Web 2.0 in Higher Education in the Netherlands

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A review of current and developing international practice in the use of social networking (Web 2.0) in higher education

Jill Armstrong
York St John University

Tom Franklin
Franklin Consulting

With National reports by

Australia
Catherine McLoughlin

The Netherlands
Wim Westera

South Africa
Philipp Schmidt

The United Kingdom
Brian Kelly

The United States
Alice E. Marwick

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Executive Summary

This report was commissioned by the Committee of Inquiry into the Changing Learner Experience[1] to review the current and developing use of Web 2.0 technologies in higher education from an international perspective. The terms of reference for the study were to produce a report that:

"reviews current and developing practice in the use of Web 2.0 in higher education internationally and provides an assessment of the relative position in the UK and the likely attendant consequences. The review should cover four countries, including the USA and Australia.

"The review should look at the following:

- The areas in which Web 2.0 is being used, including academic and administrative support;

- The drivers to use of Web 2.0 in these areas;

- The issues encountered and the responses made;

- The perceived advantages and disadvantages of Web 2.0 use; and

- Prospective developments in Web 2.0 use."

The report is based on five specially commissioned reports from Australia, the Netherlands, South Africa, the United Kingdom and the United States of America. These were chosen to provide some of the leading countries in the use of Web 2.0 technologies in education together with one country where English is not the first language and one where infrastructure provision remains a critical issue.

The areas in which Web 2.0 is being used, including academic and administrative support

Web 2.0 is being used in nearly all areas of higher education, including academic, administrative and support areas. These tend to be in "hot spots" where "early adopters" are trying out new things rather than widespread. Take up across the different countries appears to be in some measure dependant on the technical infrastructure being available to enable students to access to Web 2.0 functions. Questions of equity therefore impact on take up in use. Usage to date has been driven primarily by the particular interests of individual members of staff rather than institutional policies. Lecturers are using Web 2.0 to enhance their teaching because of the affordances that it offers, or because their students are using the technologies already and it helps with engagement or because they are technologies that students will be using after graduation. Web 2.0 is being used in a wide variety of ways including to encourage student reflection through the use of blogs and commenting on the blog postings of their peers, collaborative working through collective development of artefacts in wikis and as a form of lecture replacement through podcasts and vidcasts.

Within administrative and support areas there is particular interest in using Web 2.0 to engage with students before they start both to support widening participation students and as a form of marketing more generally. Of particular note is the "yougofurther" service from UCAS which enables prospective students to connect with other applicants and existing students.

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[1] See http://www.clex.org.uk/

The drivers to use of Web 2.0 in these areas

There are limited drivers in all countries but many enablers. The UK and Netherlands lead the way in enabling use, through supporting national infrastructure developments, and some USA States have policies and strategies in place which encourage use of technologies in support of student learning. Institutions were not found to have specific drivers and, as organisations, are slow in their response to Web 2.0 technologies. Institutions have tended to start with regulations that provide codes of conduct for use by staff and students because Web 2.0 technologies cannot be excluded from the lives of their staff and students. There is a slower movement towards institutions exploiting and leading strategically with their use of Web 2.0 for institutional purposes. Where there is confidence in students' ability to access Web 2.0 tools there are found staff who are innovating new practices and much of the drive is coming from bottom up. In whatever area, academic, administrative or support, where Web 2.0 can be seen to offer some communication function that enhances their practice there can be found someone attempting to use Web 2.0. The potential transformation of the practices themselves is yet barely understood or encountered.

The issues encountered and the responses made

Issues are common across all countries with some further ahead because of the greater opportunities afforded to them by better infrastructure. HEIs and their students find themselves in unchartered territories with respect to their use of Web 2.0 technologies. The historically more certain boundaries where information and communications were controlled by universities is being lost, and institutions are struggling to make sense of how to operate in this changed and permeable space. Students have yet to discover the full consequences of their public representations. The mind sets and frameworks of reference that we have used hitherto are no longer adequate. Many boundaries have become blurred; virtual and physical localities, professional and social lives, formal and informal learning, knowledge consumption and production.

- **Social and professional lives**: The use of Web 2.0 for both social and professional purposes has created uncertainties for HEIs. This is reflected in institutions' current regulatory behaviour codes for use of Web 2.0 for both staff and students.

- **Privacy and safety**: Issues of privacy and safety have been raised within the international reports as matters of concern for students and institutions.

- **Identity:** One of the key issues that both students and institutions will face is the nature of students' and staff online identities.

- **Issues for Institutions**: Traditional frameworks for the development of academic knowledge do not sit comfortably with the speed of information sharing and information production that exists via the Internet.

- **A lack of new pedagogic models creating uncertainty** for both staff and students.

- **Time constraints**; administrative overload, high maintenance of the learning process and learning the new technologies are all time consuming.

- **A culture shift for academics:** The rapid and huge expansion of information accessible through the web coupled with tools that can be used to repurpose and create new knowledge on-line have created a very different information and a communication environment

- **Issues for students :**Issues for students are common across all countries where they are engaged in using Web 2.0 tools.

The perceived advantages and disadvantages of Web 2.0 use

There are seen to be three key advantages of Web 2.0. It offers a set of affordances that are not found in other technologies notably around the co-creation of knowledge and the support for on-line collaborative activities that can cross HEI and country boundaries. Students are already using these technologies and are therefore engaged with them, and so willing to use them in their learning and finally, many of them are free to use and come without the restrictions found in many institutional systems. Other advantages include the ability to aggregate information, data and ideas from different places quickly and easily and that the material continues to be available to the student after they have left university.

On the other hand, many of the products have already disappeared giving concerns over the longevity of others. The rate at which technologies and products are appearing is difficult for people to keep up with so that there is considerable fear of being left behind and significant effort is needed to learn the technologies and how they can be used effectively in learning and teaching. It is harder (or impossible) to exert institutional control over what happens in spaces which are outside the university even if they are being used in learning and teaching. Use of external systems can mean that students have to make use of many more user names and passwords and that their learning space becomes atomised.

Prospective developments in Web 2.0 use

Web 2.0 is changing very rapidly and new technologies and new products are emerging all the time and others are disappearing. Further, use of Web 2.0 technologies is still growing rapidly in many areas. There are some prospective developments that we can identify and will be important to institutions. They include:

- New curriculum opportunities utilising the access to primary data and means of communicating through Web 2.0 channels

- New assessment opportunities as process becomes possible to track and record through Web 2.0 applications

- The use of Web 2.0 technologies to provide support before students arrive at their university.

- In the longer term a blurring of the boundaries of institutions as they become more permeable, with virtual learning environments outside the institution including people who are not members of the institution, and more information residing outside the institution.

- The development of new virtual learning environments (including personal learning environments) which are based on Web 2.0 technologies.

- A reduction in the ability of institutions to control the technology that students use in their learning.

- A reduction in the ability of institutions to control access to information that students use in their study.

- Web 2.0 applications increasingly replacing desktop applications (notably the use of free productivity tools such as Google Docs instead of Microsoft Office).

- The use of identity management systems such as OpenID to provide access to an increasing number of both external and university based systems.

Introduction

This report was commissioned by the Committee of Inquiry into the Changing Learner Experience[2] to review the current and developing use of Web 2.0 technologies in higher education from an international perspective. The terms of reference for the study were to produce a report that:

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> - The areas in which Web 2.0 is being used, including academic and administrative support;
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> - The issues encountered and the responses made;
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The study covers five countries. Besides the USA and Australia proposed in the terms of reference we included the United Kingdom so that we could compare what is occurring elsewhere with experiences in the UK. The other countries were chosen to provide contrasts. The Netherlands was chosen as a country where English is not the first language, and has a reasonably similar context. South Africa was chosen by way of contrast, as a nation where much of the country is poor and with poor infrastructure. It will be important to understand these contexts as many of our future students will be coming from overseas including both countries where English is not the first language and where infrastructure is not as good.

The work is based on five reports commissioned from experts in Australia, the Netherlands, South Africa, the United Kingdom and the United States of America together with a qualitative survey which had 180 responses from many countries and many different institutional roles. The reports discuss the background in their country including the student population and access to technology before turning the ways in which Web 2.0 is being used in both teaching and learning and support. The reports then look at the drivers for the use of Web 2.0 and the issues that are raised by this. The most important examples and points raised in the national reports are covered in main body of the report; the national reports need not therefore be read to understand the key points.

Web 2.0, or the social web or the read / write web is a group of technologies that allow the user to not only read[3] but to contribute as well, whether by adding comments to an existing posting, jointly creating a web page or document or simply chatting in a social space. What makes a technology Web 2.0 is that the user can write to the web site as well as read it. It therefore covers a very disparate set of technologies which have widely different affordances and therefore will be used in very different ways in education.

Web 2.0 is a very new set of technologies, blogs started in 1993 but use did not become at all widespread until around 1999, while many of the other technologies are even newer; social networking sites date from around 2002 with widespread use starting about 2004. Many of the currently popular services were launched around this time, for instance, YouTube was launched in 2005. This means that Web 2.0 is very new, and that it has only been around in anything like its current form for about three years, yet it is already having an impact on higher education.

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[2] See http://www.clex.org.uk/
[3] Or listen or watch

However, this newness also means that its deployment is mostly *ad hoc* for two reasons. Firstly, with so little real experience of using Web 2.0 in learning and teaching and learner support it is not clear how to make the most effective use of it pedagogically or for support and secondly there has simply not been time for universities to develop policies on its use. Despite its novelty there is considerable use of Web 2.0, not just in learning and teaching but also in libraries, student support and marketing. It may be that it is easier to make use of Web 2.0 in these services, rather than in learning and teaching because there are seen to be fewer restrictions on what is allowed. Marketing (whether to prospective students or to users of university services) has been one of the significant uses of Web 2.0 to date, based on the premise that many potential students and users are already using Web 2.0 and therefore it is a cost-effective way of reaching them.

There are two overlapping groups of initial users of Web 2.0 in teaching and learning. There are those who have an interest in technology and will therefore take up new technologies as they appear and see how they can be used and there are those who have an interest in social constructivist pedagogies because Web 2.0 is seen to be particularly effective in supporting them.

Significant questions arise as to whether Web 2.0 will be effective as a set of learning technologies, given that over the years many technologies (tape recorders, television, mobile telephony to name but a few) have been proposed as radically changing education, but have failed to deliver on that promise. We believe that there are good reasons to believe that Web 2.0 will play an increasingly important part in education because:

- It is an active set of technologies in which the learner contributes, rather than passively consuming content (as with television).

- Its affordances are a good match for social and constructivist pedagogies as Web 2.0 is inherently social and is concerned with the co-creation and use of knowledge.

- The barriers to use are low. There are plenty of technologies which teachers and learners can use at no cost (apart from time) and which require little training or equipment to use.

- It is a natural extension of the way that many people are already using the web rather than a completely new departure

- It is being built into existing virtual learning environments and widely available elsewhere because there is already significant take-up of at least some of the technologies.

Web 2.0 is likely to become important in addressing some key policy issues that are facing UK higher education. For instance, to improve 'retention' Web 2.0 is being used to support learners in their transition to higher education by providing information on what it is like being a student through authentic material such as student blogs and by setting up social networking sites so that students are able to make friends before arriving at University so that they can quickly feel part of community.

The international reports demonstrate that all countries are beginning to exploit the potential in Web 2.0 technologies with the greatest differences relating to the current levels of technical infrastructure which enable or inhibit use. South Africa and Australia are not yet as well served with widespread and necessary broadband-width and this limits the development potential as issues of equity of access still dominate. Use that is developing in all countries is led by individual academics, faculty and administrators rather than being driven from national policy or even institutional policy levels. The Web 2.0 functionalities find especial favour with those who embrace constructivist pedagogies and there is a sense (rightly or wrongly) that students are driving use through their expectations of ubiquitous use of Web 2.0, including in higher education study.

We hope that this report will help institutions in deploying Web 2.0 effectively by illuminating the key issues and bringing together a large sample of current practice in the field and discussing how it is helping to address a number of important issues in higher education.

