Conflicting landscapes: Musing on the implementation of an open source collaboration environment

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This discussion of the implementation of an open source collaborative environment (MUSE) in a traditional institution during a period of upheaval not only explores the details of the evaluation of the first year of operation, but also the tensions around ownership, control and power. The paper reports on the implementation and seeks to address some of these questions: Can open source initiatives make a difference to the fundamental pedagogy of educational institutions? Can a modest change in IT solutions enable users to create their own learning and research spaces effectively? What factors would we do differently? In what ways does supplementing an existing large integrated system with another involve innovation in educational technology?

Keywords: Collaboration environments, e-Research, open source, Sakai.

Introduction

In the landscape of educational technology the nexus between teaching and research, and between information systems for supporting learning, teaching, research and business activities is crowded, competitive and complex. The rapidly changing technological environment plus the interesting power relationships of managers, academics, and administrators means that, in general, innovation is confined to small localised areas of development and difficult to embed in the sweeping hills and dales of the vast traditional landscape. Occasionally a tsunami or earthquake precipitated by a new vice chancellor dramatically changes the existing landscape. In the resulting climate change it is important to reflect on what educational technology tools, processes and people are required for effective support for research, teaching and learning. It will be interesting to see how the university sector responds to the many and varied forces in the coming years - this paper is the story of a pilot implementation of an open source development in a traditional research intensive university in a time of great change.

Background

In May 2003, in a report on their review of the University of Melbourne's learning management system, Baldwin and James highlighted the important dual demands of 'ease of use' for the majority of academics along with the capability of supporting very sophisticated educational procedures:

> The ideal is a system which is very easy to use at a basic level, yet allows – and indeed encourages – much more sophisticated and creative developments. In other words, it should be particularly appropriate for the estimated 80% of staff who are modest IT users yet not limit the opportunities for the 20% of staff who are more expert users. Ideally, it should encourage individuals to move from the former to the latter category. (Baldwin & James, 2003: 13)

Their report recommended that the university implement Stanford University's *Coursework* learning management system and that the University of Melbourne become a collaborating institution in the Open Knowledge Initiative (Baldwin & James, 2003). *Coursework* was an open source product with the advantage that the university would be able to build on its standards based framework to extend the functionality, and thereby contribute to a significant global project. The University of Melbourne had already invested over $12 million through its Multimedia and Educational Technology Development Grants Program to produce sophisticated and creative e-learning programs, and it didn't want to lose these innovations that had been locally developed.

In August 2003, the University of Melbourne engaged KPA Consulting Pty. Ltd. (KPAC) to undertake a review of the Baldwin and James proposal which recommended that the university implement Stanford University's *Coursework* LMS. The KPAC report was critical of the open source solution, stating that it represented too greater risk to the university's business and urged the university adopt a vendor solution.

These two contrasting reports demonstrate the tension between the advocacy of an open solution, favoured by the academic community, and the preference of a vendor-based system, favoured by the business consultants.

After a tendering process, a *Recommendations Report* from February 2004 and a subsequent *LMS Project Proposal* dated April 2004 both recommended the university implement Blackboard 6 and, at the same time, they recommended that the University of Melbourne should become an active member of the Sakai Education Partners Program (SEPP). Sakai is a collaboration and learning environment that was originally developed through the Sakai Project from a Mellon Foundation grant. The original partners were the University of Michigan, Indiana University, MIT, and Stanford University, and the first version of the software was based on a combined set of tools originating from the founding institutions (including *Coursework*). Sakai uses a community source model of code development so that, after the initial release of this open source software, academic institutions were invited to become Sakai Education Partners to contribute financially to the Sakai Foundation and to contribute code to the growing Sakai software base. SEPP membership was viewed by the University of Melbourne community as providing the framework for bringing support of innovative learning environments into enterprise-class applications.

