

39 Issues Surrounding the Widespread Adoption of Learning Management Systems: an Australian Case Study

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Abstract

This paper discusses the evolution of the online learning environment at Murdoch University, in Perth, Western Australia, beginning in 1997, and continuing, in late 1998, with the adoption of the WebCT Learning Management System. WebCT adoption was supported by central funds through the Murdoch Online Mainstreaming (MOLM) Project, which set out to establish online teaching and learning as a mission critical activity of the University, but also to give academics control over their material. The rationale behind the MOLM project is described, in terms of a model of adoption of technological innovations.

The Murdoch Online Mainstreaming Project met its objectives. Currently 223 units are available through WebCT, with the highest uptake in the Schools of Commerce, Law and Information Technology. Over the last twelve months, 9364 individual students have been enrolled in a WebCT course. This is over three quarters of the students enrolled at the University.

However, despite demonstrable and enthusiastic uptake by teaching staff and students, the MOLM initiative encountered significant problems in 2001, when the initial two years of project funding was exhausted. It then became apparent that the University's strategic directions were not well-coupled with its budget allocation processes, with the result that ongoing funding was not initially available to support online learning.

The paper discusses various approaches taken to secure ongoing funding for online learning, including a comprehensive, user-pays model, which was eventually rejected in favour of a central allocation. The paper concludes with a discussion of recent moves by the University to radically redesign the ways in which it conceives of a unit of study, both in pedagogical and administrative terms.

1. Introduction

Murdoch University, in Perth, Western Australia, is relatively small, with approximately 12,000 students studying from a selection of approximately 1,000 units¹ of study. The University made a strategic decision in 1997 to move towards online provision of units of study, and commenced the Murdoch Online initiative. This set out to provide internet-

based teaching and learning to a wider range of students in more interesting and flexible ways. Murdoch's move into online teaching and learning was facilitated by its experience in distance education, building from a history of structured study guides, based on the UK Open University model. Staff were accustomed to a coordinated, but flexible, approach to designing self-study materials.

1.1. First Steps with Murdoch On-Line

Murdoch Online was launched in November 1997, as a special initiative of the Vice-Chancellor and Pro-Vice-Chancellor (Academic). Implementation was managed by the Teaching and Learning Centre (TLC), with initial objectives to:

1. establish an online teaching and learning facility for Murdoch University, building on its existing academic programs, academic support services and administrative policies and procedures;
2. contribute to the quality and effectiveness of the University's teaching and learning through the use of internet services;
3. attract new students to Murdoch University and provide a vehicle for University promotion amongst the rapidly growing population of internet users: locally, remotely and worldwide;
4. take advantage of new opportunities for improved efficiencies in teaching and learning.

Murdoch Online was a timely and popular initiative. A number of schools and individuals expended substantial effort in producing online units, notably in the Schools of Engineering, Energy Studies and Economics. The number of units designated as 'online' rose from 23 in 1997, to 79 in 1998, and 141 in 1999. However, many of these were online in name only, and production of online materials had not commenced in many cases. There was enthusiasm for the Murdoch Online initiative, but after the initial enthusiasm, progress slowed.

Murdoch Online units were originally designed according to a frame-based HTML template, supported by public-domain discussion and communication tools. Technical support was needed to assist most academics in this process. This was provided partly by the TLC, and partly by those schools that had invested resources in Murdoch Online. As time went by, it became apparent that the system was too difficult for most

academics to cope with, and demand for services exceeded available TLC resources.

While the original Murdoch Online initiative was championed by the Vice-Chancellor, it was not supported by any funding allocation. This lack of investment impacted negatively on the impact of Murdoch Online on the wider University community.

1.2. The Adoption of WebCT

The shortcomings of the original approach prompted Murdoch University to adopt the WebCT (WebCT, 1999) Learning Management System in late 1998. This choice was made to simplify online development and to give academics control over their material and the tools available. The adoption of WebCT was supported by \$Aus230,000 of central funds through the Murdoch Online Mainstreaming (MOLM) Project, which set out to establish online teaching and learning as a mission critical activity of the University, providing essentially uninterrupted access to online course materials for students.

There were three aspects to the MOLM project, discussed more fully below:

- hardware and systems support, including integration of WebCT with the University’s administrative and information systems;
- staff development workshops, seminars and documentation – to provide academic staff with the knowledge and skills to develop educationally sound online units using WebCT;
- production support and assistance to staff, including WebCT templates that are uniquely presented for each target audience, whilst adhering to a set of Murdoch University standards.