What is Web 2.0 / Social web

The term Web 2.0 was coined by Tim O'Reilly in 2005[4], and has no agreed definition. Tim Berners-Lee suggests that it was what the Web was always intended to be[5] with some of the functionality included in his early versions, but that the functionality that is now thought of as Web 2.0 got lost in creating usable software at that time.

Web 2.0 has also been called the "read / write web" and the "social web" which encompass the main ideas associated with Web 2.0. Whereas "Web 1.0" was about making information available - where the owner of a web site would publish information and the user would read (or listen to or watch) that content, with Web 2.0 there is the implication that the users of web sites contribute to them as well as consuming the information.

Typically, Web 2.0 sites require users to log in to them in order to be able to write to them. So, for instance, most blog systems will only allow people to make posts or to comment on other people's posts if they have logged in[6]. One interesting aspect of the need to log in is that people may not use their real name (or even a nick name that they are known by), so that although they have to log in they can remain anonymous to other users of the system. Equally many systems encourage people to give detailed information about yourself such as name, address, date of birth, pictures, interests etc. which may then be publicly available, or used by the system, for instance to target advertisements.

Web 2.0 is not a coherent idea, and covers a wide variety of technologies (though which ones they include will vary depending on who you ask). We briefly describe some of the most important and common of the technologies.

Blogs

The term blog is a contraction of "web log", which suggests that blogs were initially conceived as online log books where the author could put their log entries, and if they wish publish them. Blogs, like log books, are cumulative and each new entry is appended to the previous ones (usually with the newest ones at the top). They also offer a variety of features not found in log books. Entries can be "tagged" with appropriate key words (or phrases) so that related items can easily be brought together. With many blog systems the publication of individual entries can be controlled to private, to friends / colleagues only or to the public.

Most blogs also allow the reader to post comments, and these may require moderation before they become public (the decision being left to the owner of the blog).

Blogs can be published using "RSS[7]" (see below) which allows readers to easily see when new postings have been made, so that they do not have to go to each blog that they are interested in, but can see them all in a single news reader or aggregator.

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4   http://web.archive.org/web/20040602111547/http://web2con.com/ and http://www.paulgraham.com/web20.html

5   A transcript of a podcast interview of Tim Berners-Lee, inventor of the Web. http://www-128.ibm.com/developerworks/podcast/dwi/cm-int082206.txt

6   Many sites also contain "anti-spamming" tools to stop computer robots from automatically posting to them (often pornography).

7   Or "Atom"

Wikis

A wiki is a tool that enables the collaborative creation of sets of web pages. The best known wiki is Wikipedia[8] an online encyclopaedia created by anyone who has an interest in some topic. Each topic can be given its own web page. Among their distinctive features, wikis record all the changes that have been made to them, so that it is possible to see who has contributed what to any page. Many include sophisticated management and linking tools to support navigation as well as discussions areas associated with each page. Most wikis also allow the wiki owner (or sometimes page creator) to determine who may see or edit the page, and they may use RSS to inform people when pages have changed.

Social bookmarking

Social bookmarking sites (such as del.icio.us[9]) allow people to gather all the pages that they are interested into a set of bookmarks (similar to Internet Explorer Favourites or Firefox Bookmarks, but held on a server instead of the user's computer). Typically they allow entries to be tagged so that they can be grouped together by subject. Many social bookmarking sites will suggest appropriate tags based on the tags that other people have used when bookmarking the same site.

Social bookmarking sites can also be used to see who else has bookmarked the same site, and therefore may be interested in the same topics, and also to see what else they have bookmarked, and so may be of interest. They can thus be used to locate other resources, and people interested in the same topic.

Media sharing

Media sharing allows people to post their photos, videos, podcasts (audio files) and vidcasts (videos). There are a wide variety of sites including flikr[10] for photos, YouTube[11] for videos, iTunes[12] for podcasts, Slideshare[13] for presentations, scribd[14] for documents etc. These allow users to post their contributions, and again to tag them with key words. In most cases they allow viewers to post comments, reviews or ratings as well.

It is worth noting that in most cases the user is assigning many of their property rights to the site owner. Some require content to published under some form of Creative Commons[15] license, while others seek non-exclusive rights over the content. However, after grass roots campaigning site owners seem to be seeking fewer rights than two or three years ago.

Social networking

Social networking sites such as Facebook[16] , MySpace[17] and Bebo[18] allow the creation of online communities of people with common interests (which could include a course). These include a

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8   http://en.wikipedia.org/

9   http://del.icio.us

10   http://www.flikr.com

11   http://www.youtube.com

12   http://www.apple.com/itunes/

13   http://www.slideshare.net

14   http://www.scribd.com/

15   http://creativecommons.org/

16   http://www.facebook.com

wide variety of tools (often allowing third party plug-ins) which may include blogs and media sharing.

An interesting recent development is ning[19] which allows users to set up their own social network sites, hosted by ning, and control who has access, and what facilities are made available. We are beginning to see this being used in learning and teaching as an alternative to the institutional virtual learning environment.

Aggregation

One of the features of Web 2.0 is the large number of sites that people tend to use - blogs that they follow, friends who they want to keep in touch with, news sites etc. RSS[20], which at different times has stood for really simple syndication, RDF[21] site summary and rich site summary, enables the user to view information from a wide variety of sources quickly and easily. There are many tools which can be used for aggregation and many of these allow the user to see the information by its source, date or the subjects which it is tagged by. The last may be particularly useful if, for instance, members of a course "tag" their work with course IDs that are relevant to that piece of work. Thus, the reader would be able to see all blog postings, updated wiki pages, new bookmarks etc which are relevant to that course, and ignore all the work (for other courses that they may not be on or personal postings).

Other technologies

There are many other systems that can be included within the overall framework of Web 2.0, including:

- Social presence systems (like LinkedIn[22]) which are similar to social networking sites.

- Collaborative editing tools are now widely available which either allow people to share documents and edit them in turn, or in some cases allow multiple people to edit them at the same time. Examples include Google docs[23] and Zoho[24].

- Mashup usually requires some level of programming and involves mixing data from different sources in order to create something new. A common example is using Google maps to plot the locations of people on a course.

- Second life is rather different from the other technologies discussed, and many people suggest that it is not really Web 2.0 as it relies on an application on the users machine rather than working in their browser. Second life is an online environment in which users have avatars (virtual representations of themselves which need look nothing like themselves and could be animals for instance) which can move about and interact with other avatars that they encounter. Users can build buildings, host parties and even indulge in virtual sex.

- Start pages, such as iGoogle[25] and PageFlakes[26] enable users to easily access a large number of different web pages by including small windows to them on a series of tabs

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17   http://www.myspace.com

18   http://www.bebo.com

19   http://www.ning.com/

20   Another standard, Atom, also exists

21   Resource Description Framework

22   http://www.linedin.com

23   http://docs.google.com/

24   http://zoho.com/

- Microblogging sites, such as Twitter[27] allow people to publish very short messages (typically no more than the 160 characters allowed by mobile phone text messages) in much the same way that blogs are published. The idea is to enable to people to keep in touch with what people are doing. Messages might only contain information like "late for my lecture", "in the pub" or "working on my essay".

Information Quality

There has been much discussion of the quality of information that is available on the web, given that anyone can publishing anything that they want without any form of quality control or peer review. Most of the content on the Internet has not been peer reviewed in any formal sense. However, with Web 2.0 the ability exists to edit what has been posted, or leave comments, ratings, and reviews which gives rise to the capacity for informal peer review. There have been, for instance, comparisons made between the quality of Wikipedia and Encyclopaedia Britannica[28], which while hotly contested[29] suggest that the differences in quality may be less than many imagine and may be shrinking as pages get edited and improved. However, there is the need for new skills to be developed in assessing the quality and reliability of information, as suggested by the Google Generation report[30]. Even with issues over quality Web 2.0 sources have many advantages including availability and currency, but this is balanced by the difficulty of understanding the validity and trustworthiness of the source. What becomes increasingly important is trust of the author or source, and the development of communities where trust can be built. Note that this contrasts with the historic trust in the publisher to ensure quality control (ie if something comes from a reputable publisher (including journal publisher) then the content can be trusted.

The current state of Web 2.0

For many years Gartner have been analysing emerging technologies using their hype cycle, which has five phases:

1. "Technology Trigger" - The first phase of a Hype Cycle is the "technology trigger" or breakthrough, product launch or other event that generates significant press and interest.

2. "Peak of Inflated Expectations" - In the next phase, a frenzy of publicity typically generates over-enthusiasm and unrealistic expectations. There may be some successful applications of a technology, but there are typically more failures.

3. "Trough of Disillusionment" - Technologies enter the "trough of disillusionment" because they fail to meet expectations and quickly become unfashionable. Consequently, the press usually abandons the topic and the technology.

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25   http://www.google.com/ig/
26   http://www.pageflakes.com/
27   http://twitter.com/
28   Giles, Jim (2005-12-15). "Internet encyclopedias go head to head". Nature 438: 900–901. doi:10.1038/438900a. Retrieved on 2006-10-21.
29   "Fatally Flawed: Refuting the recent study on encyclopedic accuracy by the journal Nature". Encyclopedia Britannica, Inc (March 2006). Retrieved on 2006-10-21.
30   information behaviour of the researcher of the future, JISC, http://www.jisc.ac.uk/media/documents/programmes/reppres/gg_final_keynote_11012008.pdf or http://tinyurl.com/5bxyxs

4. "Slope of Enlightenment" - Although the press may have stopped covering the technology, some businesses continue through the "slope of enlightenment" and experiment to understand the benefits and practical application of the technology.

5. "Plateau of Productivity" - A technology reaches the "plateau of productivity" as the benefits of it become widely demonstrated and accepted. The technology becomes increasingly stable and evolves in second and third generations. The final height of the plateau varies according to whether the technology is broadly applicable or benefits only a niche market. [31]

Gartner, in their emerging technology hype cycle[32] suggest that Web 2.0 is falling into the trough of disillusionment. There are a number of important implications from this. Typically new technologies are hyped up as being completely different and novel and will make a fundamental change to everything, but are at that stage simply research results, prototypes and pilots. The people using them are technically extremely competent and enthusiastic and both believe and add to the hype. At some point the technology moves beyond this group and begins to be used by a wider group of people who have bought into the hype (or marketing) and are not as able or willing to put up with all the problems that the technology suffers from. They are also less forgiving of any difficulties in achieving the promises of the technology. The result of this, is that people become despondent and believe that the problems will be insurmountable, or that the technology will not deliver on the promises that were made and the technology drops into the trough of disillusionment. Some technologies never recover from this, many however go on to be useful and important, but to a lower degree than the hype might have suggested. One important point to note is that the trough arises precisely because a technology is moving to a wider group of users, and that they are encountering problems with it.

Gartner is therefore almost certainly right to suggest that Web 2.0 is slipping into the trough, and by implication that what Web 2.0 delivers over the next few years will not live up to the early promise of changing everything. However, this also means that Web 2.0 has broken out beyond the enthusiasts and is being more widely taken up. As this continues we will achieve a more realistic idea of what Web 2.0 can achieve.

Although Web 2.0 as a whole is slipping into the trough of disillusionment it should be noted that many of the individual technologies are at other points on the curve. According to Gartner, wikis are entering the "slope of enlightenment", though it could be argued that in education they have moved a little further; whilst social computing platforms are still at the peak of inflated expectations.

What is important to note here is that the technologies are evolving very rapidly, and our understanding of their value in education is still limited. It will be some time before we really understand the affordances that each of the technologies offers, and thus where its use is appropriate. Until that time we are going to need much experimentation and therefore we can assume that mistakes will be made, and over-enthusiasm for some of the technologies will get in the way of realistic evaluations of use.

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[31]   http://www.gartner.com/pages/story.php.id.8795.s.8.jsp

[32]   Hype Cycle for Emerging Technologies, 2008, http://www.gartner.com/DisplayDocument?id=717415&ref=g_sitelink or for free access to the diagram try http://www.techcrunch.com/2008/08/18/where-are-we-in-the-hype-cycle/

Why does Web 2.0 matter in higher education?