In the period 2005 to 2007, most of the energy and resources were spent on the progressive implementation and integration of the university's instance of Blackboard, while the exploration of Sakai was neglected. In early 2007, the decision was taken to implement a pilot version of Sakai at the enterprise level as a collaboration environment. There was a perceived need by academics to have a collaborative research environment, available at their desktop, that can facilitate communication and collaboration with colleagues at other institutions. Since the Sakai collaboration environment can function as a common development environment for innovative learning experiences as well as fostering cross-institutional collaborative research, it was considered timely for this development to be supported at the enterprise level, and be made available to all researchers and innovative teachers. The implementation of this collaboration environment was given the name the Melbourne University Shared Environment (MUSE). This paper expounds on the issues and outcomes that arose through its implementation.

About the MUSE Project

The project aimed to establish an online environment to facilitate cross institutional initiatives in learning, teaching and research between academics at the University of Melbourne and partner institutions. It would provide new collaboration opportunities, across institutional boundaries, using a common "open framework" for the development of innovative online teaching and research solutions.

This project would exploit the research-teaching nexus which had been highlighted as of crucial importance under the Growing Esteem strategy plan for the university. Discipline groups from various institutional partners would be able to come together online to meet in a virtual space to share knowledge, experience, and resources. The project would also undertake a summative evaluation of the efficacy of this approach.

Some important fundamental philosophies were that:

- all staff & postgraduate students can create sites
- the control of access, permissions and functionality (tools) to be in the hands of the site creator.

Scope

Initially the project would provide access to an online environment, accessible from several institutions using the Sakai Collaboration and Learning Environment for Education (http://sakaiproject.org/). The University of Melbourne is a Sakai Education Program Partner and pays an annual subscription to the Sakai Foundation which maintains the Sakai Open Source code-base and fosters a user community. This project would make use of these international affiliations and share any developed code-base with the Sakai community.

Building upon similar JISC-funded projects such as the *Sakai VRE for Educational Research* project at the University of Cambridge and the *Sakai VRE Demonstrator* project being conducted by several collaborating UK Universities (Lancaster, Daresbury, Oxford, and Portsmouth), this initiative would make use of some of the unique features available in the Sakai release that support interactive teaching and research such as the digital scholars workbench, audio/video conferencing and/or the distributed whiteboard. In addition the project would explore and evaluate repository connection capabilities, such as those being developed at the University of Oxford: Context-based Information Retrieval; Collection Cross Search; Google Web service interface; Application Discovery; Scientific Data Query; data repository creation and data extraction. Another area for enquiry would be tools for data analysis like those being investigated at Daresbury: Scientific Calculator; Active Spreadsheet; Statistical Computing; Data Management; Simple Visualisation; and connection to Grid Information, Network Information, and Grid computing. An important aspect of the project would be an ongoing evaluation of, not only the technology tools, but also the behavioural aspects of cross-institutional collaboration.

The project would explore the unique possibilities provided by Sakai and its open source development community and would not duplicate or replace the functions provided by the enterprise-wide Learning Management Systems offered to students at Melbourne (Blackboard). It would be a more "open framework" than the "out of the box" solution provided by Blackboard and would therefore appeal to the a significant minority of the university community that wishes to experiment in a more open environment with respect to teaching and research solutions, but that environment would be supported at the enterprise level and would be a common development environment for the whole university community.

The project would involve communication and collaboration between research students and staff in ways that are grass roots in style – supported at "the desktop". In particular it was thought that it may appeal to researchers and students in the social sciences and the arts.

Desired outcomes

By establishing the infrastructure to enable lecturers, researchers, higher degree students, and PhD students to discuss and collaborate in their discipline areas of specialisation, the online collaborative environment would provide the following benefits:

- Increase productivity for researchers involved in collaborative research projects by decreasing travel time and increasing "contact" time.
- Development of "communities of learning and of practice" across the university that can be extended to other institutional partners, eg. Universitas 21
- The creation of a shared space for resources such as files and data. The possible connection to other data repositories would increase productivity in group research projects with data stored in a common, accessible place, and enable a broader range of study and research with other data available through online repositories and data mining search capabilities (eg. National Library of Medicine).
- Model collaborative research behaviours for students.
- Facilitate discussion and critical enquiry in specific, focussed teaching and research areas across institutions.