2. Factors Affecting Adoption

The planning of the MOLM project was informed by considerations subsequently published in McNaught et al. (2000). This Australian project investigated factors relating to the adoption of ICT resources in universities through a case study of five faculties at universities throughout Australia which had achieved widespread adoption rates. The themes identified in the study were refined into the ideal model shown in Fig. 1, with three major contributions: *policy*, *culture* and *support*.

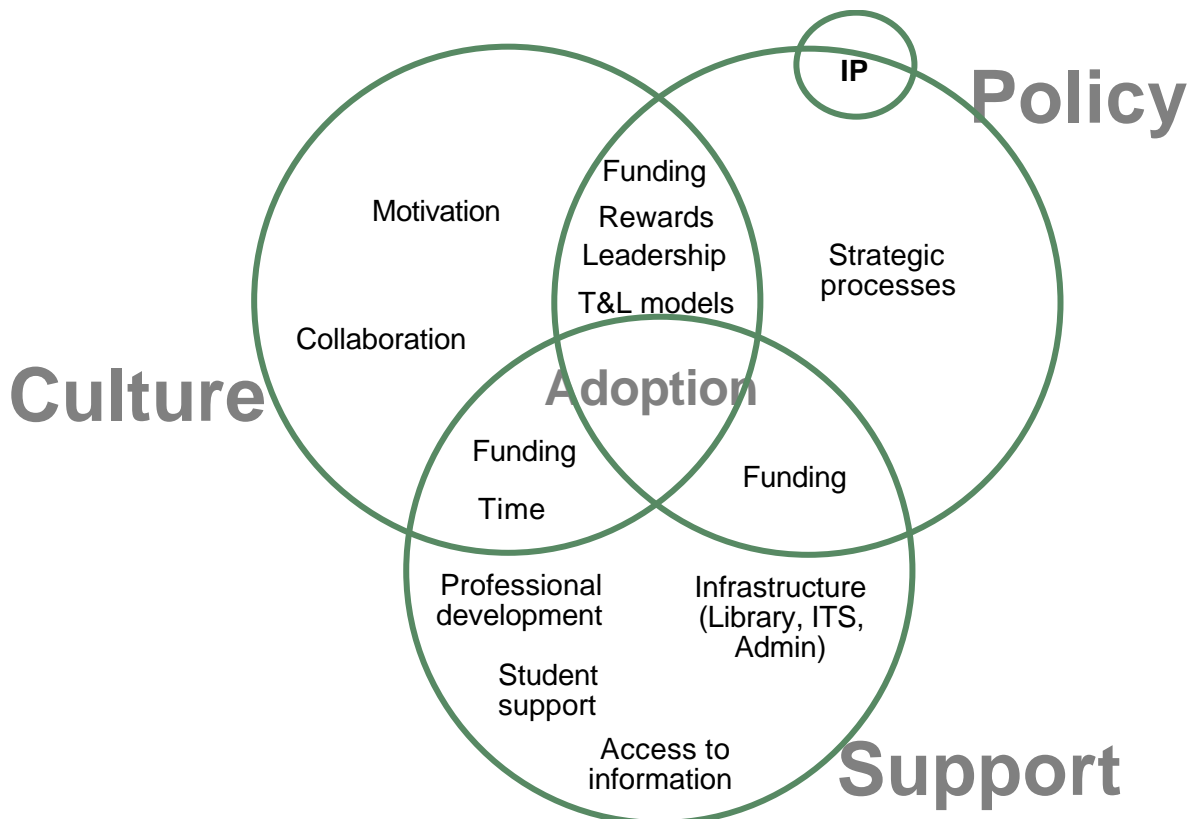


Figure 1. Three phase technology-adoption model (from McNaught, Phillips, Rossiter, & Winn (2000)). IP is an abbreviation of Intellectual Property and ITS is an abbreviation of Information Technology Services

While all faculties were deficient in some aspects, the conclusion was drawn that an institution which addressed all of the themes shown in Fig. 1 would be likely to achieve high uptake rates of any educational innovation. A further implication of the model is that policy direction needs to be both from the top down, and from the bottom up.

It is informative to analyse Murdoch's performance² in terms of the adoption model. The initial Murdoch Online Initiative was supported by leadership and policy direction, followed by project funding. The MOLM project funding explicitly focussed on providing appropriate support and professional development, as well as focussing on the needs of academic staff, by seeking to develop partnerships with academics, reducing administrative load and empowering them to have control over their own educational material. A strong pedagogical emphasis was central to the initiative.