There are two important reasons why Web 2.0 matters to universities. Students will increasingly be using Web 2.0 technologies in their social lives, at work and in previous study, and will begin to expect that their courses will make use of them too, in the same way that we have seen students increasingly expecting the provision of online material both within their virtual learning environment and from the library (for instance through the provision of online journals) and, perhaps more importantly, because Web 2.0 provide a new set of powerful educational affordances.

That students are using a technology is not a reason *per se* to use it in education. In the 1950s television was seen as an educational panacea, however it was later realised that its purely transmissive nature was of limited educational value. Similarly, in the 1990s many people were advocating the use of mobile phones in teaching, and suggesting that we should allow students to write their essays in "text speak". However, it soon became apparent that 160 character text messages are not a suitable format for teaching in higher education, and that part of the role of higher education is to bring students into the community of scholars in their chosen subject. One of the key characteristics of a community is the language it uses, and therefore students need to be able to use the language of that community.

As already discussed, Web 2.0 is not a single coherent entity, but a wide variety of different technologies and these technologies offer different affordances. It is likely that some will have a very limited role in formal education, while others will over the longer term have a profound effect on how students engage with their learning.

Drivers and enablers

Drivers and enablers for using Web 2.0 in Higher Education

There are limited drivers in all countries but many enablers. The UK and Netherland lead the way in enabling through supporting national infrastructure developments, and some USA States have policy and strategies in place. Institutions are not seen to have drivers and as organisations are slow in their response to Web 2.0 technologies. Where there is confidence in students' ability to access Web 2.0 tools there are found staff who are innovating new practices and much of the drive is coming from bottom up within institutions.

National, Federal or State drivers

There are a limited number of drivers at state, federal or national level. Most activities are broader in scope than just Web 2.0, usually looking at wider digital needs. The focus is instead either promotional and or enabling. Included in these activities are:

- **Broader strategies that include the use of Web 2.0** and provide incentives to deliver strategy:(e.g. in Australia, the Learning Performance fund (DEEWR, 2008) which provides substantial monetary rewards to universities in return for evidence of improved student retention, overall satisfaction with teaching, integration of generic skills and numbers of students progressing to postgraduate study; in the USA the Department of Education has an office of Educational Technology, which released *The National Educational Technology Plan* in 2005. This plan called for increased broadband access, incorporation of e-learning and a move to digital content.

- **Policy drivers** are rare and of a broader nature than just Web 2.0 in all of the countries with no policies referred to in the South African report. There are however, other government policies, e.g. anti-file sharing provisions in the current version of the Higher Education Act in the USA, which will potentially affect choices for implementing social media technologies. In the UK a Minister for Digital Inclusion was appointed in January 2008 whose mission is "to co-ordinate policies and a coherent strategy that all citizens, especially the disadvantaged, can benefit from new technologies".)

- **Higher education funding agencies policies** can provide some drivers for HE institutions; (e.g. In the USA State-funded universities are often confronted with state-wide technology mandates, some of which may involve the adoption of social media. For instance, Michigan's 2008 IT Strategic Plan calls for state agencies to emphasize citizen-targeted services, experimenting with mashups, wikis, social networking and other Web 2.0 services.[33] Many of these initiatives may affect university technology policy on a systemic level.)

- **Investment into infrastructure for equity of** access and economic development: (e.g. In Australia the Rudd Government has a new education strategy called the *Digital Educational Revolution* (DER) which is leading to investment in the digital infrastructure. The Australian ICT in Education Committee in 2005 prioritised for HE:

  o providing advice to ensure that legislative arrangements and other agreements relating to digital copyright and technological protection measures did not impact negatively on education;

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[33] State of Michigan (2008). *IT Strategic Plan.* http://www.michigan.gov/itstrategicplan

- developing approac**hes to high speed access to th**e internet at a fair price. In particular leveraging from the work done in the higher education and research sectors across to *the schools and the VET sector*s.

- **Government sponsored or national reports** into use of ICT for education and wider social purposes, (e.g. Australian 2008 report '*Educators and ICT Usage*'. The report reveals the integral role information and communications technologies play in the education sector for teaching, for research, and for administrative tasks; that is, ICTs are considered a core enabler for the functioning of learning organisations.

- **Central (state, federal and national) investment in agencies** that promote, often through funding that support innovations in development projects delivering tools, resources and communities of practice. (e.g. In the UK the **Joint Information Systems Committee** (JISC) is funded centrally to maintain and develop the technical infrastructure on behalf of the education sectors, and provide funding for projects and services that provide support and promote innovation for new developments. In Australia the *Education Network Australia (edna)* is a collaboration between all Australian governments, states and territories and sectors of education and training. Through its website, workshops and activities, edna provides educational quality assured, secure interactive web based tools that meet agreed technical and quality standards, and provides professional learning and development support for pre-service, new and experienced teachers and educators. In USA there are many federal agencies that are active in encouraging the educational use of social media technologies. For instance, the Library of Congress has integrated social media into its website, including blogs, RSS feeds, podcasts, and widgets, and provides digital resources to interested instructors.

- **Other agencies are also investing:** e.g. In the USA the MacArthur Foundation's Digital Media and Learning initiative has provided $50 million in grant money "to researchers, educators, game developers, and others to explore how, and to what extent, digital technologies are changing the way young people learn, play, socialise, and participate in civic life."[34] These grants have been distributed to a variety of institutions and are sponsoring several long-term, wide-scale projects including the development of digital literacy curricula, ethnographic studies of young people's use of digital media, and the impact of digital media on civic institutions. The USA also has a number of non-profit making organisations such as EDUCAUSE, "an non-profit association whose mission is to advance higher education by promoting the intelligent use of information technology." They publish many working papers, reports, and surveys, and publish a useful journal of information technology and education.

Institutional drivers

In each of the different countries there are limited institutional drivers, and there are very few that have created formal strategies for the integration and effective use of Web 2.0 technologies across institutions. More have acknowledged their anxieties about misuse of these virtual spaces by developing codes of conduct around use, seeking to make sense of the ethical issues and protecting themselves, staff and students through explicit regulation. Institutions appear to be aware of Web 2.0 developments and are watching the habits of young people carefully to try and understand how they should be responding. There are some drivers explicitly noted:

- Limitations of physical spaces and need to support/teach groups of learners through the use of Web 2.0 tools who have limited, minimal or no face to face contact on campuses

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[34]   McArthur Foundation. (2008). Domestic Grantmaking: Digital Media, Learning & Education. http://www.macfound.org/site/c.lkLXJ8MQKrH/b.946881/k.380D/Domestic_Grantmaking__Education.htm or http://tinyurl.com/68kao9

- Desire to keep in front of developments ("*The changing student generation and also the fact that academia has to keep up with developments.*")

Academic/administrator drivers

Most of the development appearing within HEIs is driven from the work of individuals who are innovators or early adopters and recognise the potential in the functionality offered by Web 2.0 tools. Some are exploratory but many find the opportunities for collaboration and communication across boundaries fits with their pedagogic or communication strategies. There is pushing against and across many traditional boundaries within HE
- The continuity of resources (created by both students and others) beyond University life ("*I want my students to have access to the resources after the course ends!*")
- The creation of communities beyond traditional HEI communities: employers, practitioners, other students across the world. ("*Engagement with a wider community; Transcendence of institutional boundaries.*")
- The development of communities before and after undergraduate and graduate courses: induction through social networking and alumni sites
- The commitment to lifelong learning (values of academics) ("*Learners will need to be confident in using Web 2.0 in their future employment (and can also benefit from a lifelong learning perspective).*")
- The extension of new forms of knowledge. ("*Interested in the ways that emerging technologies allow new forms of knowledge to be produced, published, and assessed.*")

Curriculum needs

For some within Higher Education there is a direct need to engage in Web 2.0 because this is a formal part of curriculum. The drivers here are much more direct.
- Use of Web 2.0 is part of the course e.g. media, computer science ("*We are teaching modules related to web 2.0, mash-ups and web services so it is useful for students to experience these types of applications.*")
- Need to equip students with appropriate computer and information literacy skills for use in the future employment, professional practice, lifelong learning and social lives. ("*Students need to develop skill in use of Web 2.0 technologies to be prepared for employment.*")
- Use of collaboration tools for practice professionals and others off site to support learning and practice development. ("*They also need to develop skills in collaboration and team work, and the ability to critique each other's work and reflect on their peers and their own work.*")

Enhancing teaching methods

Many professionals seek to update their practices and lead new thinking and driving the use of Web 2.0 tools is seen simply as part of their professional lives.
- Professional drive to enhance teaching practices (and keep up to date) through the use of tools including: use of collaborative tools, tracking and monitoring process/progress, use of communication tools outside formal HEI 'closed' tools, changing assessment practices ("*To keep with up to date teaching practice and learner needs.*" and "
- Pedagogic approaches underpinned by constructivist beliefs drive towards use of Web 2.0 tools. ("*I am also deeply committed to the idea that knowledge is socially constructed and web 2.0 technologies make that idea visible and tangible.*")

- New opportunities for creation and co-creation of content. ("*To collaboratively create their learning resources.*")

Enhancing students' learning

In many countries the focus on the student experience leads to a desire to use these technologies they see young people engaging with.

- Harnessing students' engagement with Web 2.0 to enhance their learning opportunities through collaboration and different communication tools and wider access to resources, their own and others. ("*The kids already have ownership of these platforms.*")

External drivers

HEIs recognise the changing virtual world, its visual and multimedia dimensions and its global reach. They recognise the changing landscape of information and communication and there is a driver to engage with this for their own contexts, whilst being uncertain what it might come to mean.

- Students' changing (technological) expectations, skills and motivations driving academics and HEIs towards use of Web 2.0 tools.
- New lecturers' different personal experience of learning is changing approaches to teaching.

Enablers

Many factors affecting uptake of Web 2.0 tool use in Higher Education are concerned with being enablers rather than specific drivers.

- Web 2.0 tools are accessible, flexible, simple and mostly 'free' ("*… I chose to incorporate public freely available tools external to the CMS on purpose for several reasons.*")
- Innovators utilise new opportunities.

Barriers

In all countries in this study there are barriers to use concerning appropriate access to the necessary bandwidth and computers. This is most acute in South Africa but there are also issues of adequate access to broadband away from Universities in Australia. The use of Web 2.0 technologies is not likely to advance much until there is greater likelihood of equity. Once bandwidth and access to computers has been resolved the barriers revolve around institutional constraints, lack of appropriate pedagogies and the usual resistance and inertia in organisational change. The following barriers emerge from respondents responses:

Inequity in student access

- Students do not have access to computers or the appropriate bandwidth for Web 2.0 Internet activities, particularly in South Africa and Australia. (also…."*Fine for students who are in work, but some students don't have easy access to broadband where they live. This is especially a problem for international students who have to come on campus to use the technologies as they don't have sufficient credit rating to get contracts for broadband*." "*Also, for those students not wired at home, we need to be sure that they can have Internet access from school or at the library.*")
- There are inequities in the social capital of some students who do not all have equal technological backgrounds.
- There are accessibility issues for some disabled students using Web 2.0 tools and legislation (in the UK) that can create further barriers to use.

Institutional ICT/audit restrictions

- Not all institutions allow Web 2.0 tools to work on their network systems. ("*Many networks in the Schools in my institution are locked down and some even block YouTube.*" "*No barriers per se, although some colleagues at other schools have to convince their administration to allow access to sites like Ning.com, facebook.com, blogger.com, etc.*")
- To date there is little evidence of integration of Web 2.0 services within managed learning environments (MLEs)
- There are still hardware and software incompatibility issues for some programmes.
- There is some resistance from institutions to use of Web 2.0 after their investment of other internally run applications.
- There is a change of culture required by institutions to use externally hosted software or external storage of content as there a number of 'control', 'audit', 'compliance' and 'rights' issues associated with this. ("*My organisation has been very encouraging but we are on the brink of making decisions about proprietary software and there is always a tension around 'openness' and 'closed' (secure) ways of operating in the online environment*.")
- The pace of change in technologies always leave investment behind, as this is not just about the software and hardware. ("*Lack of investment centrally in support - the people there are very helpful, but there aren't enough of them, and as a result there is a focus on using WebCT rather than supporting use of other Web 2.0 technologies*".)