The creation of new online tools for data analysis, modelling and visualisation would result in:

- New teaching and research insights that may not have been possible before, some of which may then be transferred into the undergraduate teaching experience and the wider area of knowledge transfer into industry and the community.
- A new focus for exploration and sharing of data-rich research activities that will fit well within the developing concept of the "Learning Hub"

Parties already interested in the possible use of a collaborative environment across institutions included: Universitas 21 institutions (eg UBC, Hong Kong, NUS), Monash University, Public Health Research Centres.

Implementation

A 90% reduction in the project budget meant that the project's scope needed to be scaled down to a modest pilot, with minimal functionality, using Sakai 'out of the box'. It was initially envisaged that the pilot implementation of this Sakai-based Collaboration Environment (MUSE) would support exploration of the 'out of the box' Sakai tools and sites by faculty academics, general staff and Research Higher

Degree students. The pilot installation would support up to 1,100 users, representing 10% of the total possible users in the above categories, for up to one year.

After some initial cost comparisons, it was determined that this MUSE collaboration service would be hosted by the external provider Netspot (http://www.netspot.com.au/) working in partnership with the university's Information Services.

Sakai 'out of the box' has support for two different types of sites: Course sites (used for teaching); and Project sites (used to support collaboration in a project context). Most of the tools and functionality are available to both types of sites, the only difference is that course sites have three different types of users and project sites have two types of user. Project sites have ' Maintain' and 'Access' users. The Maintain user is usually the site creator, although a 'Maintain' role can be assigned to any user who has access to a site.

An important principle would be that all users would be able to both create and participate in Sakai 'project' sites which have functionality to support research project collaborations or discipline-specific 'common interest groups'. External university 'associate' users would also be able to connect. In this way MUSE differs significantly from the Learning Management System: The control and responsibility for creating sites and managing participants is firmly in the hands of the individual student/researcher.

In this implementation:

- All Unimelb users (staff and postgraduate students) were able to both create their own sites and participate in other 'project' sites.
- External users were able to be registered, as guest users, by site owners to use their site. In Sakai, this type of registration is done manually by the site owner and uses the email address of the guest as their username.

University of Melbourne users were able to use their university username and password to access MUSE. This type of sign on required integration work between the external provider Netspot, and the university's LDAP authentication service. A secure network connection was also required between the external host and the university, plus some additional domain name and email configuration work to support the host's naming (muse.unimelb.edu.au) and some of the communication tools' functionalities. Further work was required to identify a user as 'staff' or 'postgrad'.

The Sakai code makes it possible to 'skin' the software with your own graphic look and style. This work was undertaken by a graphic designer and a programmer from the university's Educational Technology Services. The site's name and its 'Welcome' page were derived through a consultative approach with the academic and postgrad reference group. The whole philosophy was to create a warm, welcoming environment devoted to sharing ideas and outputs.

Other important considerations were that this project would form part of the university's Enterprise Architecture in order to be a centrally supported system, and that there would be a strong co-dependency with the University's other e-research initiatives such as the eScholarship Research Centre and the Victorian eResearch Strategic Initiative - VeRSI [http://versi.com.au/].

Initially the MUSE collaborative environment service was funded to run as a pilot for one year.

Promotion

Promotion of the MUSE service was deliberately low key. A very conservative strategy was undertaken since, theoretically, any University of Melbourne staff member or postgraduate student, or potentially more than 11,000 users, could log in and begin creating sites. Since the pilot implementation had a limit of 1,100 users, there was a risk that rapid, widespread uptake would quickly exhaust the system's capacity. The promotion strategy consisted of presenting the system to selected audiences such as: the academic and postgraduate reference group; IT professionals and project managers; library managers; an eResearch day; a symposium on educational technologies. The existence of MUSE was not broadcast widely to the academic community.