While the initial impetus of the MOL initiative was top-down, it soon became bottom-up as staff took ownership of the initiative.

Weaknesses in Murdoch's approach were in rewards for staff, and taking a strategic approach to the initiative, particularly with respect to funding.

3. The Murdoch Online Mainstreaming Project

3.1. Hardware and Systems Support

The TLC worked closely with the University's Information Technology Services area to provide hardware and systems support for WebCT, aiming at 24 hour x 7 day availability. A dedicated, central WebCT server was purchased, and staff were appointed to manage the WebCT installation. A second server was subsequently purchased as part of a disaster recovery plan.

WebCT has been integrated with other corporate systems, such as the Callista student records system, the Concept human resources system and Murdoch's own MAIS authentication system through a middleware application called WebCTMan (Phillips, Strong, Hallam, & Benschop, 2002)

WebCTMan manages courses, the students within courses, and staff roles within courses. A web-based interface enables administrative staff to easily control which groups of students should go into (or out of) each course, and when this should happen. A subset of functions is available to helpdesk operators, who can look up details of both students and staff within the system and troubleshoot problems.

By integrating WebCT with other systems, we have reduced the amount of administrative work required by academics in managing their course, thereby freeing up time for teaching interactions with students.

3.2. Staff Development and Training

Staff development was an integral part of the MOLM project. A staff development officer was appointed to develop documentation and present a range of technical WebCT workshops. This person complemented existing staff who presented seminars about pedagogical aspects of online learning. Seven technical workshops and ten pedagogical seminars made up a staff development series entitled "Designing Units for Online Learning".

The aim of the staff development was to enable lecturing staff to become self-reliant in their use of WebCT, empowering them to manage their own online teaching environment without requiring technical support.

3.3 .Production Support

The third aspect of the MOLM Project was the production of new units in WebCT format, and the conversion of existing Murdoch Online units into WebCT format. Increasingly, staff develop their own WebCT courses, although some staff still require production assistance. Once WebCT materials are developed, almost all staff maintain them themselves.

WebCT courses are based on a template which adheres to Murdoch University standards. Where possible, unit information is provided in a way that course designers can 'fill in the blanks'. In the Murdoch University environment, it was not possible to mandate a common look and feel for all units. However, the use of a standard template increases the likelihood that courses will be recognised as a Murdoch University product. Some schools and departments developed their own unique templates. The template approach also reduces work for lecturing staff.

Production work uses a project management approach. All project effort is recorded on timesheets under categories of work. Data recorded in this way has allowed the development of a standard price list for entering standard content into WebCT, shown in Table 1.

Entering administrative details into existing WebCT Template	\$420
Entering administrative details into a specially-tailored WebCT Template	\$960
Study Guide (up to 60 pages of content)	\$360
Powerpoint slides	\$15 per lecture
Extra additions to WebCT unit	\$60 per hour

Table 1. WebCT unit production pricelist (in Australian dollars)

Semester	Target		Actual	
	Production	Preparation	Production	Preparation
1/99	20	40	19	29
2/99	60	40	47	43
1/00	100	40	65	84
2/00	140	40	122	43

Table 2 Targetted and actual numbers of units put online as part of the Murdoch Online Mainstreaming Project

Teaching area	Semester 1	Semester 2	Other	Total
General	7		1	8
Information Technology	8	7	1	16
Commerce	17	19	27	63
Education	2	8	4	14
Humanities	16	12	0	28
Law	16	16	4	36
Physical Sciences	1	6	0	7
Biological Sciences	12	16	0	28
Politics		3	0	3
Social Sciences	1	7	0	8
Veterinary	5	6	1	12
Total	85	100	38	223

Table 3. Current numbers of WebCT units broken down by teaching area and teaching period.

	Teaching Period S1/00	S2/00	S1/01	S2/01	S1/02
Business, Information Technology and Law	1593	3461	3734	7906	4249
Science and Engineering	246	302	633	1359	1265
Foundation Units	1721	1912	2184	2158	2201
Social Sciences, Humanities and Education	563	1223	1165	2161	2345
Veterinary and Biomedical Sciences		11		276	315
Total	4123	6909	7716	13860	10375

Table 4. Summary of student enrolments in WebT courses for each of the teaching Divisions, for the last five semesters.

4. Project Outcomes

At its outset, the Murdoch Online Mainstreaming Project set targets for the number of units which were expected to be available in WebCT at the end of the project. Both the targets and actual achievements are shown in Table 2, for courses which were both in production and in preparation.