Institutional management indifference/inertia/risk aversion/different values

- Use of external Web 2.0 tools creates a dilemma for a culture within institutions that have sought to 'be safe' by maintaining and controlling and keeping secure their own systems. (*"The main concern is whether to keep students 'safe' within university-developed systems,*

or to use publicly available web tools. So far the former approach has been adopted, via the university's VLE. The VLE [is] 'under development' so usability and functionality are important issues [that need to be] address[ed].")

- Some institutions' senior managers demonstrate a lack of knowledge or low priority for supporting technology developments. ("*Decisions by executives/politicians who have no understanding of the technologies and the support platforms/hardware/networks which are needed, and have no idea of the time and expertise needed to do a good job of organising and supporting these strategies.*")
- Some institutions have particular values that do not give rise to changing pedagogies that go with use of Web 2.0 tools. ("*Institutional values where the use of ICTs et al are understood to pretty much maintain the status quo in terms of pedagogy.*")
- Some institutions are struggling for money to invest in technical infrastructure.
- There are some governance, potential litigation and IPR issues that can be raised as barriers.

Risk or uncertainty of success with students

- The general lack of institutional support leaves some academic staff with the responsibility of taking the risks in using Web 2.0 tools for their teaching and some are reluctant to put the success of their students at risk. ("*…additional downloads/installs for students who don't otherwise utilise these tools; need for technical support for students installing software." "As far as I'm aware, no-one else in my (technology-focused) department is using wikis or blogs properly in their teaching.*")
- The lack of knowledge amongst both staff and students creates a barrier to use. ("*Primarily, staff and student lack of knowledge on how to use." "Technological competence - students have different levels of experience with these technologies, especially as all the students are 'mature' learners.*")
- There is also a perceived resistance in some students. ("*…students need encouragement to use them. We need to market these services in such a way that students accept that it is worth investing time to 'check them out'." "Incentive to use an unfamiliar technology is lacking for other than social purposes. Students don't often see the 'point' if it's not fun.*").
- Some students are also reported to be resistant to the pedagogic approaches and academics are reluctant to require students to make their learning more public. ("*Students conceptions of learning are often that it is about receiving the knowledge from the tutor." "there is student reluctance to record opinions to be viewed by others.*")
- Some fear that this is just another technological fad that will have very little lasting impact on formal education or that there are problems with using unproven technologies, both particular implementation and of using approaches that have not been demonstrated to be effective. ("*Constant change, educational investment in 'unproven' technologies" and "Technologies evolve rapidly and online environments come and go*").
- Staff who have tried the technology find that it can be unreliable and therefore are not willing to use it with students. ("*Half the time the technology doesn't work.*")

Academics indifference/inertia/risk aversion/different values/lack of knowledge and skills

- Staff lack the technical and pedagogical knowledge and skills to utilise Web 2.0 tools for teaching. ("*… there is a staff lack of knowledge and risk taking in developing new ways of learning". "(Library) staff reluctance to 'give it a go'; worried that it is too difficult to learn how to use some technologies (small minority).*")

- There is some resistance to letting go of control and giving that to student through the use of Web 2.0 tools.
- Some staff are indifferent and see no particular reason to invest time learning and using Web 2.0 technologies.

Time restraints from overload from development, administrative changes/demands, research, student numbers

- Staff across HEIs have heavy demands on their time and creating space for developing their teaching and supporting student learning with Web 2.0 technologies requires a high level of priority be placed on it. ("*Time in helping learners feel confident and supporting their use Web 2.0 learning tools. The quickest thing to do is to go and give a 50 minute lecture. Once you start using Web 2.0 then you need to do more setting up, more feedback/monitoring in between sessions (and so forth) - you can help students to learn to do some of this, but it still takes you more time*". "*…lack of time to develop strategies*".)
- For some the pace of changes with tools is overwhelming. ("*Probably the multiplicity of tools; and the fact there are new tools emerging permanently. When you think you have mastered one tool, such as the wikis in my case, you realise that there are a number of new ones that may be of interest for your practice; but you don't have the time to get into them*." "*Keeping up with developments in times of staff / fund cutbacks*")

Pedagogic uncertainty

- Some staff are uncertain about the pedagogic usefulness of Web 2.0 tools. ("*Where it hasn't got a practical use to make things better, and it's just technology for its own sake*." "*It would be an educational investment in 'unproven' technologies*".)
- There is a lack of confidence about having the right pedagogies in place to make appropriate use of these technologies.

Not yet 'user friendly' enough

- The endless logging on with passwords to different systems and needing students to remember their passwords can make systems too unfriendly to risk using. ("*…some students may find it cumbersome to have to get accounts for all the different tools*".)
- There is a time investment that may prohibit use by staff and students. ("*The tools are sometimes hard to get to know and use efficiently in the first instance, e.g. the wiki work is something that you need to spread over an entire module as the students cannot suddenly plunge in there and get to work. The technology isn't always robust and login/access permissions can get complicated.*")
- Although Web 2.0 tools have become popular partly as a result of their ease of use, they can still be difficult to manage for learning purposes. ("*It can be difficult to integrate different Web 2.0 technologies with each other - although I am experimenting with aggregators/ RSS feeds as a way of doing this.*")

Benefits of using Web 2.0

Respondents wrote, "When systems work well, and the environment is well planned, students are very pleased with the ability to connect, participate, and share." …."I get more feedback from my teaching". "we can engage the Generation Y students". "They (web 2.0 tools) accomplish my educational objectives and also expose the students to tools which they can apply in their workplaces." Although there is not widespread take up yet of Web 2.0 tools, especially in countries where bandwidth and access opportunities are limited preventing institutions from early adoption, where tools are used there is much enthusiasm. Most of the use is by those involved in teaching and learning, and support of student learning. There are a few other areas, such as pre-entry social networking, and alumni operations that are beginning to use Web 2.0 tools. Marketing may not be far behind, but many respondents to our enquiries thought it was very early to make judgements about how useful Web 2.0 tools are in enhancing the student experience. The following summarise the areas of benefits suggested by respondents:

Provides an opportunity to tap into student motivations

- Students enjoy using Web 2.0 media and find it fun. ("*It excites and interests the students - they are engaged in doing real research and the classes are made relevant to their own personal interests and questions.*")

- Better student engagement and performance. ("*Better learning - more creative options - more excitement from the students*")

- Young people are used to using these environments and adapt quickly to their use.

Improves student learning

- Transferable skills development for students. *("…- increasingly the skills you need to use in Web 2.0 technologies are needed in the work place*". "*Introduces students to new applications*".)

- Sharing their work and thinking in a communal space has given students examples of other's learning and so helped them improve their own learning. ("*Blogging has encouraged reflection.*" "*… creates more insights from students*".)

- Creates more active learners

Meets current pedagogic goals

- Creates opportunity for collaborative work, and sharing knowledge with each other and developing new knowledge.

- Offers opportunities beyond text and linear based learning. ("*Basically, things you couldn't do in other ways, or being able to blend face to face and online interaction in a way that deepens learning. It can be more fun to teach too.*")

- Enables academics to support enquiry led approaches to learning. ("*changes our focus, moving from teaching to learning*").

- Provides the ability to monitor, track learning and see processes during the course.

- Creates opportunities for 'authentic' engagement of wider communities of learning, especially for professional training courses, drawing external professionals into the learning space.

Changes the nature of learning boundaries

- Much informal learning that has always taken place now becomes much more visible, but also creates many more spaces for this to occur and begins to blur the boundaries between students and others in informal learning. ("*….breaking down the barrier between informal and formal learning - students can draw on other interests and link different areas of their lives.*")

- Creates a shared learning community between students ("*Wikis - students collaborate on a document. I didn't use this to its full advantage, but when I do in the near future, I expect students to form more of a community than currently possible.*")

- The monolithic VLE tools provide little scope for the wider ranging ambitions of innovators and those who want their students to work with enquiry led approaches. Web 2.0 tools offer much more potential for innovation in learning, teaching and assessment. ("*With these we can develop evidence based research, creating communities that grow beyond instructor/course involvement, creating community, establishing student control and presence*".)

Provides new functionality for supporting students

- Work can be viewed and assessed on-line. ("*Handy storage space on line for students to park their work and reflections, which saves on the paperwork - I just go in and view what they choose to publish.*")

- Support services such as the Library can be offered more flexibly. ("*Web 2.0 allows us to offer alternative means by which students obtain information to support their course work. They may not be able to attend, or have forgotten what they learnt in library information skills workshops, but they can view vidcast demonstrations and podcasts to reinforce learning.*")

- Improved communication environment and easy communications tools enhance many aspects of supporting students. ("*Our student body includes a lot of part-time students and students who take breaks in study. Web 2.0 technologies can be of tremendous value here allowing constant communication all months of the year and sustained contact.*").

- In some countries social networking sites are used widely for pre-entry support of new incoming students and increasingly for campus communities.

Ease of use providing ready access

- Many tools are seen as easy to use by staff and students. ("*Rapid development of new online learning services which are highly flexible and adaptable to meet user needs - staff and students We find we do not need promote web 2 tools in the way we had to market our previous more static tools - the communities which develop through the tools themselves are an engine for growth and innovation.*")

- Students can readily access what they need and communicate with others through use of these tools. ("*Provides full use for everyone. Easy to navigate." "No development time and very little support required. Technologies are understood by students - so don't need to explain what they are." "Disperse (preserve and organize) information to many without having to constantly email faculty/grad students notifications about "New" info available to them.*")

Provides new flexible virtual spaces without walls or time constraints

- Students and staff can work on and off campus. ("*Opportunity for remote access to a private page (wiki) so committee faculty can jot down their ideas whenever they occur for later sharing.*" "*Flexibility, supports process based and reflective teaching methodologies, lets my work and the students work be porous to each other and the world.*"

- Extends the learning community beyond the boundaries of the university. ("*Gives transcendence of institutional boundaries providing engagement with a wider community*".)

- Cuts across fixed time constraints. ("*I have extended the classroom beyond the physical walls and time.*" "*Ability to make work, particularly long-term research work, easier.*")

Being at the front of the game

- Advantage is thought to accrue from operating in the virtual world that young students are familiar with and increasingly have as expectations of their HEIs. ("*It is no good just doing it to be "cool" though - it does have to have an obvious relationship with what is being learned, or students feel you are wasting their time.*")

- For some HEIs the use of Web 2.0 tools forms part of their image. ("*It's brand and image, flexibility, 'walking the talk'.*")

- It's also seen as fashionable. ("*…it's seen as trendy - so it's easier to get teaching and learning funding.*")

Motivates staff

- Provides a space academics can control (not hosted within fixed institutional Virtual Learning Environments) for their own innovative teaching practices

- Gives opportunity for academics to innovate around their preferred pedagogies

- Is seen by some as time saving. ("*It saves me time and also encourages me to generate content for students and other colleagues.*")

- Spread good practice amongst staff. ("*…using it personally I get a huge amount of awareness of what other librarians are doing in their practices.*")

Supports wider HEI practices

- Student experience is affected by the use of Web 2.0 tools in other parts of their HEIs. ("*The network of former students provides better contacts as students move through successive apartments, grad student housing etc.*" "*Students that I personally introduce to bookmarking tools, open source picture editors, and things like Google Docs are excited and go away with a positive image of the library.*")

Environmental benefits from using Web 2.0 technologies

- The benefit of freely available externally hosted sites for use with students is considered beneficial by some, since their institutions are not likely to be able to afford to host or develop the tools themselves.

- More environmentally friendly. ("*Staff and students use much less paper.*")

Issues encountered and responses to them

Issues are common across all countries with those further ahead because of the greater opportunities afforded to them by better infrastructures facing such issues ahead of the others. HEIs and their students find themselves in unchartered territories with their respective uses of Web 2.0 technologies. The once more certain boundaries where information and communications were controlled by universities is being lost, and institutions are struggling to make sense of how to operate in this changed and permeable space. Students have yet to discover the full consequences of their public representations. The mind sets and frameworks of reference that we have used hitherto are no longer adequate. Many boundaries have become blurred; virtual and physical localities, professional and social lives, formal and informal learning, knowledge consumption and production.

