Content Management: An Institutional Repository for the University of Wollongong

The Way Forward

Final Report of the Content Management System Evaluation Team

12 December 2005

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1   Executive Summary

An institutional repository will foster teaching, research and community service by giving teachers and researchers with access to relevant materials, giving a higher profile to university research and giving the public access to work carried out at the University. Hence the University of Wollongong must plan for its long-term institutional repository needs. As teaching and research staff increasingly work in an electronic environment, the University must provide the necessary infrastructure to enhance, capture and promote the intellectual capital of its community. This will necessitate increasing the skills of general, academic and IT staff, the implementation of infrastructure upgrades across campus, and the identification of software solutions.

This rapidly evolving area of information technology and infrastructure will require the University to take on board new solutions and adapt to the changing environment set by government and funding providers. Open source solutions are increasingly being implemented by universities worldwide. The federal government is supporting the investigation of open source solutions via its Strategic Infrastructure Initiatives funding. As these projects come to fruition in the next year it will be essential that the University and ITS maintain a watching brief on developments of benefit to the University.

Although we have spent a year seeking an integrated single solution to the institutional repository needs of the University of Wollongong and its satellite

campuses, none has emerged. Instead, a combination of the aforementioned proprietary software with open source solutions currently under development may enable the University to better manage, promote and reuse its research and teaching and learning outputs.

At this point in time, the Content Management System Evaluation Team does not recommend a particular solution to the institutional repository needs of the University of Wollongong. The adoption during 2005 of specific software packages should be treated as an interim step; these packages will provide an opportunity for University staff and students to acquire knowledge in the operation and use of digital repositories.

Authors: Michael Organ, Helen Mandl and Members of the Content Management System Evaluation Team.

2   Introduction

The Content Management System (CMS) Evaluation Team was a project group formed by the eTeaching Steering Committee on 2 March 2005.

The Team's focus was on the use of a CMS as a centralised institutional repository for assisting in the development and maintenance of teaching and learning objects including peer reviewed re-usable resources, and research-based digital objects such as refereed journal articles, preprints, working papers, e-readings and theses. The Team's terms of reference required it to work closely with key stakeholders to:

1. Assess and report on current practice and University needs relating to the use and maintenance of digital objects

2. Lead University consultation and discussion on the merits of a content management system

3. Liaise with the Graduate Attributes Outcomes Portfolio Team regarding possible functionality in the systems we explore

4. Explore the potential for using the system for web content management

5. Develop checklists for the evaluation of potential content management systems

6. Organise presentations and demonstrations of potential content management systems

7. Liaise with key stakeholders and involve them in the process of assessing potential content management systems

8. Evaluate a range of content management systems

9. Recommend a content management system solution for the University

10. Construct a budget for the purchase and implementation of a content management system

11. Provide progress reports to the eTeaching Steering Committee and the Research Standing Committee

12. Develop strategies and incentives to encourage academic staff to use the content management system

The CMS Evaluation Team met bi-weekly and held 18 meetings between 22 March and 5 December 2005. Membership of the Team comprised the following:

- Helen Mandl   Library, Project Leader and chair
- Professor Sandra Wills   CEDIR
- Dr. Ric Caladine   CEDIR
- Dr. Christine Brown   CEDIR
- Associate Professor Brian Martin   Arts
- Associate Professor Lee Astheimer   Biomedical Sciences
- Dr. Jon Cockburn   Creative Arts
- Dr. Wendy Russell   Biological Sciences
- Sharon Hughes   Research and Innovation Division RaID
- Dr. David Christie   Academic Registrar's Division ARD
- Joe McIver   ITS – to 31 May 2005
- Donna Meagher   ITS – from 31 May 2005
- Michael Organ   Library, Secretary

Megan Huisman (ARD) and Russ Pennell (CEDIR) also attended Team meetings during the latter phase of its deliberations and provided valuable input.