While the final figure of 122 units in production during semester 2, 2000 is below the target of 140, project funding did not commence until semester 2, 1999, and the project, therefore, was six months behind schedule. Given this delay, the project exceeded all its targets.

The number of WebCT units offered by each teaching area is shown in Table 3. Table 3 also shows the number of units offered online in each teaching period: semester 1, semester 2 or other (trimesters and summer school). Currently, 223 units are in production in WebCT, up from 193 in 2001. The highest uptake of WebCT is currently in the Division of Business,

Information Technology and Law (Commerce, Law and Information Technology).

In addition to the figures reported in Table 3, approximately 140 other units are available to students online through other mechanisms. Most of these are in the Schools of Engineering and Physical Sciences, and had been developed before the MOLM project commenced. Over one third of Murdoch's units now have an online presence.

It is also apparent from Table 3 that some areas of the University have not yet embraced WebCT and online learning. However, Biological Sciences have increased their WebCT presence over the last year, and Politics, Psychology, Education, Chemistry, Environmental Science are beginning to follow the rest of the University.

4.1. Student Usage

Student use of WebCT has increased substantially since 1999. Table 4 shows student enrolments over the last 5 semesters

for the University's teaching 'Divisions'. A particular characteristic of Murdoch University is the interdisciplinary Foundation unit which all students must study. Because these units cross Divisional boundaries, they are reported as a separate row in Table 4.

A strong increase in the number of students using WebCT is consistently apparent in Table 4. The figures shown in Table 4 indicate student enrolment in WebCT courses. That is, if a student is enrolled in two courses, that student is counted twice in Table 4. Over the last twelve months, 9364 individual students have been enrolled in a WebCT course. During the same period, 17169 students were associated with courses, indicating that each student is enrolled in approximately 2 courses, on average.

Table 4 needs to be interpreted carefully. At first glance, it would seem that enrolments had dropped in semester 1, 2002. However, the figures shown in the two 'semester 2' columns (S2/00 & S2/01) are cumulative, representing the total enrolment for the year, rather than just the enrolment for that semester.

Despite the intentions of senior management to increase student enrolments by offering study online, this has only been marginally effective, as shown in Table 5. Table 5 displays the number of students currently enrolled in each of four types of study. By far the majority are enrolled as internal students, that is, they attend normal classes and receive complementary online functionality. External students are enrolled in the traditional distance education mode, and also receive complementary online functionality. When Murdoch Online was established, two new enrolment options were established, 'online internal', where students were managed according to the infrastructure set up for internal students; and 'online external', where students were managed as an external student. Table 5 shows that few students currently use these enrolment modes. Other evidence, to be discussed in the final section of this paper indicates that students find them confusing.

Enrolment Type	Number
Internal	5931
External	698
Online Internal	137
Online External	106
Total	6872

Table 5. Enrolment types of currently-enrolled Murdoch students

4.2. Server Usage

Figures 2 & 3 show the average distribution of WebCT use per day of the week, and the average usage per hour of the day, respectively. Usage is spread relatively evenly over the entire week, even on weekends (Fig. 2). WebCT is also used throughout the day, including in the early hours of the morning (Fig. 3). This data reinforces the need to have the

WebCT system supported 24 hours a day and seven days a week. This system is, arguably, more important than any other university information system.

5. Sustainability

The impressive uptake rates described in the previous section indicate that the MOLM project has been successful. Murdoch Online has met the first two of its objectives (see Introduction); namely, establishment of a facility that is building on the institution's existing academic programs, and contributing to the quality and effectiveness of the University's teaching and learning.

Objective Three, essentially the commercialisation of online offerings, has not been met, except in a very small number of rather unique areas. Locally, however, Table 4 shows an enormous growth in online usage that extends the diversity of flexible learning options available to Murdoch University students. In terms of policy direction, bottom-up enthusiasm outstripped top-down attempts at income generation. Murdoch's experiences are similar to those of Columbia University, New York University and the University of Maryland, reported in the New York Times (Hafner, 2002), although less expensive.

Nevertheless, despite demonstrable and enthusiastic uptake by teaching staff and students, the Murdoch Online initiative encountered significant problems in 2001, when the initial two years of project funding was exhausted. It then became apparent that the University's strategic directions were not well-coupled with its budget allocation processes, and no ongoing funding was available to continue with online learning. McNaught et al. (2000, p. 87) identified a presumption that any sector of an institution that agrees to take responsibility for a university-wide initiative at its formulative stage – and receives short-term funding to try and meet the institution's goals – will absorb future costs when specific establishment grants are exhausted.