Social issues

Social and professional lives.

The use of Web 2.0 for both social and professional purposes has created uncertainties for HEIs. This is reflected in institutions' current sharing of regulatory behaviour codes for use of Web 2.0 for staff and students. These appear to be coming into place before institutional policies or strategies for effective development and use of Web 2.0 for learning, teaching and other areas. Students often have strong social presences in Web 2.0 spaces and use these spaces for informal learning activities as well as socialising. Some spaces, e.g. Facebook have also been used for formal learning with academics setting up 'groups' for 'classroom' practices These social spaces however, have also become sites of bullying and intimidation both of other students and of staff. Some universities have entered the students social networking spaces to check out student presentations of themselves and this is also anecdotally reported as behaviour of potential employers. We are uncertain how to handle these new ways of being but we are moving inexorably to having physical spaces that are also connected, for individuals and whatever collective, to their networked virtual world via mobile web interfaces.

Privacy and safety

Issues of privacy and safety have been raised within the international reports as matters of concern for students and institutions. Naïve students and staff can cause data to be revealed that can be potentially damaging for that individual and HEI security systems can become open to risk. Ethical issues that we have not encountered before are liable to surface.

Identity

One of the key issues that both students and institutions will face is the nature of students' online identities. Many students are already using a wide variety of social software for their personal or social use - to stay in touch with friends (and possibly family), to build communities with common interests whether that is music, politics, films or any other hobby. The persona that students present in these communities may be different to the one that they would want to present in their studies; but the communities may overlap in that fellow students may be friends as well.

This is not an issue that universities have begun to address in any serious way, with advice from some law schools to the effect that "incoming law students are frequently told to erase all social networking profiles so as not to alienate future employers."

Clearly there are a number of possible solutions to this, and some students already avail themselves of these. They can have different identities for social and work / study purposes,

they can remove anything that they think might be detrimental in study or work, they can restrict their use to either social or work or they can muddle along mixing the two together.

We suspect that over the next few years we will see students acquire multiple persona, and have some degree of separation between their work / study personae and their social personae. Many of them may form links between their various persona.

Issues for Institutions

Traditional frameworks for the development of academic knowledge do not sit comfortably with the speed of information sharing and information production that exists via the Internet. Web 2.0 adds further challenges the types of knowledge production and validation practices of academics. Web 2.0 has been described as being seen as 'frivolous', but its functionality fits more comfortably with the newer pedagogies that embrace constructivist approaches, and increasing numbers of individuals across all countries are seeking ways of utilising Web 2.0 within their teaching. These numbers are still small however.

A lack of new pedagogic models creating uncertainty

- Academics are uncertain about adopting new pedagogic approaches with the use of Web 2.0 tools.

- Institutional structures and processes are not set up to support them using Web 2 0 tools. E.g. Assessment patterns and practices focus on summative tasks that often do not align with the pedagogic practices of Web 2.0 use, but the assessment strategies are enshrined in regulations and in the UK at least, external examiners may not give support to these processes or Web based products.

- There is anxiety not to disadvantage students by expecting them to engage in innovative practices that may not benefit their learning.

Time constraints

- Administrative overhead for use of tools that are (mainly) hosted externally.

- High maintenance of the learning process once up and running within a course/module

- Learning new technologies, and keeping up with new technologies can be seen as very time consuming.

- Supporting students with their use of new technologies as they learn them takes additional time and there does not tend to be much centralised institutional support for students who need help using these externally hosted sites.

- Academics running these technologies for their own needs because they are not supported within the institutions

A culture shift for academics

The rapid and huge expansion of information accessible through the web coupled with tools that can be used to repurpose and create new knowledge on-line have created a very different information and a communication environment. Traditional ways of delineating and building discipline understanding through the careful use of directed resources has been lost to the

plethora of information accessed through the Web. In addition to this the specific nature of Web 2.0 resources represents a further loss of control for academics.

- Loss of control over content as the Web opens up content creation opportunities.

- Loss of content security as tools exist mainly externally and content may disappear.

- The diversity of sources and ease of access of information sharing for students changes demands made on students and staff in the construction of new knowledge and understanding.

Issues for students

Issues for students are common across all countries where they are engaged in using Web 2.0 tools

A culture shift for students in pedagogic approaches

- Most students have little experience of using Web 2.0 tools for learning.

- Many are also making a transition to the types of pedagogy that use collaboration as an approach to learning and requires them to operate effectively in group situations, rather than just as an individual.

- Students have to become self-directed in their learning and have to maintain their own motivations.

- Students may have some resistance to the pedagogies that lie with the use of collaborative communication and content creation tools.

Issues of access and equity

- Academics cannot move to exploit Web 2.0 tools whilst their remains inequity in access to broadband (particularly South Africa and Australia), or computers by students.

Technology barriers still exist

- Too many tools, too many passwords and still too much potential for students to find the technology gets in the way of their learning.

- The externally hosted sites contain advertising and potentially inappropriate materials that could be an issue for those teaching minors.

- Externally hosted sites may not be reliable and there is no certainty of retaining the content developed.

Students need to be taught new skills (information and digital literacy)

- Student's social use of Web 2.0 tools does not necessarily provide them with the skills for collaborative learning.

- Students need to learn how to operate in this information rich but essentially anarchic Web space at the same time as developing their subject knowledge base, concepts and frameworks to enable them to make appropriate intellectual judgements.

Implications

Information services

Until the advent of Web 2.0 most of the provision of services for students was by the university through provision of email, virtual learning environments etc. With the advent of Web 2.0 a plethora of free (at the point of use) services have sprung up which are being increasingly used by academics in their teaching and by students in both their formal and informal learning. There are a number of important implications here.

Control

Where the university deploys the technology it is able to determine who may use the systems and what they may use them for. The university can, if it so chooses, limit access to members of the university and can remove access rights if members of the university abuse them in any way, or fail to pay their fees. Once externally hosted systems are used these controls are lost, and anyone (such as visiting lecturers or external experts) can be invited into the space.

Intellectual property rights

Information, including licensed information such as learning objects and research papers, are more likely to "leak out" of the university as people post material relevant to their course into any spaces that they are using for learning. Universities will need to be aware of the dangers of this, and educate their staff and students accordingly.

Personal security

Web 2.0 spaces can be very visible, and information posted there may remain for a long time (potentially forever). Users therefore need to be made aware of the dangers of including personal information (which can be used to identity theft, or to know when they are away from home), comments which may be embarrassing to them in a few years time etc. Again, there may be a role for universities to educate their staff and students.

Curriculum

Over the long term Web 2.0 is likely to have profound effects on the nature of the curriculum at all levels of education, including higher education. While it is much too early to be able to predict what these will be in any detail we can suggest some of the possible ways in which curriculum may change over the next ten years.

Web 2.0 implies that students will be involved in creating as knowledge as well as consuming it. Historically, what (undergraduate) students have produced has been almost entirely private, and postgraduate students have produced thesis from which they may also produce papers. With Web 2.0 students work can be visible to each other, and to the wider world. We are therefore likely to see requirements for students to publish their outputs to each other for comment, and that many students will make their outputs visible. We believe that this will have several effects.

- Peer assessment will become increasingly important as students are asked to constructively comment on each other's work.

- Plagiarism will be an increasing problem as there are more sources to plagiarise from, which will result in a re-design of the curriculum to design out plagiarism.

- The process will become as important as the product. In the fine arts, amongst other areas, students are assessed all stages of their work from initial ideas, researching sources, materials etc, initial sketches, drafts and the final product. The process can be more important than the end result. We believe that this approach will be increasingly extended to other subjects. For instance, students may be asked to produce annotated reading lists showing why papers are relevant to the topic, an outline of an essay, draft and final essay. Each phase could then become part of the assessment, and feedback provided at earlier stages is likely to be a powerful learning tool.

- Increasing group work. It is easier for students to share their work. With electronic sources it becomes almost trivial to share them, without having to hand over or copy that paper you are working on. Co-authoring becomes easier with document creation tools such as Google Docs or Zoho.

- Web 2.0 challenges current notions of authority, and staff are likely to find their expertise and knowledge challenged as students explore alternative sources of information and (re-)construct knowledge in different ways.

- Skills and competencies associated with creating knowledge from existing knowledge and assessing the value and validity of available knowledge and information will become more important at the expense of learning information (which will become dated increasingly quickly).

Assessment

Some of this has already been addressed under curriculum. Much of what we will see will be a continuation of existing trends towards authentic assessment and increasing amounts of group assessment. We are also likely to see students producing a wider variety of different types of artefact for assessment, where the process is as important as the product. It is likely that students will be producing, in addition to traditional essays and reports, videos, portfolios, improvements to Wikipedia entries relevant to the course, articles published in student run journals etc.

Universities may need to revisit their assessment strategies in order to support this type of work.

The future of universities

Web 2.0 by itself is unlikely to have a significant effect on higher education over the next ten years, but it will almost certainly accelerate some of the trends that we are already seeing:

- Universities will lose their privileged role as a primary producer of knowledge and gatekeeper to it, as knowledge becomes more widely accessible through other sources, and is produced by more people in more ways.

- The funding sources of existing universities will become increasingly threatened as other providers start to offer degree courses. In the UK we are seeing further education colleges offering higher education provision, and in the United States there are many private universities (including for profit universities, and university divisions of large corporations).

- Distance learning will increase as the technology reduces (not eliminates) the differences between campus based learning and distance learning.

- Work-based learning will increase with courses being more closely embedded into the work-place as work can more easily be shared between colleagues at work and on

courses. Note that this will raise concerns over confidential information that universities, employers and students will all need to consider.

- Collaborative work across courses and across institutions will increase, both planned as part of the courses themselves, and informally as students get to know each other through their social spaces.

Examples of use

There is considerable, though patchy, use of Web 2.0 for teaching and learning and learner support within higher education institutions. Some of the current developments are institutionally driven or supported, but much of the current work is being undertaken by staff with a particular interest or enthusiasm. Because Web 2.0 is a very recent set of technologies there is little that has been little in the way of national policies that has directly addressed Web 2.0. However, there are examples of use of Web 2.0 to support existing policies, such as the use of social networking to support students before they reach university as part of the widening participation agenda. Though, as noted above, we are beginning to see it break out beyond the enthusiasts to a wider group and some of the difficulties are becoming more apparent as a result.

Most of the examples that are given here come from three main sources - the international studies included in the appendix, the survey that we undertook as part of this work, and work undertaken by one of us for a previous study[35] to demonstrate work at an institutional level.

Before looking in detail it is worth quoting one response from the survey in detail, as it shows how one person has used a variety of different tools on different courses to achieve different ends:

> "Depends on the specific course, of course. In a literature course, I will have students collaboratively create a wiki entry for a specific text. In a writing course, I might have students create subject entries, one on "voice," for example. In research writing, I have students use delicious and diigo to find and evaluate sources. In majors' courses such as "Advanced Technical Writing," I have students create an e-portfolio for use in my assessment of their work and for future employment. In graduate courses, I often have students maintain a course blog on a specific topic." Jane Lasarenko, Slippery Rock University of Pennsylvania

What the quote makes clear is that the different technologies offer differing affordances and are therefore suitable for different purposes. It should also be noted that whereas in the past teaching and learning has mostly made use of technologies provided by the university (in the form of university email addresses, virtual learning environments, bulletin boards, discussion forums etc) most of the technology being used here is external to the university, and free at the point of use.

We believe that the external nature of the technology will have an increasing impact on teaching and learning for a number of reasons:

- It reduces the learners' dependence on the university for the provision of services including the technology itself but also the additional services including the access to information, the teaching, tutoring, mentoring etc which would historically have been provided by lecturers, course tutors and so forth.

- It reduces teachers' dependence on the university for learning technologies enabling much greater experimentation with different technologies. There are several important implications of this. It will be harder for the university to dictate what teachers may do through limits on the available technology (instead it would require policies or policing of internet connections through blocking sites etc). There is the potential for students to have to use many different technologies depending on what their teachers have decided to use, with the problems of

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[35]   Franklin T, and van Harmelen M, Web 2.0 for Content for Learning and Teaching in Higher Education, Report to JISC, 2007, http://www.franklin-consulting.co.uk/Reports.html#Topic6

maintaining multiple accounts and multiple different ways of doing the same thing, and creating silos for each course or module.