A CMS Team website – **ir.uow.edu.au** – was created in July 2005 to help inform the University community of the work of the Team. The site also housed Team documents such as minutes and reports, and provided links to articles which discussed the open access issue and the reuse and storage of teaching and learning objects.

The CMS Team worked to the following timetable, adopted at the meeting of the eTeaching Executive Committee on 2 March 2005:

March 2005	1. Develop Terms of Reference	Completed
	2. Formation of steering committee or working party	Completed
	3. Development of action plan and timeline	Completed
March – mid May 2005	4. Discovery - assessment of University needs and potential digital objects – via individual interviews and forums. Scope the range of current digital objects in faculties. Could include teaching objects, text-based objects, working papers, eprints, ereadings, multimedia, digital art etc. Determine extent, size, format, complexity, and longevity.	Completed
	5. Report on needs assessment	Completed
mid May – Mid June 2005	6. Development of checklist for CMS	Commenced
	7. Formation of broader evaluation committee – likely to include more academic staff	Completed
June – August 2005	8. Demonstrations of CMS and repository systems	Completed
	9. Possible provision of systems for evaluation	Completed
September – October 2005	10. Evaluation of systems against checklists	Deferred
November 2005	11. Report and final recommendation on a system/systems best suited to meet University teaching and repository needs.	Completed

The Team worked closely to this timetable. The only major area of deviation was in regards to the preparation of checklists (#6) and the evaluation of systems against those checklists (#10). A further discussion on this issue and its deferral is contained in the Actions and Outcomes section below.

During August the Team put in place a campus access only *DSpace* pilot site - lib59.uow.edu.au:8080 - to assist in the process of better understanding issues associated with the operation of an institutional repository.

3   Actions and Outcomes

Within its terms of reference the CMS Team was allocated 12 specific tasks by the eTeaching Management Committee. These tasks, with associated outcomes and recommendations for further action, are described below:

1. <u>Action</u>: **Assess and report on current practice and University needs relating to the use and maintenance of digital objects**

    <u>Outcomes</u>: A Needs Assessment Survey was carried out during May-June 2005. This involved Helen Mandl and Michael Organ formally interviewing 51 individual members of staff, along with engaging more than 70 staff through groups such as faculty committees. These encounters comprised Q&A sessions aimed at seeking information on the current use of digital objects on campus, and perceived needs for their re-use, storage and promotion. Open access issues were also discussed with academic staff.

    The *Needs Assessment Survey* report (attachment 1) outlined some of the ways in which digital objects are stored, reused and made available on campus, and clearly identified the need for an up-to-date, centralised system which serviced the needs of staff in this area and dealt with digital rights management and related administrative issues.

    The Team also engaged in discussion regarding issues such as priorities for different stakeholder groups. These included academic staff, support staff from CEDIR, the Library and ARD, University administration, and external policy setters such as government.

    The Team identified the lack of any framework or policies for campus-wide management of teaching and research objects.

    It is clear that the University needs to better manage digital objects, from desktop to the whole-of-campus level. Information Technology Services ITS also needs to be made aware of the increasing local demands for storage, discovery and re-use of digital objects. The large size of some of these objects, most especially multimedia items used in teaching, will have implications for infrastructure development across campus. Whilst being driven by the needs of particular faculties at this point in time, it is anticipated that this area will grow with the development of 'e-Research' and enhanced teaching methods.

    The term "e-Research" embraces those virtual environments that facilitate research collaborations of researchers and research organisations, nationally and internationally. While relatively new as a structured concept, e-Research has started to underpin all scientific disciplines, including the social sciences, and humanities. e-Research allows for the sharing of data and information via distributed high-performance computing and data storage capacities and accessible data and information repositories.

    Files required for streaming audio and video lectures to satellite and offshore sites are large and require a central storage system. A Learning Content Management System (LCMS) would provide the descriptive and search functionality linking through to the streaming server. It would also work

seamlessly with other University systems such as *WebCt / Vista* and SOLS. A range of current and future projects including the re-purposing of video pieces, webcasting and capture and pod casting would utilise the LCMS as the descriptive database linking to the storage server.

