type of system lends itself to any educational requirement where there is student demand for computer software limited to on-campus computers (provided permission from the copyright owners can be obtained). In future, both for the convenience of the students and to alleviate the demand for computers on campus we will be attempting to maintain this software borrowing facility.

Articles

Garcia L. M. 1997, 'School-leavers take back door to uni', *Sydney Morning Herald,* March 15, p. 9.

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