Support

The budget for providing help and user support to MUSE users only consisted of some in-kind allocation of a limited amount of one or two people's staff time. It was not possible to make use of the university's

first tier Help Desk support and so a minimal self-help strategy had to be adopted. This consisted of

- The Sakai online help system, augmented by
- Feature demonstrations - 2-4 minute video tutorials of features from Indiana University's Oncourse CL system.
- Video Tutorials - more video tutorials from Texas State University, especially the 'Setting up a project site' tutorial.
- Sakai Knowledge Base – created by Indiana University.
- A 'musehelp' email address that would distribute queries to the MUSE implementation team who were registered with a 'musehelp' project site in MUSE.

Technical problems were generally swiftly dealt with by the external service provider Netspot.

Open framework as an enabler for local development

The MUSE collaboration system was also designed to provide a base for other related and spin-off projects. The open framework nature of Sakai's architecture would allow the migration of locally developed Java-based teaching and learning tools such as the Neo Suite of teaching and learning tools that had been created in -house. Another locally-developed tool was the PRAZE peer review software that could be made available to the whole university through the MUSE environment. Several researchers in the eScholarship Research Centre and VeRSI were investigating the Shibboleth authentication system and Shibboleth integration with MUSE was another area for investigation.

Several ePortfolio projects were expecting to make use of the Open Source Portfolio tools in Sakai 2.4. The aim of the Melbourne Portfolio Framework project is to develop and implement an on-line learning portfolio framework, templates and resources for research postgraduate students and supervisors across the university. It would be specifically designed to support the PhD process and include guided reflection on the process including ethical responsibilities, personal and professional skill development. The intention is to provide an opportunity to showcase or promote University of Melbourne research higher degree students and their research, and also to enable them to more easily participate in global communication in their research areas.

This would be enabled by using the Sakai workspace as a digital collection point, tools such as the blog and news feed (an RSS aggregator) and other tools of the student's choice to build a personal website collection. This would be further refined by integrating with the existing 'courseware' supporting RHD students - Postgraduate Essentials 1 & 2 (Brooks & Fyffe, 2004). In addition, the OSP tool would be used to selectively present information to public view (a profile), and in a selectively released manner to varied consumer groups such as supervisors, potential employers, other researchers and the like. The aim was to enable a large degree of user control and creativity while maintaining institutional authority and possible 'branding' spin off benefits. The development would also create sustainability for existing software programs and content, while allowing for new features to be created.

The University of Melbourne did not have an eportfolio process, policy or specific tool in use at this design phase of the Melbourne eportfolio Framework so it was anticipated the framework would inform future IT support and development directions.

Sakai is readily available in a mobile phone mode. At present the use of this function is not a specific criterion of many of the existing projects. However it has significant potential not least for remote researchers such as those based in hospital systems. One potential use would be for reflection eportfolio development – developing the reflective practitioner such as occurs in UK medical education under NHS directives (Braidman, 2008).

The MUSE collaboration site was launched in July 2007. We hoped we had sown the seeds of an alternative, more open, more autonomous system for learners and researchers. We were unsure whether the seedlings would survive the harsh climate.

Evaluating the project

The overall purpose of the evaluation was to provide the Project Leader, Project Manager and Project Sponsors with timely and relevant information about the effectiveness of Sakai in achieving the objectives of the system, which would enable them make decisions on whether to implement the system in full production mode, modify, or terminate it. Therefore the primary audiences for the evaluation were

the Project Leader, Project Manager and Project Sponsors of the Sakai Open Collaborative Environment. Important secondary audiences included staff and research students who were involved in piloting the system as well as members of the University's teaching and learning committee.

The following questions were to be addressed in the evaluation:

- To what extent has the use of Sakai fostered collaboration generally, and of teaching and research?
- To what extent has the use of Sakai been able to impact on the knowledge and behavior of staff and research students?
- How useful has this system been for staff and research students engaged in teaching, research and collaborative activities? In what ways has the system been useful?
- How easy has it been to use the system?