The Needs Assessment Survey revealed that there is a pressing need for a centralised, digital repository at the University. Such a repository should have varying levels of access. These should range from open access, as required for research objects, to closed access, which has been requested for the majority of teaching and learning material, in a similar vein to *WebCt / Vista*.

The repository should also be able to deal with a variety of formats and accommodate a variety of metadata schema. This need is at present felt by both academic and general staff.

Current practice in regards to the management of digital objects across campus is ad hoc, uncoordinated and does not make use of the latest technologies.

Recommendation: The University of Wollongong adopt a centralised approach to an institutional repository program to manage teaching and learning objects and research material.

2. Action: **Lead University consultation and discussion on the merits of a content management system**

    Outcomes: The CMS Evaluation Team comprised representatives from academic and administrative units across campus. Academic membership was expanded mid-way through the process to facilitate wider discussion within the faculties on the general subject of institutional repositories, and the more specific issues of reuse of teaching and learning objects, and open access to research material.

    A number of public discussion and briefing sessions were organised for University staff in June and July, along with team meetings and one-on-one briefings. In this way, the work of the Team was widely publicised throughout the University community, and opinions sought. The work of the Team therefore both stimulated discussion on the topic of an institutional repository and also offered an avenue of assistance for those individuals and faculties looking for solutions in this area. This need remains and those faculties identified will form the collaborators in any pilot projects.

    Recommendation: The University utilise any on-campus repository projects to further promote issues associated with content management systems.

3. Action: **Liaise with the Graduate Attributes Outcomes Portfolio Team regarding possible functionality in the systems we explore**

    Outcomes: The Team discussed the issue of student portfolios and came to the conclusion that, whilst there could be some linkages between the institutional repository and storage of student portfolio material, it was difficult to envisage such a link within the systems explored.

The Graduate Attributes Outcomes Portfolio Team met a number of times during 2005 to discuss and explore a student portfolio system called *IWebfolio*. After initial investigation, this system was not pursued for use by students and the Medical School. However a small trial will be implemented to evaluate the suitability of the system as a staff peer review mechanism.

The level of interest in a portfolio system is still strong and other solutions will be explored in 2006, with the aim of obtaining a better understanding of how student portfolios could enhance learning and student experience outcomes. Possible links between a student portfolio system and content management system will be better revealed via this process. During the course of the year, it became apparent that other system vendors such as WebCT are also looking at developing portfolio modules as part of products such as Vista.

Recommendation: The Graduate Attributes Outcomes Portfolio Team provide a separate proposal outlining the most appropriate solutions to their needs.

4. Action: **Explore the potential for using the system for web content management**

   Outcomes: Web content management and institutional repository content management are two different systems with similar terminologies.

   The Team came to the realisation that web content management was an evolving area which would not be best suited by the installation of an institutional repository, but rather, by a specific web content management solution. The present institutional repository software solutions did not specifically address all the needs of a web content management system.

   The creation during the year of a separate web content project, run by the Academic Registrar's Division ARD, reinforced the decision by the Team to turn its focus away from web content management and towards the management of teaching and learning objects and research objects within a closed and / or open access repository.

   Some material generated by the web content management system may find its way to the institutional repository, though this would not be a primary driver. One possible use may be for the storage of subject outlines and reading lists in the repository with links to the web content management system.

   Recommendation: That this report inform the Web Content Management System Team and they consider repository content in their deliberations.

5. Action: **Develop checklists for the evaluation of potential content management systems**

   Outcomes: The process of developing checklists of the University's specific needs and requirement in regards to a content management system was commenced during the term of the project. However it was recognised that any

such checklists would be less than comprehensive due to the lack of experience by team members and the University in operating such a system.

A number of external checklists were obtained to feed into this process.

Recommendation: Checklists be developed for the evaluation of content management systems at the University, utilising experiences gained from pilot projects and first-hand experience.

