A MODEL FOR THE IMPLEMENTATION AND SUSTAINABILITY OF A COURSE MANAGEMENT SYSTEM IN A RESEARCH UNIVERSITY

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Abstract

Many universities are facing the prospect of committing significant resources to a course management system. This paper presents a model adopted at a research university with predominantly on-campus students, for the implementation and sustainability of such a system. Although no one solution will suit all institutions, research-intensive universities all have a common culture that must be acknowledged and accommodated with any model for a distributed learning environment. This model emphasizes partnerships between the technical and academic areas of the universities and active student participation.

Keywords
Distributed learning environment, research university, course management system

Background

A number of structural changes have occurred in the tertiary education sector over the past decade, such as the expansion in the number of entry points for students, the shift from a relatively small set of highly focussed prerequisites to a more open system, and an increase in demand for modular programs with numerous entry and exit points. In addition, student numbers have risen dramatically with mature age and part time student numbers increasing as students attempt to balance employment and further education with a necessity to work from home. Funding cuts in government grants to universities have resulted in institutional strategies directed at attracting fee-paying students by offering a variety of articulation points into degree programs. Coupled with these external pressures there has also been a shift in the philosophy of pedagogy from an emphasis on teaching to that of learning, implying a fundamental shift in the role of teaching staff.

Universities are confronted with the conflicting goals of improving the learning and teaching environment for students whilst increasing the size of the student cohort (and therefore the funds available to the institution) with diminishing staff numbers. Much has been written on the ability of online systems to provide students with a wider access to educational opportunities (Spender, 2001; Ling et al. 2001; Brown & Thompson, 1997; Reid, 1999; Land, 2002; Condron & Sutherland, 2002). Most tertiary institutions have become involved to varying degrees in some form of distributed learning and committed significant funds to infrastructure and staff and student training.

Teaching staff at the University of Adelaide sought to integrate more effectively existing good practice and experience in learning and teaching into the use and development of educational technologies in order to improve the student learning experience and associated outcomes. Distributed learning was envisioned as an essential tool to be used by all staff with responsibility for student learning, rather than as a specialised activity of a few enthusiasts. The emphasis was to shift from innovation and individual projects to the effective integration and appropriate use of distributed learning for all students and a demonstrated evidence of enhanced student learning.

Staff development and student training was to be a major component of the strategy for the online program and an Online Help Desk facility for staff and students for routine requests for information and assistance. The program was to be more than the simple delivery of course content through the web. It was to incorporate access to a variety of resources (library resources, web-based information, on-line journals), materials that support learning (simulations, CAL packages) or communication (email, bulletin boards, videoconferencing, document sharing) and streamlined administration. From the perspective of the student, the program was to enhance transferable skills that would contribute to their future employment. As such, there must be opportunities for IT skills to be developed within undergraduate degree programs through embedding their use in the curriculum.

The University of Adelaide had developed a legacy course delivery system that functioned well for the static delivery of digital content. The system had no ability to engage students in interactive activity nor facilitate online discussions. Staff and students were seeking a richer, more productive environment in which to learn and teach.

Vision

The University of Adelaide's Learning and Teaching Plan (2000-2002) contained the following key goal: To encourage the development and use of student-centred and flexible learning through Information Technology and Telecommunications (IT&T) by:

- integrating student acquisition of appropriate IT skills with the design of course and subject offerings throughout the University;
- encouraging Faculties, staff and students to recognise the difference between the use of IT in the process of learning and teaching and the learning and teaching of IT;
- developing further generic capabilities for electronic learning and teaching through projects to improve quality and reduce the time involved on the part of academic staff;
- encouraging co-operation and the sharing of information in the development of electronic learning and teaching;
- ensuring the availability of appropriate and ongoing professional development programs in the technical and the pedagogic dimensions of electronic learning and teaching for all academic staff

The task was how to combine a vision of learning and teaching embedded in a cultural framework of a research-intensive university, the literature already available on previous implementations of distributed learning and course management systems, and actualise a sustainable program? The initial phase concentrated on identifying the stakeholders and bringing them together for "big picture' discussions.