Initial discussions with academics who were keen on piloting Sakai revealed that a one year pilot timeframe was insufficient. Staff indicated that they needed time to familiarise themselves with a new system and to explore and use the unique possibilities offered by Sakai to develop a project site and carry out collaborative activities. They were hesitant to commit time, effort and resources to a system that may not continue beyond the pilot phase. Accordingly, before the one year pilot was concluded, the decision was taken to extend support for another two years and to run the MUSE service as fully supported Enterprise Application.

This influenced the design of the evaluation in that a series of questionnaires would be administered over the period 2008, 2009, and 2010. Other data such as interviews; anecdotal records through user blogs/wikis; site numbers, user numbers and usage patterns would be collected. This paper reports on the initial questionnaire and gives some usage figures.

Usage figures

In February 2008, the total number of project sites (worksites) on MUSE was 76, the number of login sessions in the previous month was 282, and the number of unique users who logged in over the previous month was 76. In June, the total number of worksites was 199, and the number of user accounts was 577 (328 University of Melbourne users and 249 non-University of Melbourne users).

Survey results

In May 2008, a Questionnaire was prepared and all of the MUSE users were invited to respond. The number who did volunteer to respond was 24. All respondents were internal to the university, and so the response rate represents about 7.3% of University of Melbourne users. Of those who responded, approximately 42% were academic staff and 58% were general staff. There was one masters student and one PhD student who also responded. 58% were from Information services (library and IT) and the remainder from the academic faculties of Arts, Education, Engineering, Medicine, Dentistry, and Health Sciences, Science, School of Graduate Studies, and one respondent from the university's Postgraduate Association. Over 66.7% of respondents had been using MUSE for more than three months.

Regarding the use of MUSE, 29.2% used the service at least once every two weeks compared with 70.8% who used MUSE once a month or rarely. The predominant style of use was for project-related group work (73.9%), followed by collaborating on research activities (39.1%), and personal information management (17.4%). The number of respondents reporting not having used MUSE in any significant way was 21.7% and 26.1% reported other uses such as: using it for committee administration, or 'To share information within our organisational unit, and to disseminate information within the eCoffee (eResearch) community'. Several respondents reported that they used MUSE to 'learn more about the functionality of Sakai'.

When asked to elaborate further on their uses of the MUSE service, the most common use was 'to store files & other resources and to communicate with others working on the same project'. Others added the usefulness of collaborating with others outside the university and using the calendar and communication tools to schedule meetings. Several respondents commented that once they had set up collaboration sites, it was hard to get project group members to access the site regularly. Perhaps a related issue is the problem of integrating MUSE with normal daily work practices and environments, as one respondent says: 'It is still not part of my 'normal' work routine and I am not sure how I change my workpractices so that it becomes more integrated. Outlook seems to completely dominate my work interface so it would be nice to have a direct link from outlook - I have no idea if this is possible.'

Another barrier to use seemed to be the lack of exemplar sites and introduction workshops for users: 'It still needs more work to be really useful to me. It would be good to have a local user group who could configure it to our needs'. Another user, frustrated by the lack of useability of the interface and tools, resorted to using external tools such as docuwiki and EVO (for synchronous communication) and suggested these could piggy-backed off MUSE's authentication: 'Sorry to be negative but only people who don't know what modern software can offer regards (sic) interfaces and usability could enjoy using Sakai. However I don't discount its value as a group/user provisioning tool. Could we have a "redirector" on this as per LMS, so other external systems piggy back off its authentication?'

One respondent with six worksites had three differing uses for MUSE: For the management of a university cross-faculty and interdisciplinary Steering Committee with members across the university and external to the university; to provide follow up resources and facilities to workshops given at conferences external to the university (using 'public access' in Sakai); and to enable collaboration on research projects with partners across the university and external to the university.