This was certainly the case for the Teaching and Learning Centre, which was the sponsor of the MOLM Project, and the driving force behind the success of a University-wide initiative. The very success of the project, and concomitant growth of WebCT usage, contributed to the inability of the TLC to support it from its own resources. There was, initially, only one technical support position, with no ongoing funding, leaving the University potentially exposed to system unavailability. The exposure became real when the technical support person chose to leave. At approximately the same time, some unusual and complex circumstances resulted in significant system unavailability early in 2001.

A proposal was therefore developed for central funding to sustain the Murdoch Online initiative. However, in the currently-devolved management structure at Murdoch University, a proposal for an 'off-the-top' funding allocation was not initially supported by decision-makers. Instead, a,

user-pays model had to be developed. This model anticipated all costs for running WebCT over the next four years, including potential hardware upgrades and software price rises. The staffing profile to effectively manage WebCT at Murdoch is shown in Table 6. The total cost of supporting

WebCT was estimated to rise from \$Aus290,000 in 2002 to \$Aus400,000 in 2005. Funds were to be recouped by charging a nominal rate per course and a fixed rate per student using WebCT.

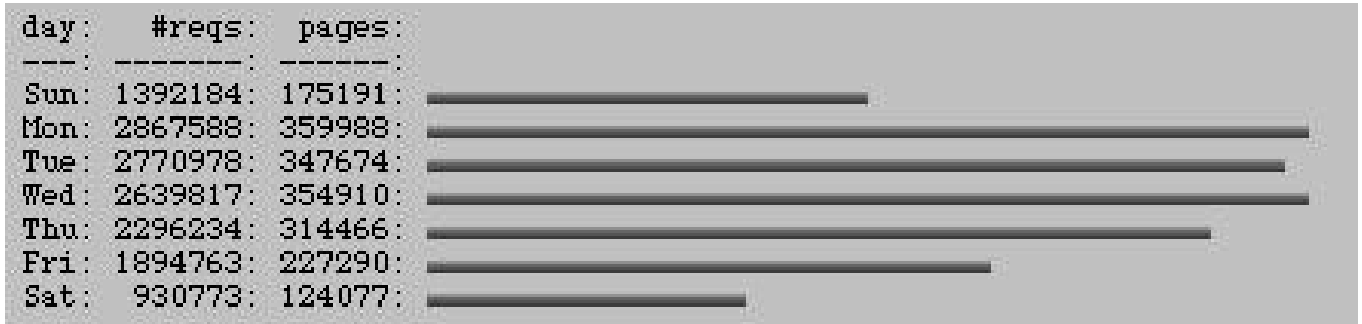


Figure 2. Average distribution of WebCT use per day of the week.