Bringing the stakeholders together

Distributed learning and online delivery of course content was not a new activity for staff at the university. The two areas predominantly involved in strategy and policy on online learning, namely Information Technology Services and the University Learning and Teaching Committee, decided to form a small working party to summarise the issues, seek input from Faculty and student bodies and then make some clear recommendations about the process for moving forward. The task of the working party was not to decide on a particular system or product, rather its role was to be reflective, to identify the contextual nature of distributed learning at our institution and to identify where we would like to be in ten years time. This was an important part of the overall process, to take time to be reflective. Some of the key issues that were identified by the group included:

- any distributed learning system would need to accommodate the fact that staff at this university were involved in research and teaching
- emphasis should be placed on a devolved model of responsibility for course content and use
- whilst overall responsibility for strategy and policy would rest in central committees and structures, departments and teaching staff should have responsibility for tactical decisions on course content use and format
- resources must be provided to support any expected changes to staff or student work and study patterns
- recognition that any cultural shift associated with a new vision of learning and teaching would be an evolving process

A project group, PLATO (Providing Learning And Teaching Online), was then established, to implement a centrally supported distributed learning environment for the University. PLATO collated experiences and recommendations from universities across the world and held further forums with staff and student representatives. The issue of whether it was more efficacious to purchase a commercial product or to develop a purpose built system in-house was addressed. The advantages of purchasing a commercial system included a perceived professional level of service and support from the vendor, the expectation that the vendor would have experienced developers available and the tested product would be available for immediate implementation. The disadvantages of purchasing a commercial system included the realization that the vendor might not be responsive to the unique needs of the institution, the product may be difficult to integrate with other administrative and support systems and the source code would be unavailable for adaptation or modification. In reality all of these issues, both positive and negative, came to be realized during the implementation process and this is a fact that all institutions will have to confront. It was decided that for reasons of long-term sustainability and integration issues a commercial product would be used for the distributed learning environment.

The three commercial products investigated were Blackboard, WebCT and Lotus TopClass. All three vendors supply to the international market, have good track records, are substantially IMS compliant (IMS, 2002) and integrate with major administrative systems. In essence, one product was neither better nor worse than the others, they all had advantages and disadvantages. The final decision was based on which product was more suited to the current and future learning and teaching culture of the university and which product could be integrated more effectively with the existing university administrative and support systems. Blackboard was eventually chosen, however the model described in this paper is independent of this fact. The same model would have applied to any other commercial product or purpose built system, and indeed will still apply, should the university move to a different product in the future. This is a key issue when designing a distributed learning environment for a university, the conceptual model and the processes followed by staff and students should be substantially independent of the particular product currently being used. For this reason the PLATO group decided very early in the process to brand the new online environment as MyUni and not refer to the name of a particular software package. MyUni, as a learning and teaching environment, will continue even if the software used to deliver it changes.

MyUni - The Model

Various models have been identified for online learning and teaching systems, commonly involving collaborative activities, interactive content and assessment and a move to resource-based learning (Mason, 1998; Reid, 1999; Yetton, 1997; Bates, 1995, Brown & Thompson, 1997; Xiaoxing, 1999). The conceptual framework for distributed education usually encompasses one or more of the following patterns:

- digital enhancement to essentially face-to-face teaching
- mixed mode delivery of short, intense face-to-face sessions with extended periods of resource based learning
- fully online programs with little or no personal contact between teacher and student

Chickering and Ehrmann in " Implementing the Seven Principles: Technology as Lever described practical ways to turn educational theory into practice making appropriate use of technology " (Chickering & Ehrmann, 1996). The University attempted to use these guidelines to develop a distributed learning environment that enhanced student learning. The principles emphasised the importance of contact between staff and students, cooperation between students and active learning. MyUni would need to encourage this type of participation. However, new technologies and expensive systems do not necessarily cause a proportional improvement in student learning (Ehrmann, 2001). An evolving process with universal participation, necessitating a focus on the "average instructor" rather than on the innovator would be a central component of MyUni. Equally important is the construction of a sustainable collaboration between teaching staff and technologists, between staff and students and between teaching staff and evaluation specialists.