- It supports life-long learning by providing places where the learner can access their learning resources and community after leaving university, and when the move from course to course (or more accurately learning opportunity) through their life. Historically, once the student leaves a university they effectively loose access to their peers, the university resources and many of the resources that they and their peers created during the course. By moving where peer groups and resources may be held to outside the university's control the student is able to have continued access to both the group and resources after graduation.

- It enables a wider learning community. The lecturer can easily invite peers from other universities and experts from outside academia to part of the group. Furthermore, the problems of location are significantly reduced and appropriate experts can be used from anywhere in the world. While this was possible before, and experts could be invited in both physically and virtually it has often been hard to get them fully enrolled into institutional systems. We have heard many stories of lecturers struggling to get experts accounts on the university VLE as they were not members of staff (or students) at the university. The use of external system removes this problem, as it is usually up to the owner of the group who they invite in, and they do not need university credentials.

- It enables wider experimentation. There are far more systems available than any university could ever support, even if they wanted to.

Teaching and learning

One of the areas where there has been the keenest interest in the use of Web 2.0 technologies is in teaching and learning, in part because it is believed to offer good support for social constructivist approaches and the co-creation of knowledge, both of which have become more popular in higher education in recent years.

The survey that was undertaken as part of this work has thrown up some interesting examples of the use of Web 2.0 in formal teaching. It is harder to find clear examples of the use of Web 2.0 in informal learning simply because the information is not as readily available, and much of the evidence is, at best, anecdotal.

Formal learning

The quote in the introduction to this section showed how the different technologies are seen to offer differing affordances and therefore be useful in different places. This means that there is currently little overlap in the uses of differing technologies for the functions discussed below. It also means that there is little difference in the ways in which Web 2.0 technologies are being used in the various countries covered by the national reports and the survey responses. The homogeneity of use internationally may also be increased through the use of the technology itself. With the exception of the Netherlands where there seems to be use of Dutch language based systems the tools being used across countries tend to be the same.

Currently use is fairly low in all the countries studied, so that there are a relatively small number of international experts that many people monitor to see what is happening and gain ideas. Further, the technology itself supports international cooperation. The main difference to be noted relates to access to technology on the part of the students, and thus the assumptions that

teachers can make. For instance, in South Africa use of SMS is lower than elsewhere because of the charging structure, and people use data services such as MXit[36] instead

Learning environments

All the main commercial virtual learning environments (VLE) (also known as learning management systems (LMS) are adding Web 2.0 features into the toolset that they offer. This has a number of advantages and disadvantages. The main advantages are that the tools are all available in a single place with a single sign-on and that use can be restricted to members of the course. The latter of these can equally be a disadvantage, as it can be problematic getting visiting lecturers or guest experts the necessary permissions to use the system. Other disadvantages include they are often less good than the dedicated Web 2.0 systems which can dedicate more effort to their development. Keeping Web 2.0 within the VLE separates it from students' informal learning and social spaces (which may be seen as advantageous, but anecdotal evidence suggests that many students are ignoring the provision of Web 2.0 features in the VLE to use the systems that they prefer (Facebook, MySpace etc)).

There have been some work towards the development of Web 2.0 based learning environments, and the University of the Western Cape has developed a system designed to bridge the gap between traditional VLEs and Web 2.0 technologies. It is claimed that this can behave like a traditional VLE, a portal, a Web 2.0 system or even a personal learning environment (PLE)[37].

Journals or reflective logs

The use of reflective journals, which has been common in some subjects such as art and design for a long time, is spreading as it is seen to a powerful tool to support deep learning and to help students with both their creative and metacognitive skills. Historically the journal has been a private affair, between the student and their tutor. However, the use of blogs etc as e-journals has enabled the student to share the journal with whoever they might like including their peers, friends, professionals in the community or everyone. Journals is one area where several alternative technologies are being used by different people, and there are even a few who are using more than one technology to create journals.

Blogs are increasingly being used for learning journals, and many of the respondents to the survey are using blogs for journals. In some cases they are requiring that they be open to peers and that the peers comment on each others' blogs.

E-portfolio systems are being used explicitly as learning journals by some people, though they do not say how, and many e-portfolio systems offer some blog functionality. There are also reports of wikis being used for this purpose, presumably with only the student being allowed to edit the pages.

It is worth noting that the student can, in most systems, control the level of access at the level of individual posting, so that we see practices evolve where some are shared with anyone, others only with their fellow students, perhaps some that they think reflect well on themselves will be made public and therefore visible to potential employers, while others may be visible only to their tutor or maybe to no one other than the author. However, students and tutors are going to need to acquire the skills to manage this in a way that supports the student's learning without compromising their identity.

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[36] http://www.mxit.co.za/
[37] There is no agreed definition of personal learning environment, and they vary from a personal copy of the VLE at one end to students plugging together bits of software that they wish to use in learning at the other. It is possible that, in the end, they will simply become personal environments that are used for everything including learning.

Lecture replacement

A wide variety of technologies are being used to replace, or supplement face to face lecture time. This can be:

- to free up the face-to-face time for more interactive activities,
- the selected technology is thought to be a more effective vehicle to deliver some or all of the lecture content,
- to enable students to review the material,
- to support distance learners, or others who cannot attend the lectures.

Technologies that have been used include:

- Podcasting is seen to have the advantage of near ubiquity in that almost all students will have a (mobile) device that can play them (many mobile phones, iPods, MP3 players etc), which means that they can view or listen to them anywhere, anytime to suit the learner's convenience.
- Recorded video (sometimes called vidcasts) is being used to make lectures available, both to students as a form of advertising. For instance, both Oxford and Cambridge Universities have made a large number of lectures available via YouTube.
- Some people are using wikis to replace lectures, wiki pages can include embedded video, and may mean that all material is gathered in a single place rather than putting the lectures on a video or sound server and other material elsewhere.
- At least one lecturer is using a wiki for students to contribute to a compendium of theories and models rather than doing this in lecture time, which can then be used for discussion.

Source sharing

While lecturers issue reading lists these are, inevitably, a small selection of the available material and students will, during their work, find much other interesting and relevant material (and material which at first glance may seem relevant but which on further pursuit is not). In the past there has not been an easy method for systematically sharing this material. Now, a wide variety of technologies are being used to support and encourage sharing of resources. Examples include:

- Social bookmarking sites (such as del.icio.us) where both students can add links to resources, can describe them, comment on them and tag them with appropriate keywords are widely used. Some systems also allow items to be rated using simple star ratings. The main disadvantage of most social bookmarking sites is that they do not allow resources which have no URL to be bookmarked - this might include books (though a link to a book in the library catalogue or Amazon is usually possible) or archive material.
- Where more discussion of the items is wanted wikis are being used. A page can be created for each topic or each item, and people can add commentaries, précis, and descriptions of items.
- Blogs are being used by many because of the notification systems (using RSS) which allows students to see as items are added, and enables viewing both by the order that they have been added and by their tags. Blogs are also seen to be especially supportive of the addition of readers' comments.
- Twitter (micro blogging with very short messages) is also being used as it is easy to send the messages from a mobile phone or a computer.

It is worth noting that some lecturers are beginning to assess this type of work as both demonstrating students ability to locate relevant material and to comment on that material in a way that is useful to fellow students.

Group course work

Web 2.0 technologies are seen as especially appropriate for group work, and almost all of them are being used in one way or another; both those provided by institutional systems (especially within the virtual learning environment) and those available externally. They are used for communication and for building knowledge in a wide variety of contexts.

Wikis are particularly popular for this as they allow members to edit existing material collaboratively; whereas blogs for instance only allow material to be added as new postings or comments on existing postings which makes structuring material very difficult.

Others are using shared document management tools like Google Docs or Zoho to support the collaborative development of artefacts of varying types.

Course work

Some courses are asking students to produce their assessed work in new formats. Examples include:

- Updating / improving / correcting pages in Wikipedia. This is intended to improve the quality of the entries in Wikipedia, help students to understand the quality of data found in Wikipedia and to research around the topic from other sources in order to be able to improve the entry.

- Producing podcasts or vidcasts. This covers a wide range of subjects including the performing arts where it is easier for students to provide evidence digitally. Some courses are now asking students to produce podcasts or vidcasts instead of doing class presentations. Reasons given for this include having a record of the presentation and exposing students to the technology.

- Some courses are using wikis or blogs as a way of submitting essays and other assessed work.

Research tool

A number of courses are beginning to make use of Web 2.0 technologies as a vehicle for students to undertake their research. This includes using survey tools such as Survey Monkey (though many would argue that this is not a Web 2.0 tool) and conducting interviews in Second Life. Other courses are also getting their students to research Web 2.0 technologies and their affordances, effects etc.

Practice based teaching

Teacher trainers are using Web 2.0 technologies to help their students develop assessments that they can use in the classroom with their children. They have deliberately decided to use externally hosted systems as this allows their students to use the materials developed during classroom work, including after graduation.

Promoting discussion

Getting discussions going, and keeping them alive, can be problematic; especially in more formal settings. While students may be happy to discuss lectures, theories etc informally, getting discussions that are visible to lecturers can be difficult. Lecturers are therefore experimenting with a wide variety of technologies to foster those discussions (note that students

may be doing similar things without the lecturer in informal learning spaces too). These include, by way of examples:

- Getting students to post comments to a blog on lectures.

- Having discussion forums for students.

- Hosting spaces in Second Life to discuss issues.

Games and role play and virtual worlds

Web 2.0 has opened up new possibilities in terms of online role playing games, where students can take on different persona and pursue some goal in a role playing environment. There is considerable interest in the use of games and role play use both in teaching and student support (see below), but at the moment they require considerable effort and skill to set up effectively. The barrier to use is shrinking as environments become more usable and techniques to make effective use of them become well understood, though they are likely to remain a niche tool that supplements other types of activity as, to date, only a small percentage of students has been found to engage with online and artificial reality games for formal learning or learner support

Virtual worlds have been used for some time in higher education, including virtual ancient worlds, laboratories and microscopes. While these have not usually been Web 2.0 we are beginning to see field trips being carried out in Second Life. In some of these Second Life is the subject of the field trip, but it is also being used, for instance to interview people in the social sciences.

E-portfolios

Many e-portfolio systems make significant use of Web 2.0 type technologies, especially their blog tools which allows users to record their reflections and to control who can read them at the individual posting level. Equally, some lecturers are encouraging (or even requiring) their students to make use of blogs or wikis as "interim e-portfolios" while their universities select e-portfolio systems.

We believe that this is an area where insufficient attention has, so far, been paid to the students' needs, in that many universities appear to be implementing e-portfolio systems without proper consideration to what happens once the student leaves the university. In many cases universities appear to have no provision for their students to continue to use the system once they graduate, and students are expected to export their material and import it into another system. This raises a number of important issues such as:

- Who "owns" the content of the system (which may include material generated by the student, the university and material licensed by the university)?

- How can we support life-long learning where students may have an e-portfolio already?

- Can universities make effective use of e-portfolios as hosted systems to encourage students to undertake further learning at their alma mater?

- Should universities be providing e-portfolios? or should they be encouraging students to make use of external (commercial) systems that they will have continued access to?

- What are appropriate financial models for e-portfolios hosted by universities for students once they graduate?

Data source

Students are using the Web, including Web 2.0, as a source of information for their learning. Wikipedia is well known as a source, with many lecturers worried about its use, and others embracing it. Clearly, students are going to make use of Wikipedia, and therefore there are

issues that need to be addressed about how students evaluate the validity of data in the new environment, and how they use resources of questionable validity, including how they use them to access other information.

Media sharing sites such as Flikr, YouTube and Picasa are being used as resources to locate media created by other people, and usually freely available for reuse. Examples of use include asking students to identify images on Flickr that represent the concept of "research" and discuss how/why.

Visiting lecturers

Web 2.0 offers new ways for "visiting lecturers" to give lectures and presentations without having to go to the university. Videoconferencing has been used for some time, but we are now seeing the use of vidcasts and podcasts as well as live presentations being made in Second Life. These are then being supplemented by other Web 2.0 tools such as social networking spaces, blogs and wikis and discussion forums to continue the interactions beyond the initial presentation.