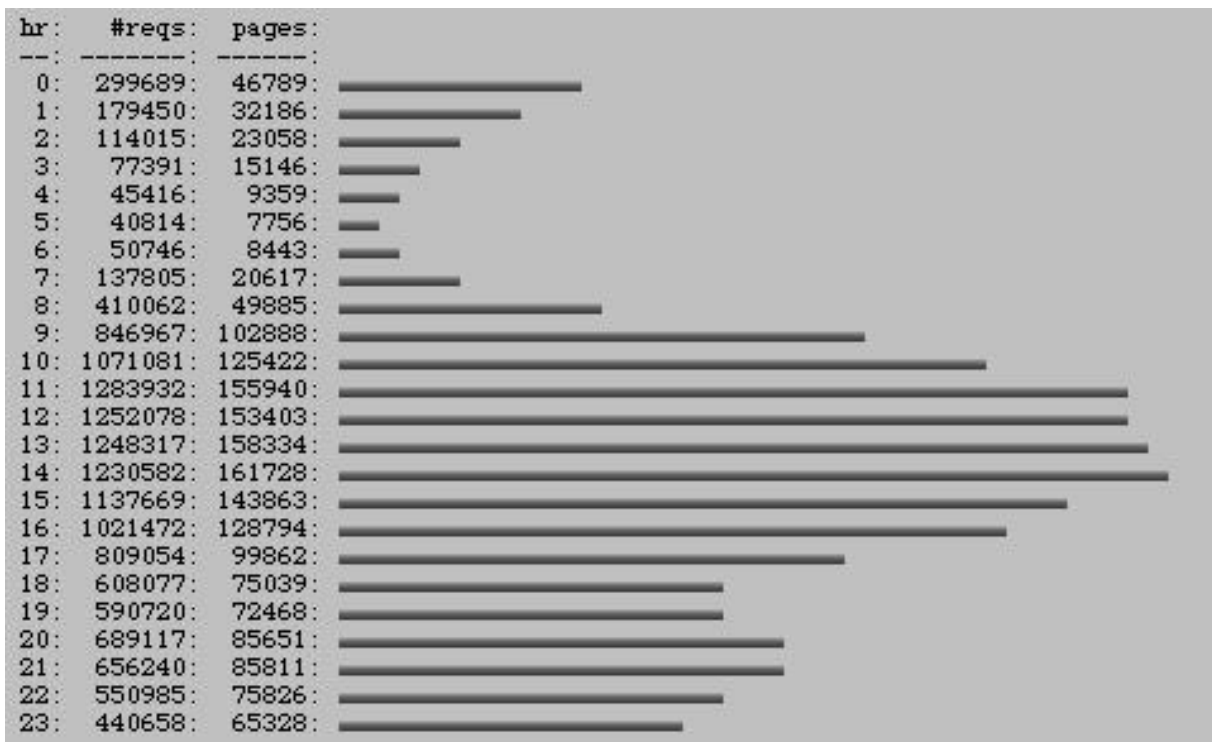


Figure 3. Average distribution of WebCT use per hour of the day.

The Executive Deans of the four teaching divisions requested that the funding model be refined to account for different usage rates between units. A revised model was built, based on the Australian Government’s Department of Education Science and Technology (DEST) definitions of online usage:

1 Web Supplemented (participation online is optional for the student)

2 Web Dependent (participation online is compulsory)

3 Fully On-line (there is no face-to-face component)

A refined funding model, which was agreed to by senior management, is shown in Table 7. However, when announced to teaching departments, this scheme was met by significant resistance. It appears that senior management had agreed to the scheme without consulting, or informing, teaching staff.

After some protest, senior management were persuaded to formally acknowledge the importance of online learning, and to provide ongoing funding for the continuation of WebCT at Murdoch.

Management	40% FTE
Administration/training	100% FTE
Administration support	50% FTE
Technical support - WebCT internals	100% FTE
Systems Programmer, incl. systems support	100% FTE
Helpdesk – casual staffing costs	\$Aus10,000
Annual fixed costs – hard-, software, training	\$Aus5,600

FTE – Full time equivalent

Table 6. Estimated staffing costs for effectively managing Murdoch’s WebCT installation.

An off-the-top allocation of \$Aus150,000 was provided in 2002 to cover salary costs not already provided by existing budgets. In addition, hardware and software license costs were accepted centrally, and Information Technology services entered into a partnership with the TLC to jointly support WebCT.

Setup price	\$Aus100	per course
Online level 1	\$Aus10.00	per student per course
Online level 3	\$Aus12.50	per student per course
Online level 3	\$Aus20.00	per student per course

Table 7. Differentiated user-pays funding model

6. Flexible Learning at Murdoch

At the same time as the funding crisis was impacting on WebCT functionality, a Flexible Learning Working Party of Academic Council (second only to the Senate as a University-wide decision-making body) was reviewing Murdoch’s provision of external and online study options. External studies (distance education) had been progressively devalued under the devolved administrative structure, and, as described above, the notion of online enrolment was both unpopular and confusing.

The Flexible Learning Working Party report (Thiele, 2002) attempted to resolve these issues by proposing “that instead of thinking of a unit as having various delivery versions, we should think of a unit as a coherent package of resources that can be accessed in various ways”.

Currently, a Flexible Learning Implementation Committee is investigating ways of moving towards a single version of a unit of study, where students can choose the ways in which they access resources – online, in print or face-to-face; and

where an equivalence of assessment is offered. This radical reconceptualisation of a unit of study will require significant organisational cultural change, but may also provide significant institutional efficiencies.

The remainder of 2002 will be spent in piloting five prototype flexible units, and developing a plan for the implementation of the project over the next three years. With this strategic direction, hopefully supported by appropriate funding, the remaining aspect of Fig. 1 which may form an obstacle to widespread adoption of online learning at Murdoch University is rewards and recognition for academic staff.

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Notes

- ¹ The term *unit* is commonly used in Australia to refer to a course of study undertaken over a 13 week semester. Typically, four units make up a full-time study load.
- ² No Murdoch faculty was part of the original study