MyUni was conceived as a partnership between the two portfolios responsible for learning and teaching, Information Technology Services (ITS) in the Division of Staff and Student Services and the Learning and Teaching Development Unit (LTDU) in the portfolio of the Deputy Vice-Chancellor (Education) and Provost. An online program should always be a partnership between those areas of the University responsible for the technical aspects of advanced computer systems, the library and the educational areas responsible for content creation, staff development and evaluation. The ability to forge a genuine partnership between these areas is critical to the development of a sustainable, coherent online program. ITS currently provides the hardware, software, Online Helpdesk and initial training of staff for MyUni. Expertise for the creation of content resides with staff in the Faculties, whilst expertise in content formatting, packaging and delivery, staff development and evaluation reside in LTDU.

The organisational chart for the MyUni environment is shown in Figure 1 and emphasises the partnership between the two key areas, whilst acknowledging the expertise of individual components.
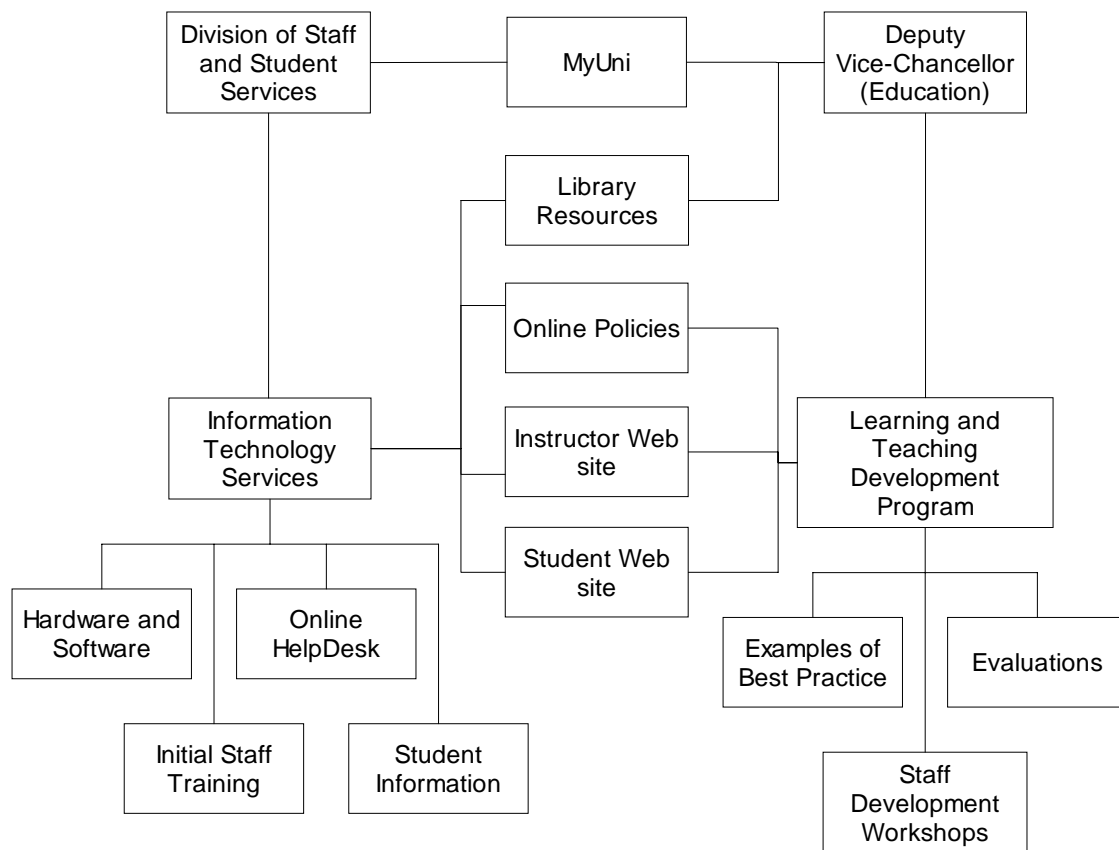
Model for MyUni