6. Action: **Organise presentations and demonstrations of potential content management systems**

   Outcomes: Helen Mandl and Michael Organ made a number of presentations to University staff on the work of the Team and the subject of institutional repositories during 2005. Demonstrations were also presented to the Team of a number of software solutions, including *DSpace*, *Digital Commons* and *Learning Edge*. Some team members had also seen demonstrations of *Harvest Road* late in 2004 as part of the Learning Management Team. A number of demonstrations of the *DSpace* pilot project were presented to staff during the second half of the year.

   In order for any institutional repository program to be a success, there must be usage at the individual desktop level by academic and teaching staff. They must engage with the process, both in populating the repository and in promoting and using it. In order for this to be achieved, the task of demonstrating and presenting will be an important part of the roll-out of any institutional repository program.

   Digital rights management, specifically copyright and intellectual property issues, will form an important part of the successful implementation of such a program.

   Recommendation: The University support a program to educate staff on issues concerning institutional repositories.

7. Action: **Liaise with key stakeholders and involve them in the process of assessing potential content management systems**

   Outcomes: The membership of the Team was designed to achieve broad representation across campus. It included a mix of academic and administrative staff. There was no student membership of the Team. Key stakeholders were engaged via the Team meeting process, one-on-one interviews and group information and discussion sessions.

   During August – October the Office of Research and the Graduate School of Medicine Project Team raised urgent specific issues in regards to their repository needs for 2005-6. The previous work of the CMS Team facilitated the process of assisting these two groups in making informed decisions concerning repository needs.

   It is clear that the University will need to continue to monitor the environment of content management systems, as more software solutions become available and

as the Federal government's Research Quality Framework process evolves. It is envisaged that any institutional repository will form a key element of the University's teaching and research infrastructure. It must be flexible, simple to use, scalable, interoperable and able to generate relevant statistics in regards to usage and impact.

Recommendation: The University maintain a watching brief on content management systems, particularly in the open source environment, giving special consideration to the Research Quality Framework process and the reuse of teaching and learning objects.

8. Action: **Evaluate a range of content management systems**

Outcomes: Institutional repository content management systems are relatively new, with few proven open source or proprietary software solutions on the market. During its existence the Team considered the following CMS solutions in some detail:

- o DSpace
- o Digital Commons
- o Harvest Road Hive
- o Learning Edge
- o Concord Masterfile
- o Open Repository

In regards to research objects the open source *DSpace* was the most widely used solution worldwide, whilst Proquest's *Digital Commons* was the most popular proprietary solution. Complex solutions for teaching and learning objects were available via *Learning Edge*, Harvest Road *Hive* and Concord *Masterfile*. Whilst many of these solutions could handle both research and teaching and learning objects, it was clear to the Team that there was a clear distinction between the management issues involved with the two groups, and therefore the likely software solution would be different.

It was decided to implement a *DSpace* pilot in order to increase the knowledge of Team members in the use of an institutional repository and assist with the evaluation process. Time constraints meant that vendor demonstrations were only received from *Digital Commons* and *Learning Edge*, though the team secretary also attended demonstrations of Concord *Masterfile* and Harvest Road *Hive* given to the School of Medicine Project Team. As previously mentioned Harvest Road *Hive* had been seen by some team members in 2004.

Evaluations of the available content management systems were therefore of a preliminary nature.

In regards to open access research repositories, at the time of the compilation of this report, *DSpace* is the leader in the international scene as an open sourceware solution, whilst *Digital Commons* is the leading proprietary software.

In regards to teaching and learning object repositories, also known as Learning Content Management Systems, the two lead solutions were *Learning Edge* and Harvest Road *Hive*, both Australian.

Emerging and new developments have arisen continually throughout 2005. Both proprietary system vendors and the worldwide open source community are working rapidly to develop and tweak solutions for the repository area. The links between repositories and other systems such as learning management systems are becoming tighter and more intertwined.

Recommendation: The University continue to monitor institutional repository solutions as they become available.