The next survey question asked respondents to rate the usefulness of different tools for collaboration activities. The results are summarised here, ranked from most useful to least useful: Common document store; Collaborative workspace; Mailing lists and archives; Wikis; Aggregating functions; RSS/Atom Feeds; Blogs; Instant messaging.

Most of the respondents provided suggestions to the open-ended question: 'What other tools/functions would help to improve your activities?' Many wanted tighter integration with external environment tools such as their single calendar (that could be synched to a mobile device), Facebook, Google apps (including spreadsheets), social bookmarking tools, and repositories. One respondent summarised this nicely as the: 'Ability to leverage institutional authentication/identity in group provisioning tools under researcher control. Like a secure "my space" for researchers, perhaps?'. If the external tools could be hosted on Aarnet, then even better. Several people wanted a quick and easy video conferencing system for small groups. A number of other responses were in the category of suggestions for improvements to the interface and functionality of existing tools. For example: 'A more open collaborative wiki' that functions more like widely available public domain wikis; 'A blogging function in which you can have a public face and RSS/Atom feed for'; 'A better resource/file manager that is easier to use and allows for citing collections/folders'; A change password facility for external users; shorter URLs for site links. Some respondents suggested features that already existed in Sakai: 'I thought that I would be able to put a web site into MUSE ... Haven't worked out how to do that yet.' Such responses may indicate that improvements may need to be made to the interface, or to the online Help system, or more user education needs to be undertaken. Finally, one respondent highlighted the important issue of obtaining user buy-in so that they don't feel they are over investing their time in site creation, resource uploading, and general system use: 'The absolutely most important thing that has to be added to MUSE and indeed all of these sorts of system is an "exit strategy" that enables all stuff loaded in (including the relationships between things and the 'agents' [people etc]) to be exported in a non-proprietary form (ideally RDF-XML)'.

When asked what other ways can MUSE add value to activities, several respondents made note of the way in which MUSE is projected into the university community: 'An important issue we have seen in relation to resistance to uptake comes from a combination of ignorance and unrealistic expectations (i.e. it is not perfect).'; 'Maybe a bit more active promotion and modelling of research / project collaboration by influential members of the academic community?'.

Finally, respondents were asked for suggestions for improvements. Responses seemed to fall into three main classes. The first of these concerned promotion and user education: 'more active user group'; 'I would like to see some really good examples of use that highlight what you can do with MUSE'; 'An updated FAQ section' and 'user guides'; 'Heavier promotion'; workshops conducted in consort 'with eScholarship Research Centre staff who have a range of experiences and suggestions'. A second class of responses included suggestions for improvement in functionality, some of which have already been canvassed: the blogging tool; 'Develop the tools that are there already so they're easier to use (too many clicks in for functionality)'; 'Develop the settings to enable private/public choices simply'; 'Maybe better integration with university email / calendaring / LMS (Learning Management System) / web CMS (Content Management System)'. A third class of suggestion for improvement was really a suggestion for an alternative system using a local hosting provider with Shibboleth authentication enabled and a repertoire of third party tools that includes EVO video conferencing.

Discussion

This discussion of the implementation of an open source collaborative environment (MUSE) in a traditional institution during a period of upheaval explores the details of the evaluation of the first year of operation, and also the tensions around ownership, control and power. Can open source initiatives make a difference to the fundamental pedagogy of educational institutions? Can a modest change in IT solutions enable users to create their own learning and research spaces effectively? In what ways does supplementing an existing large integrated system with another involve innovation in educational technology? What can we say we have learnt from this implementation? What would we do differently?

The MUSE environment would be enhanced if:

- It were publicised more broadly in the university community.
- It was supported with a more comprehensive user education and Help Desk support strategy
- The useability of the toolset, including the investigation of connection with Web 2.0 services and technologies, was further refined.