Figure 1 Organisational Chart for MyUni

MyUni – Implementation

Initial phase
The project group PLATO developed an implementation plan that included the following components:

- an evaluated pilot program
- an immediate, broad-based implementation of the online environment
- a professional development program to train staff to use the system
- an Online Help Desk as the initial contact for technical and instructional advice for both staff and students

- educational designers to provide ongoing technical and instructional support to staff
- an ongoing evaluation program to assess the efficacy of the use of MyUni on student learning outcomes

Project PLATO developed an initial project charter and plan and secured funding from the institutional sponsors (Executive Director, Division of Staff and Student Services and the Deputy Vice-Chancellor (Education) for the hardware and software orders. Through discussions with staff an initial suite of pilot courses were identified, as were the initial interface requirements for the administration systems and email gateways. Training sessions were then organized for the staff involved in the pilot courses and workshops on online pedagogy were held. The initial phase was to last one semester. This initial round of activity highlighted a need to review some of the business processes of the University and some of the work flow issues for staff. Pilot courses were made available to students after 4 months of preparation. Initially only 26 courses were available for students in the first semester of 2001, then 120 courses in semester 2 of 2001.

MyUni sought to develop all three of the modalities outlined above for a distributed learning system. The same environment should be capable of adapting to a variety of uses, as these may change over time. The initial trials for MyUni have involved:

Enhancement to face-to-face delivery
This approach to distributed learning is the most common form and is important for a rapid participation of staff who have a significant research commitment in addition to their teaching. It is the major use of MyUni at our university. MyUni emphasises convenience and flexibility for students by providing access to course content. In order to encourage standardization in the format for content delivered to students the MyUni team recommend (but do no mandate) that:

- documents for printing be available in Adobe Acrobat format
- documents for on-screen viewing should be either in Adobe Acrobat or html format
- PowerPoint slides should not be placed online unless staff have a specific reason for doing so
- staff use the Online Helpdesk to convert their PowerPoint or Word documents to Adobe Acrobat format

The current support for MyUni is modelled on university teaching staff preparing and delivering the content for their own courses. Teaching staff have maximum control over their content and the format for its delivery to students. This model is not appropriate for fully online or mixed mode delivery of courses and programs, it assumes a significant level of contact between staff and students. The major enhancements to student learning in this framework involve the use of email communication, online threaded discussions and online formative assessment. The learning model is centred on a resource-based approach to learning, involving the provision of necessary resources to students and encouraging students to take significant responsibility for interpreting the content. Staff-student contact time is then used for elaboration or clarification of course content and exploring extensions. There is a mixed use of multimedia enhancements to course content by staff. The central service units do not produce multimedia material for staff, but will provide a file conversion service and advice on how to use multimedia material effectively. The pedagogy is still relatively teacher centred.

Our approach has been to encourage participation by all staff and students, with guidelines and advice on practices that will enhance student learning. The MyUni environment is not designed to be prescriptive nor does it require every staff member to be a web expert. A natural consequence of this approach is a variation in the level of staff participation, the quantity of material in course web sites and the quality of the learning experience available to students in different courses. In terms of the model we have adopted this is not a disadvantage, rather it reinforces the paradigm that discipline specific teaching staff may choose different modes of teaching just as students have different modes of learning. In a research intensive university there will necessarily be a compromise between the proportion of time staff spend on their teaching and research activities. Student learning may be enhanced by both types of activities.