Answering queries

We are beginning to see the use of Web 2.0 technologies to support queries from students. One of the major advantages is that when one student asks a question the answer can be made available to all, whether this is done using blogs, Facebook or Second Life. Clearly this is not appropriate for personal or sensitive questions, but for many questions (whether academic or administrative) it can save answering the same question again and again.

Informal learning

The international reports and survey did not address informal learning, and while there is plenty of evidence of use of Web 2.0 in informal learning it is much harder to determine ways in which it is actually being used by students in their learning. Many of the examples provided as part of their formal learning are replicated in their informal learning; thus there are plenty of students who have their own blog and discuss their learning on it as a form of reflective practice (even if they do not realise that this what they are doing).

Anecdotal evidence suggests that students are often using technologies similar to those provided by the university in preference to the university ones. This includes setting up their own discussion spaces in Facebook (or similar) rather than using those that exist in the VLE. Anecdotal evidence suggests that they are doing this because:

- They are in control of what happens - when and what they can say.
- It will continue to be available after they finish the course.
- The tutor can be excluded (or invited in) as they choose.
- It is where they are anyhow.

Learner support

As with learning and teaching, there is no great difference between what is happening in each of the countries that we have looked at, and because we have not undertaken any quantitative work the absence of some technology or use thereof in one of the national reports cannot be taken as evidence that it is not being used in that way.

Course notices

A wide variety of technologies are being used to give course and other information to students. This includes blogs, social software as well as a variety of other non-Web 2.0 technologies such as SMS (mobile phone messaging) and email. They are seen as cheap and effective ways of quickly reaching students by using technologies that students are already using. Amongst the uses are

- administrative matters such as cancellation or moving of lectures,

- informing students of tasks that they need to undertake as part of the course,

- providing information to support to support assignments including suggested readings, this means that the entire reading list does not have to be issued at the start of the course, but can be provided as needed, or as new sources come to light.

- Reminding students of information provided earlier. This includes technique such as effective searching, interesting resources that may be particularly pertinent at the time of the blog posting or of ideas and concepts that may be difficult to understand first time.

Course information

Wikis are increasingly being used for course information; for notes and course handbooks, research guides. They are seen as being more flexible than previous technologies where the content typically has to be edited and uploaded, usually as a large single document.

Wikis offer the advantages of being easy to update and have the ability to easily create and link new pages as new ideas are thought of. If desired they can be made editable by the students; or students can be allowed to comment on them. Wikis also support RSS, with the ability to automatically notify users of changes when they are made; thereby ensuring that students know when changes have been made without the person making the change having to do anything.

Some universities are also experimenting with the sue of social spaces for this kind of information, in the belief that students will find it more readily.

Social spaces

Some lecturers are creating social spaces for their students using tools like Facebook. This may be a useful way to get such groups going, but we are also aware that many students set up such groups for themselves. What remains to be seen is whether students want the involvement of the university or staff in their social spaces. There does seem to be strongly divided opinion amongst students as to whether they wish to have their staff appearing as friends in their Facebook accounts.

Some universities, such as the University of Brighton, have created social spaces where all students can undertake informal learning and social activities with their peers. This has been reported as being effective in helping with student retention both through the early identification of problems (as students may blog them) and the peer support that has been offered.

Libraries

Libraries are making wide use of Web 2.0 technologies to assist learners in making better use of library resources (both physical and electronic). These include both didactic resources to inform students and more interactive technologies to give individual or group assistance.

Many libraries have produced videos such as library tours, explanations of how to use some of their resources (data bases, search tools, electronic journals etc) and information skills. These may be placed on the library site or external sites such as YouTube.

Podcasts and vidcasts are being widely used to complement traditional ways of communicating information about library services and resources. This includes virtual library tours, which may replicate physical tours or guide people around online services. These latter are particularly appreciated by distance learners who have limited access to the facilities on campus. Other libraries are using blogs to announce new resources and general news. Slideshare is being used to make PowerPoint presentations on information skills available.

PageFlakes has been used as an RSS aggregator to bring together links to useful information resources, podcasts and vidcasts

Links to useful resources and information on library services designed specifically for particular subject groups are collected in the RSS aggregator Pageflakes. Widgets for del.icio.us bookmarks and photographs on flickr have been installed on some Pageflakes pages.

Marketing

Web 2.0 offers new forms of marketing by being present in spaces where students (and prospective students) already congregate, such as social networking sites. It also offers new ways to communicate and work with prospective students.

To prospective students

Many universities have created sites in places like FaceBook and Second Life in order to explain what university life is like and particularly to encourage students whose families have no experience of higher education. This enables the university to give support to prospective students in the time between their applying and starting at university. The aim is to enable them to learn something of university life before starting so that they are more comfortable and confident on arrival. It also enables them to meet other students and make friends at university before leaving home.

Some universities are using Blogs to market themselves to prospective students in order to explain what the university, and university life, is really like. This can help to reduce stress in prospective students in a process which many students find very difficult and stressful and help them to make the most of their application by explaining what the university is looking for.

To students

Many courses and services are now marketing themselves to students through the use of blogs and presences in social spaces such as Facebook, and MySpace as well as Second Life.

To alumni

There is increasing use of social network sites set up to attract alumni back into university focus. It is not clear whether these will entice past students, perhaps wanting to maintain contact with their peers, or whether students will remain in their own social spaces as they leave their university courses.

Informal marketing

With the increasing availability of information prospective students will become less dependent on official information about universities such as university prospectuses, UCAS web site and university ratings such as those from the Times or the Telegraph newspapers. They also have access to the results of the National Student Survey, and QAA reports, but beyond that Web 2.0

tools are opening up entirely new sources of information over which universities have no control whatsoever.

For instance, prospective students will find it easier to interact with students at universities that they are thinking of attending and see what they are saying, for instance using social sites such as Facebook. There are also sites like "Rate my professor" (www.ratemyprofessor.com) which provide students the opportunity to comment on lecturers and we can expect similar sites for courses and universities. Of course, this need not be negative. Most students at universities will want to give a good impression of the university that they are attending.

International comparisons

Where Web 2.0 is being used, whether in teaching and learning or in learner support, it is being used in remarkably similar ways. Similar tools are being used for much the same purpose; with blogs being used to support activities like reflection and communication and wikis to support group work. It is also notable that usage appears to be essentially *ad hoc* determined by lecturers who identify a particular need or opportunity. In Australia "The social web appears to be mostly being used in an ad hoc manner at the moment, with few, if any, institutions having rolled out the social web in a strategic manner to support learning, student support or administration", while in the Netherlands "[T]he basis for Web 2.0 innovations is quite small; only a small group of front runners is prepared to explore the options" or South Africa "More advanced applications of technology in education are typically taking place within small research groups or pilot experiments – often without institutional support and driven by individual lecturers or students".

The differences that do exist are mainly a reflection of the external socio-political factors. In the Netherlands there is use of systems developed in Dutch, such as Hyve, in parallel with use of the major English language based systems. In South Africa there are great concerns over access to resources (both computers and Internet), with as yet low levels computer use, especially outside the urban areas.

	Mobile telephone		Internet users		Computers	
year	2002	2006	2002	2006	2002	2006
Australia	45	96	35	74	47	76
Netherlands	68	97	44	89	40	85
South Africa	19	72	6	11	7	9
United Kingdom	73	115	26	55	34	78
United States	39	78	44	70	57	76

Table 1: International comparison of computer and mobile phone usage (Source: World Bank)[38]

1 shows that, excepting South Africa, between 2002 and 2006 mobile telephone and computer ownership nearly doubled, while internet usage more than doubled. Interestingly, in South Africa computer ownership and internet usage is rising very slowly, while the rate of mobile phone ownership has risen from less than half that in the other countries to close to the levels of ownership in the United States. An implication is that universities may need to consider how their overseas students from less developed countries will be able to access the internet in general, and Web 2.0 in particular over the next few years. Figure 1 shows how rapidly usage is rising, and that in 2004 South Africa had computer ownership rates similar to those in Europe in 1990 and internet access similar to Europe in 1995.

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[38]   Individual country data available from http://go.worldbank.org/GAG7BVEGU0
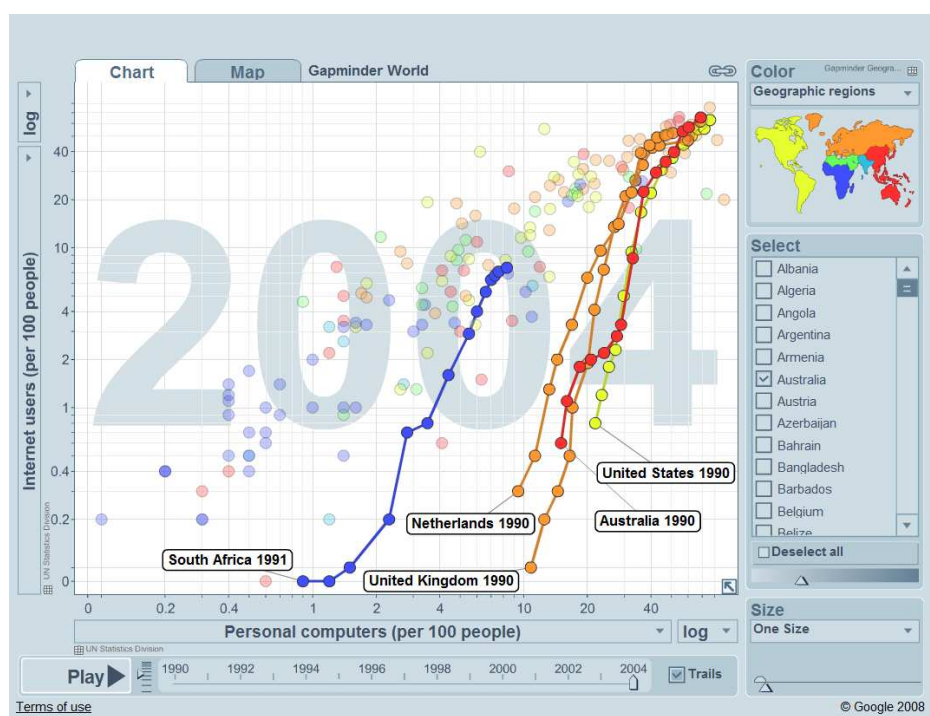
Figure 1: Growth in Internet usage 1991 - 2004 (Source Gap Minder[39])

One area where there seems to be some regional differences is in the attitude to virtual learning environments (also known as learning management systems). These are not Web 2.0 technologies, but the developers of the major systems are including Web 2.0 type tools within them. However, there is also some evidence of growing disenchantment with the current generation of virtual learning environments. In the United Kingdom this has led to interest in the development of personal learning environments (PLE) which can either be based on existing VLE ideas, or made up of external components as some form of mash-up; and both approaches are being pursue. In South Africa there is interest in the development of a specifically Web 2.0 learning environment (KEWL 3). In the USA there does not seem to be the same interest in developing holistic environments outside the existing virtual learning environment (called learning management system in the USA), and the effort is more at the tool level or their presentation within social networking sites. However, as all developments are watched internationally we can expect to see considerable convergence over the next few years, with VLEs offering better Web 2.0 tools and the development of Web 2.0 based learning environments.

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39   http://graphs.gapminder.org/

Appendix A: International reports

Australia

The Netherlands

South Africa

The United States of America

The United Kingdom

Web 2.0 in Higher Education in Australia

Catherine McLoughlin, Australian Catholic University

Background

Student profile

In 2006, the percentage of Australian school leavers, aged 15 to 19 years, who enrolled in HE was 29.6% (or 25.2% of males and 34.4% of females).

The percentage of Australian school leavers entering HE has remained around 30% over the seven years between 2000 and 2006 (MCEETYA, 2006).

In 2005, there were 957,176 students attending Australian HE, an increase of 1.3% over the number in 2004 (DEST, 2007).

- 75% were domestic students and 25% were overseas students.