9. Action: **Recommend a content management system solution for the University**

    Outcomes: During the course of the year developments occurred within the University that overtook some of the work of the team and whilst not directly making a recommendation, the team believes that the projects given priority by the DVC (Research) and the Medical School are excellent starting points for continuing activity in these environments.

    During September the Library, in its preparation of a Research Repository proposal for the DVC (Research), recommended that Proquest's *Digital Commons* software be adopted for the period 2005-7. *DSpace* was not recommended due, in part, to local IT support issues.

    The Graduate School of Medicine Project Team urgently required a Learning Content Management System and *Learning Edge* appeared to meet their needs in addition to those of the University generally.

    The Team also supported the setting up of a *DSpace* pilot project in August.

    The Team considered that any recommendation for a single CMS solution for the University was premature and that, instead, various pilot projects should be investigated with additional solutions being considered during 2008. These deliberations could take on board experiences gained during 2006-2007 through the direct use of *Digital Commons* and *Learning Edge*.

    Recommendation: The University revisit its institutional repository needs during 2008.

10. Action: **Construct a budget for the purchase and implementation of a content management system**

    Outcomes: Whilst the Team did not recommend a single content management system solution for the University, a budget and implementation strategy was developed by the Library for the Research Repository proposal utilising Proquest's *Digital Commons* and the open source *DSpace* software. A copy of the successful submission is included in the attachments to this report, along with

the *DSpace* costing. Costings were also prepared by the Graduate School of Medicine Project Team for the *Learning Edge* software, and these were extended to a University-wide solution.

In each case, the majority of costs are those for staffing to provide IT support, implementation and integration activities in order to ensure widespread acceptance and use of the repository.

The digital and external environment have matured to the extent that content management in the form of research and teaching repositories must be seen as integral pieces of University infrastructure. If UOW is to take its ETeaching Plan to the next level, a repository for learning objects supports that vision. In terms of return on investment for research activity, a repository for UOW publications must be seen in a similar vein.

A centrally supported infrastructure that provides assistance to all faculties is essential. Recurrent funding should be identified to ensure its long-term sustainability. Funding was provided for two years to cover the implementation of the *Digital Commons* research repository. Additional funding will be required for *The Learning Edge*.

Recommendation: The University investigate funding sources for the content management program.

11. Action: **Provide progress reports to the eTeaching Steering Committee and the Research Standing Committee**

Outcomes: Progress reports were provided to the eTeaching Steering Committee in June and October by Helen Mandl. In addition, the Needs Assessment Survey report was presented to the Committee at the June meeting, and at the October meeting Team members Dr. Christine Brown and Michael Organ presented a demonstration of the *DSpace* pilot site.

The Research Standing Committee was informed of the work of the CMS Team via Team member Sharon Hughes' regular reports to the Deputy Vice-Chancellor (Research) throughout 2005. The success of this process was revealed by the success of the Research Repository proposal in October.

It is envisaged that the current report will be presented to the December meeting of the Committee, with a recommendation that it be noted and consideration be given to its findings and recommendations.

Likewise, the Research Standing Committee will be informed of the preparation of this report.

Recommendation: The final report of the CMS Evaluation Team, dated 12 December 2005, be presented to the eTeaching Steering Committee and the Research Standing Committee.

12. <u>Action</u>: **Develop strategies and incentives to encourage academic staff to use the content management system**

<u>Outcomes</u>: The Team realised the important role that academic staff would play in determining the success or otherwise of an institutional repository, whether it be focussed on teaching and learning objects or research objects.

The literature refers to a number of strategies to encourage academic staff to use a content management system, and also identifies the difficulties in achieving this. The most useful reference was: Nancy Fried Foster and Susan Gibbons, 'Understanding Faculty to Improve Content Recruitment for Institutional Repositories'. *D-lib Magazine*, 11(1), January 2005.

There was discussion amongst Team members in regards to the use of the 'carrot and stick' approach, aiming to ensuring that staff make use of any institutional repository set in place. Other institutions have implemented specific policies however a mixture of strong guidelines and persuasive benefits was seen as the best way forward.