The Online Helpdesk is a central component of the MyUni environment and is staffed by students from across the discipline areas of the university. Although some of the students on the Helpdesk have significant technical skills in computing, the majority are appointed on the basis of their customer service

approach. The Helpdesk is the initial contact point for both staff and students, either by telephone or by email. They provide a number of services for staff, including initial advice on appropriate file formats, how to reduce the size of downloadable files and a file conversion service. They do not provide interpretation of University policy, comments on staff online content or web pages nor advice on evaluations. These aspects are referred to the LTDU. Most student queries relate to access and downloading files.

Mixed mode delivery

The University is not a traditional distance education provider. Nevertheless, there are a number of discipline areas where the demand for a significant online presence is required. The Department of Clinical Nursing offers courses to nurses in rural areas of South Australia through MyUni. The course consists of collaborative activities, learning resources and joint assignments. The heart of the course takes place online through discussions, accessing and processing information. The course contents are dynamic as they are largely determined by the individual and group student activities. Evaluations conducted on these courses have highlighted the necessity for professional assistance in the formatting and packaging of educational content for the online environment, the need for suitable support in the form of an Online Helpdesk offering 24 x 7 support and the requirement for professional evaluations of courses with timely feedback to students. The staff role is also more extensive compared to the first model, as less of the course is pre-determined and more is created each time the course is delivered, through the discussions and activities.

Fully online delivery

An example of a fully online course is the Graduate Program in Gastronomy, the result of a collaboration between Le Cordon Bleu and the University's Research Centre for the History of Food and Drink. The introductory phase has run successfully in the first half of 2002 and the preliminary evaluation studies have indicated a very positive desire for students to continue with the fee-paying portion of the program. The support issues, as outlined above, were the major features of the student feedback and will continue to be a major element that we will need to address with this type of model.

Trial implementation report

Overall the feedback received from participants, in response to the use of MyUni as a centrally supported online distributed learning tool, were very positive. The features felt to be most valuable were:

- personalised portal interface that provided rapid access according to enrolment and/or your role in the institution
- easy navigation and use for students accessing material and staff uploading material
- integrated nature of the software eg. e-mail, calendar, discussion forums, course material, online chatrooms, announcements and staff details are all accessible within the one package
- the flexible interface and ability to provide links to further material

The major outcome from the feasibility study was highlighting of the fact that the implementation of MyUni is a considerable task that needs development of business requirements in many areas:

- interfaces to other systems (email, PeopleSoft, Human Resources)
- development of the course catalog schema for classification of courses
- decisions about administration levels and which people will be assigned to various roles within MyUni
- the extent to which MyUni will be customised for this site and the degree to which individual instructors will be able to customise courses
- executive reporting requirements

The Online Education Helpdesk model based on students had several advantages, student employment, student feedback, cost effectiveness, students developing leadership and management skills. Students providing Helpdesk service and file conversion and advice on appropriate files types was seen as a very positive experience by staff. The partnership between the technical and academic, between general and academic staff, were both viewed as advantages of the adopted model.

On the basis of these initial trials, the various staff and student forums and the formal evaluations, it was decided that a full implementation of the MyUni environment would be adopted for 2002. The decision was made that every course would have an entry in MyUni but there would be no prescriptive requirements about the level of staff participation. A regular series of training sessions and advanced workshops was instigated for both academic and general staff. This was another issue highlighted in the initial feedback stage, the fact that the MyUni team had concentrated on academic staff and had not included general staff in the training and forums. The MyUni environment provides significant administrative tools for all staff, especially in relation to notices, calendar events and email.