In our introduction we noted that the landscape of educational technology is crowded, complex and littered with competing systems that perform different 'business' functions within the typical higher education institution. We can say that the sheer complexity of an implementation such as MUSE should not be underestimated. There is a diversity of ideas, many competing interests, and conflicting landscapes and cultures. The idea of outsourcing the hosting of this service allowed the team to get it up and running fairly quickly, but it involved careful liaison between the private provider and the university network team in order to create a secure, reliable environment. This liaison was successfully achieved, despite some scepticism that a private company would effectively 'have possession' of university data.

The ideal of having as much power within the users' control was appreciated by some users. They appreciated not having to fill in a web form to seek someone else's permission to create or administer their own sites. The users appreciated being able to create their own combination of tools and to determine the permissions associated with various classes of other users, or the public. However, greater user control was a two-edged sword in the sense that it necessarily created a greater need for user education. This subsequently exposed the lack of user education undertaken in the pilot, which was indicative of how under-funded the pilot was.

Lack of proper funding also limited the scope of the pilot so that the smaller number of users necessarily placed limitations on the amount the service could be promoted, which in turn affected uptake. There was a feeling amongst the implementation team of being hobbled by having to 'manage expectations' of the pilot users to match the available resources. Another issue also effecting uptake was the limitation in time, so that the initial pilot period of one year was soon exposed as far too short a period for academics to devote their time 'exploring' this type of collaboration.

Replacing one monolithic environment like Blackboard with an open source environment such as Sakai has afforded the opportunity to replace some functionalities with other functionalities in a modular way. As an example, the MUSE environment does permit the exploration of authentication via Shibboleth, which is underway. The creation of new locally developed components, such as the peer review tool, has confirmed that the open nature of Sakai shows the potential for it to react to new, Web 2.0 modes of collaborating.

As Wise and Quealy(2006) pointed out in their analysis of the LMS governance review and subsequent papers, there is an essential disconnect between the aims of institutions or individuals within them to support socially connected learning, and the activities of IT or teacher directed command and control based approaches. In our view there needs to be some balance between what is provided by the university as an enabler for technology, communication and access to networks for students and researchers. Some of the criticisms of university-provided modest infrastructure suppose that all students and researchers are well able to make, form and maintain their own networks. Allowing a greater measure of user control than is exhibited in the traditional LMS seemed to be one way of testing out ideas of connectivity and student engagement, while at the same time allowing access to essential networks and some limited infrastructure support.

Turning to some of the conference questions such as: *Who owns educational technology in the changing landscape - closed systems, open source, many agendas?* It would seem that the MUSE pilot provided the University of Melbourne with an easy cost effective avenue for testing out a number of variables around

ownership. In the first instance the hosting of the hardware installation was a valuable experience and freed up staff to concentrate on the teaching, learning and research support aspects. The model of site creation and functionality put ownership of site creation firmly in the hands of the users- whether researchers, professional staff, research higher degree students or teaching academics. An interesting observation was the fact that non-academic professional staff actually took to the environment with some enthusiasm, to use it for things like projects, work-groups, and committee work.

What counts as innovation in the educational technology landscape? MUSE was introduced into a very risk averse climate where the overwhelming pressure was to use vendor products, not to innovate either in style, process, or management in the IT/educational technology environment. While some commentators have been frustrated that institutional IT systems have not been able to keep pace with contemporary web developments and uses, MUSE is a working example of how a collaboration environment can be leveraged off the university's authentication system and still permit a 'plug-in' approach to the components being used.

To some, the implementation of another learning management system might seem like more of the same, however, because Sakai is open source, it allows for the possibility of some degree of pedagogical and technical innovation. By enabling the university to develop new and innovative products for teaching, learning and research, it affords the possibility of sharing them with the whole educational technology landscape. MUSE, Sakai and creative thinking represent a potential for the University of Melbourne to impact on the educational technology environment in positive ways, if it has the will to do so.

The real innovation in this project was not really a technical one, but rather the philosophical approach of empowering the users in order to focus on one of the core functions of the university – in this case, a collaboration environment for researchers, research higher degree students and professional staff.

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