In addition, key strategic faculty projects should be supported that will integrate resource pooling for staff development, subject and curriculum review and peer review purposes. This could occur via Faculty Service Agreements that deliver concrete and long-lasting results.

In regards to teaching and learning objects, it was felt that a repository should be made available which provides academic and teaching staff with a relatively simple process whereby such objects can be stored, discovered and reused. A number of examples of possible use have been identified and interest expressed by faculty staff. For these scenarios, see Attachment 3.

With regard to research objects, it was felt that the integration of faculty research management processes with the submission of research outputs to the repository was vital. This would require the participation of individual researchers, with departmental support, as is currently the case with the annual HERDC process. The need to better expose University research outputs to the world was also an important driver.

<u>Recommendation</u>: The University of Wollongong develop policy and guidelines which actively support the institutional repository.

Section 4   Ongoing Collaboration

Whilst this report ends the work of the Content Management System Evaluation Team, the team has identified a need for the University to continue its oversight of these centralised systems supporting teaching and research. Many of the systems investigated have the ability to interlink with each other and into existing infrastructure. All of these systems afford the University the opportunity to improve its management of information and content.

A number of other projects occurring simultaneously on campus such as the Web Content Management project and the Research Information Management project have implications for the systems proposed by this team. Rather than each of these projects being developed in isolation, it is important that some form cross University liaison occur on an ongoing basis.

We propose that there be a *Joint Committee on University Content Management* that meets as required to provide an opportunity to update those involved in the various projects, to avoid duplication of effort and to inspire clever solutions to University content issues. This committee may take on other issues such as:

- producing guidelines for research and teaching objects
- mapping links between projects
- eResearch implications for the University
- reviewing developments in this environment

Membership of the Joint Committee would comprise representatives from the different teaching and research infrastructure and systems projects. A summary of reports from these groups could then be forwarded to the URC and UEC for information.

Recommendation: The University of Wollongong establish a Joint Committee on University Content Management for the ongoing monitoring and sharing between new infrastructure projects.

4   Recommendations

The following recommendations derive from the work of the Content Management System Evaluation Team during 2005. In a number of instances specific responsibility for the actioning of the recommendations has not been identified.

1. The University of Wollongong adopt a centralised approach to an institutional repository program to manage research and teaching and learning objects. [1]

2. The University utilise any on-campus repository projects to further promote issues associated with content management systems. [2]

3. The Graduate Attributes Outcomes Portfolio Team provide a separate proposal outlining the most appropriate solution to their needs. [3]

4. That this report inform the Web Content Management System Team and they consider repository content in their deliberations. [4]

5. Checklists be developed for the evaluation of content management systems at the University, utilising experiences gained from pilot projects and first-hand experience. [5]

6. The University support a program to educate staff on issues concerning institutional repositories. [6]

7. The University maintain a watching brief on content management systems, particularly in the open source environment, giving special consideration to the Research Quality Framework process and the re-use of teaching and learning objects. [7]

8. The University continue to monitor institutional repository solutions as they become available. [8]

9. The University investigate its long-term institutional repository needs during 2008. [9]

10. The University investigate funding sources for the content management program. [10]

11. The final report of the CMS Evaluation Team, dated 12 December 2005, be presented to the eTeaching Steering Committee and the Research Standing Committee. [11]

12. The University of Wollongong develop policy and guidelines which actively support the institutional repository. [12]

13. The University of Wollongong establish a Joint Committee on University Content Management for the ongoing monitoring and sharing between new infrastructure projects.

5   Attachments

1. UOW Needs Assessment Survey, 17 June 2005, 5p.

2. Research Repository Proposal, 17 October 2005, 3p. + DSpace costing, 1p.

3. Learning Content Management System LCMS Proposal, November 2005.

4. UOW Scenarios for a CMS, 2 November 2005, 2p.

5. Map of UOW Infrastructure Projects.