Risk assessment
The PLATO team conducted a series of Risk Assessment Workshops during 2001 and the agreed measures of success were:

- all courses to have a presence in MyUni by March 2002
- all students to have ready access to MyUni by March 2002
- all staff to be involved in using MyUni by December 2002
- all course content from the previous legacy system to be migrated to MyUni by December 2002
- a small number of external fee-paying courses to be in MyUni by December 2002
- the principle of continual quality improvement to be in place throughout 2002

All of the risks subsequently identified by the team in the risk register had been assessed with respect to their impact on these agreed success factors. There were major technical risks associated with the development of the MyUni environment and the implementation of an enterprise level course management system. The architecture of the software was designed to separate attachments to courses (pdf, Word and HTML files) and store them separately from other course data held within the Oracle database. This results in a system management issue of maintaining consistency between the filesystem and the database for the purpose of disaster recovery. Closed system backups of the database and filesystem should to be performed simultaneously to guarantee system recovery. This would result in the reduction in 24x7 availability of the system in order to perform regular closed backups for security. There were considerable delays with obtaining resolution to problems and access to technical expertise from the software vendor in the initial stags of implementation. The MyUni environment was critically dependent on the timely processing of enrolments and entry of student details into PeopleSoft. This was a major issue for the early part of 2002 when a significant number of students did not have access for 2-3 weeks to MyUni. The project also discovered issues with the management of information and services to off-campus students where complementary business procedures needed to be designed. Integration issues between MyUni and the university administration systems have still not been completely resolved.

MyUni – Evaluations

Evaluations are an integral part of any implementation process, and may often involve decisions having to be made on the basis of complex and controversial interpretations on incomplete data. There are many paradigms associated with the evaluation of learning and teaching, and although distributed learning is a relatively recent phenomenon in the educational environment, the issues associated with evaluations are fundamentally the same as any system aspiring for quality enhancement (Oliver & Conole, 1998; Gordon, 2000; Oliver, 2000). Our approach to MyUni evaluations involves both quantitative and qualitative methodologies, as well as collaboration between practitioners and evaluation specialists.

MyUni evaluations involve 4 different types of data collection and analysis (Oliver, 1997), each forming an integrated component in the quest for quality learning outcomes:

- formative, involving a student questionnaire on readiness for online learning
- technical quality assurance of the MyUni courses, involving interrogation of the data base for information on which sections of the course site were being used, file types used and their size
- summative, involving a student questionnaires on learning outcomes
- illuminative, involving 45 minute taped interview with teaching staff involving questions (submitted beforehand) about online learning and 45minute taped focus group session with

volunteer students (maximum 8) undertaking the course answering questions related to the issues of how students learn in the online environment

The formative evaluations were carried out at the beginning of a course by teaching staff. They are built into the MyUni course template generated automatically at the commencement of the semester, but are not activated by the system administrator, rather by the course teacher. The advantage of this approach is that the survey results are available immediately to the teacher and students will not complete a survey if the course teacher is not intending to respond to the results. Our model for the evaluations was based on the premise that one should not ask for feedback if you have no intention of responding, or are not in a position to respond, to the results. The technical quality assurance is an automated process using software to collect information on the sections of the course site that are being utilised, and to monitor the file types and sizes that staff are loading. Should the file size exceed 1 Mb the course teacher will be notified of the relevant download times of the file from an average modem and advised how to reduce the size of the file for optimum delivery. Summative evaluations involve standard "Student Evaluations of Learning and Teaching (SELTS)" questionnaires. SELTS seek responses from students about their concerns from single, well defined questions, and from open ended questions requiring reflective answers. Illuminative evaluations are primarily ethnographic, as opposed to experimental (Oliver, 1997). They aim to uncover the issues that are important to the participants, rather than assessing the efficacy of an educational process in terms of standard definitions of assessment. The illuminative methodology involves using observations, interviews and questionnaires with a subsequent document analysis. It is important to remember that illuminative evaluations are primarily contextual, they are not meant to provide evidence of generalisations that would be applied to other courses or programs.

MyUni – Sustainability Issues

Technical considerations
The trial implementation phase highlighted the necessity for a small group of technical specialists to be dedicated to hardware and software maintenance of MyUni. The integration of MyUni with other resources, both administrative and educational, necessitates a close collaboration between the MyUni technical group, Human Resources and the Library. As students and staff become more dependent on the system for their learning and teaching, uninterrupted availability of content and communication lines becomes critical. This has resource implications that must be accommodated in planning and budget processes. The issue of equity of student access also becomes a technical consideration as well a resource issue.

Learning and Teaching
Technology is unlikely to be effective in improving student learning unless it is appropriately integrated into the curriculum. A key challenge for universities is to encourage teaching staff to use technology in more imaginative ways than as a digital photocopier for the distribution of content (Laurillard, 1993). Teaching styles will have to be adapted to a distributed learning environment. Although some staff will adjust to the new pedagogy that involves technology as an integral component in teaching, some will prefer to continue with methodologies they have found effective in the past. In order to promote the advantages of using a distributed learning environment, teaching staff will need significant support over the next few years. Although some authors indicate that most staff will need to be "retrained" for this new environment (Beaudoin, 1998), MyUni encourages all staff and students to participate but does not prescribe the nature of the participation. It is unrealistic, and counterproductive in many cases, to expect all staff to become entrepreneurial web users and all students to become avid web-based learners. It is not appropriate to refer to staff as being intimidated about rapidly changing technologies simply because they have found alternative methodologies effective. We do not want dedicated teaching staff to be made to feel they are losing contact with the teaching process. Nevertheless, all staff are expected to participate in improving the quality of learning and teaching, and this does involve effective communication between staff and students and a more student-centred approach to teaching. Capabilities such as online assessment, interactive simulations and multimedia, access to external resources and web-based communications all provide experiential learning for students.

Student and Staff Development
The provision of support staff for both students and teaching staff is critical, yet the resources allocated to this task can be open-ended. We have adopted the model that emphasizes considerable autonomy for

lecturers in their interactions with on-campus students and provide support staff to assist them with their MyUni site and file conversion but not content creation. Staff development concentrates on assisting effective learning outcomes, the MyUni model assumes this will be encouraged when teaching staff feel actively involved in engaging students with the material. Staff will not respond as effectively if they feel their teaching role is being replaced by online content substantially produced and delivered by someone else.

Policy Issues

The implementation of MyUni highlighted a significant number of inconsistencies and discrepancies in university policies related to data entry, data sharing, staff and student access to online resources and course calendar information. The Digital Amendments to the Copyright Act, the attribution of Moral Rights and the general issue of intellectual property rights for teaching materials have all had an impact on how staff use MyUni. The right of an author or artist to be identified with his or her works (right of attribution) and the right to object to alteration or other derogatory treatment of the work (right of integrity), cause staff to be reluctant to use some online resources. The library has been especially helpful in providing guidelines for staff on these matters. One area where we continue to struggle is in the provision of online material in an appropriate format for people with disabilities. The problem is not understanding the guidelines for such material, rather the resources that must be allocated to ensure content created by teaching staff is in the appropriate format.

MyUni - Future Expectations

Why should the issue of implementing a course management system in a research-intensive university be different from any other type of university? All universities will have some fundamental issues in common, such as integration of the online environment with administration systems and the library. Teaching staff in research universities will attempt to inform their teaching with the latest research results from current, original research papers from their discipline field (often from their own research groups). They also insist on retaining significant autonomy over the content of course material and its method of presentation. We are working towards is the integration of MyUni with the library systems so that a unified learning environment is available for students. We are gradually providing interactive tools for students to use within the online environment so that they are encouraged to engage with research quality data. Since students have differing learning modes (McKeachie, 1999) we should provide them with a choice of learning paths. This paper has outlined the model the University of Adelaide has adopted to implement a course management system in the expectation that staff and students would both benefit in the short to medium time frame. The appropriate use of a distributed learning environment can enhance the student learning experience by allowing teaching staff to provide a variety of experiences and choices for students. Teacher-centred content delivery can be shifted towards a more student-centred approach by using the technology for increased interactivity. This should allow research active teachers to retain significant autonomy over their content and delivery whilst also improving the student learning experience.

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