- The types of HE study being undertaken were: undergraduate (70%), postgraduate (27%) and other i.e. enabling and non-award courses (3%).

Figure 2: Enrolments of domestic, overseas & all students 1996 – 2005[a]
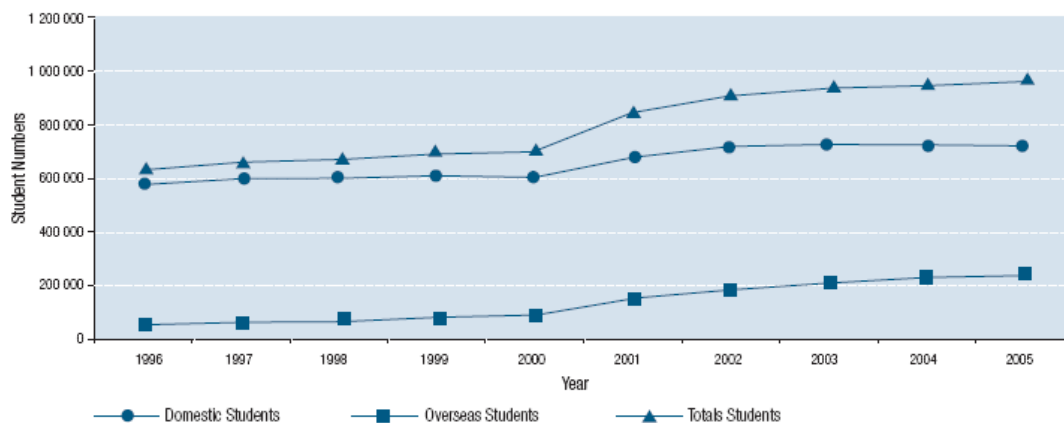
Source: Selected Higher Education Student Statistics (DEST)

(a) There has been a break in series from 2000 to 2001. Users should take care when comparing data across this time period.

Figure 2: Enrolment of students in Australia 1996-2005

General statistics on persons aged 15 to 69 years enrolled in a course of study for a non-school qualification (i.e. a university degree, TAFE certificate or diploma from another educational institution) illustrate the age distribution of HE students was as follows:

Age Group	2005	2006	2007
15–19	45%	46%	45%
20–24	23%	22%	22%

Age Group	2005	2006	2007
25–34	15%	15%	16%
35–44	10%	10%	10%
45–54	6%	6%	6%
55–64	2%	2%	2%

Table 2: Age split of those enrolled in study leading to qualification (ABS, 2007)

The majority of students enrolled in study leading to a non-school qualification were aged between 15 years old and 24 years old. (ABS, 2007)

Internet use

The proportion of these students who had access to computers and/or the internet in 2005 is shown below in Table 2.

	Post-grad. Deg.	Grad Dip./ Cert.	Bach. Deg	Adv Dip./Dip.	Cert.III/IV	Cert.I/II	Cert. n.f.d.	**Total**
Did not have access to a computer at home	3%	2%	2%	5%	12%	14%	15%	**7%**
Had access to a computer at home	0%	0%	0%	0%	0%	0%	0%	**0%**
Computer/Internet access	92%	84%	89%	86%	76%	71%	73%	**83%**
No Computer/Internet access	5%	14%	9%	8%	12%	15%	11%	**10%**

Table 3: Computer/internet access of those enrolled in a non-school qualification in 2005 (ABS, 2005)

The majority of students enrolled in a non-school qualification had access to computers and the internet at home. Interestingly, internet access seemed to increase in line with the stage of the qualification, i.e. those enrolled in postgraduate study reported the highest level of internet access of 92% (ABS, 2005).

At the end of December quarter 2007, there were 7.10 million subscribers to the Internet in Australia. This compromised 964,000 business and government subscribers and 6.14 million household subscribers. The number of non dial-up subscribers recorded at the end of December 2007 was 5.21 million, compared with dial-up subscribers of 1.89 million.

Non dial-up subscribers increased by 33%, from over 3.91 million to over 5.21 million between September 2006 and December 2007. Dial-up subscribers dropped by 31%, from 2.75 million to 1.89 million. The number of households that have broadband was 4.522 million in December 2007.

			March Quarter 2005	September Quarter 2006	December Quarter 2007
Dial-up					
	Business and government	'000	433	277	268
	Household	'000	3 744	2 472	1 619
	Total	**'000**	**4 177**	**2 749**	**1 887**
Non dial-up					
	Business and government	'000	412	549	697
	Household	'000	1 391	3 360	4 522
	Total	**'000**	**1 802**	**3 908**	**5 218**
Total					
	Business and government	'000	845	826	965
	Household	'000	5 135	5 831	6 140
	Total	**'000**	**5 980**	**6 657**	**7 105**

Table 4: Households with broadband

In a more recent study by Ewing, Thomas & Schiessl (2008), it is reported that:

- 72.6% of Australian are internet users

- Only one in 5 reported no usage of the Internet

- 18-24 year olds are regularly online as are 90.6% of 25-to 34 year olds

- Those between 50 and 64 are twice as likely to use the Internet as those over 64

Other agencies are currently researching the role of Education.au (www.educationau.edu.au) is a not for profit ministerially owned agency, governed through a Board by nominees from the Australian Government, higher education, school education, and vocational education and training sectors. The agency focuses on the needs of Australian education, training and careers within the context of emerging information and communications technologies (ICTs) and standards as they apply to the Internet. It provides innovative, leading edge solutions, trials new technologies, reviews emerging technologies that may have relevance for education and training, provides consultancy services, and provides a safe online environment in which educators can experiment. Education.au has a range of intersection points with the higher education sector. Their most recent report, published in 2008 (McGregor-Tan commissioned by Education -au), has found that educators at all levels use the Internet and social software for the following purposes:

- 83% of respondents said for research

- 80% of respondents said for finding learning resources

- 64% of respondents said for professional development

- 61% of respondents said for interacting with colleagues

The main barriers to using the internet were identified as poor infrastructure – bandwidth, equipment reliability, accessibility (41%) and the blocking/filtering of internet content. The view that the Internet is important to the work of educators was almost universal (97%).

Personal use of social web technology

What are prospective developments in social web use?

The ARC Centre for excellence for creative Industries and Innovation (20008) report on *The Internet in Australia* report that while the Net may seem to be everywhere, a fifth of Australians have never used it. And in Britain, the non-users are almost a third of the adult population. In other words, there is a digital divide in Australia and it reflects patterns of uptake that are repeated elsewhere in the World.

> "If you're male, employed or studying, if you have a university degree and a higher than average income, you are more likely to be online. These patterns are familiar, but the Net is changing, and computers have been getting cheaper. The divide is not as simple as the old idea of the better-off information "haves" and the struggling "have nots.""

In Australia, fewer than four in five home connections are now broadband. That means that about half the population have it, and half don't, but that's changing quickly, because the technology is in a rapid take-up phase. Although the quality of our broadband may not match that of some European and Asian countries, Australia has recently raised a few notches in the OECD's comparative table in this area.

Social technology in the classroom

Perceived cultural differences associated with the use of social technology in education

While Australian of diverse cultural backgrounds have become internet users, at this stage the Internet has not become a universal communications medium comparable to television. Factors such as income, education, and level of employment all continue to play a part in explaining usage and access. Many non users (34.8%) do not access the Internet because they lack interest or do not see the value, while some ex-users say that not having a computer or a connection themselves is the major obstacle.

National drivers for using social technology in the classroom

In Australia, there have been many reports that identify technology as a key to national improvement of education, productivity and innovation. For example several reports (*Australia's Teachers: Australia's Future - Advancing Innovation, Science, Technology and Mathematics, 2003)* indicate that a strong ICT infrastructure will provide the following benefits:

- power the highest level research and development

- assist the education and training sector to work better with appropriate professional development for all those delivering education and training

- improve education and training experiences for all learners and are integral for the administrative systems that are required to make the sector efficient and effective, and

- use technology strategically to help disadvantaged youth, those living in rural and regional Australia, Indigenous Australians, older Australians and those who need special education.

ICT can be used to:

- make the export of education services internationally competitive and must be used if Australia is to be a player in the delivery of international e-learning services, and

- build the knowledge capital of Australia and place it on a competitive footing with other countries who are forging ahead with ICT.

There is a widespread receptiveness, energy and enthusiasm for national collaboration within and across the sectors to progress education and training issues with ICT and to provide new opportunities across the education and training sectors for all Australians. This statement written in 2003 (Committee for the Review of Teaching and Teacher Education) shows that ICT is regarded as solving the problems of disengagement and poor learning outcomes:

> Flexible teaching–learning spaces and communication and information technology provide the means for more creative teaching and better learning outcomes. These are particularly needed to overcome such problems as student disengagement in the middle years of schooling and to motivate and support those students whose learning outcomes have been weak or poor.

Drivers for use of the social web

There are pedagogical, social and institutional drivers for the use of the social web. In an increasingly visual and multi-media oriented world it is inevitable that curricula will develop to incorporate this potential and new pedagogies will emerge that enable students to become the co-creators of knowledge in interactive spaces created with Web 2 functionalities. Students may expect institutions to provide the types of tools that they have already been using in their learning or social life. There may also be policy drivers from within institutions which supports the deployment of social web technologies to support communications in an era when even full time students spend less time in the face to face physical spaces of campuses. Finally and often important is the sense of "keeping up with the Joneses" - because some institutions are using it then others feel the need to do so too, without necessarily knowing why.

National Drivers for the use of the social web in education in Australia

Several agencies are involved in investigating the uptake of Web 2.0 across all educational sectors, and in integrating social networking tools into curricula and pedagogies at all levels in all educational sectors. In 2005, the *Framework for Open Learning Programme* (FOLP) continued to promote the uptake of Information and Communications Technology (ICT) in education and training, supported by the Department of Education, Training and Youth Affairs (now called the Department of Employment Education and Workplace relations under the current labour government.

The FOLP supported the Australian ICT in Education Committee (AICTEC[40]) which was the national cross sectoral forum advising MCEETYA[41] on issues relating to the educational use of ICT. **AICTEC's** work priorities relevant to higher education for 2005 were:

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[40]   AICTEC is a cross-sectoral, national committee responsible for providing advice to MCEETYA on the effective use of information and communication technologies (ICT) and

- providing advice to ensure that legislative arrangements and other agreements relating to digital copyright and technological protection measures did not impact negatively on education;

- developing approaches to high speed access to the internet at a fair price. In particular leveraging from the work done in the higher education and research sectors across to the schools and the VET sectors.

Education Network Australia (edna) is a collaboration between all Australian governments, states and territories and sectors of education and training. Through its website, workshops and activities, edna provides educational quality assured, secure interactive web based tools that meet agreed technical and quality standards, and which provides professional learning and development support for pre-service, new and experienced teachers and educators. Part of the edna's role is to leverage investment by all Australian Governments' in edna tools services and training including:

- communication and collaboration tools, including Web 2.0 technologies (http://me.edna.edu.au; http://groups.edna.edu.au).

- provision of free tools for content syndication and site content building, including RSS and JavaScript http://www.edna.edu.au/edna/go/highered/cache/offonce/pid/974.

- offering face-to-face and online workshops and information sessions, to assist the Higher Education community in better using various technologies in their professional practice

- trialling of emerging technologies on online services, to investigate their application in education.

The Rudd Government has a new education strategy called the *Digital Educational Revolution* (DER). In June 2008 Digital Education Revolution Round One, more than 116,000 new computers were delivered to 896 secondary schools. **Education.au** has reviewed the Discussion Paper provided as part of the Review of Higher Education (2008) which states:

> The nature of learning and teaching in higher education has also changed, with new information and communication technology (ICT) now playing a significant role. While many benefits are claimed for e-learning, its impact on quality of outcomes is largely unknown. Australian researchers have offered qualified support for the expanded use of ICT in teaching and learning, suggesting that it does not in itself improve learning outcomes, but that it can be beneficial when used in combination with an appropriately designed learning activity, appropriate assessment, and adequate preparation and support for students. They note that students respond best to a broad mix of learning tools and resources and that significant use of ICT may disadvantage students from ICT-poor backgrounds (Scott and Alexander 2000).

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online services in Australian education and training to enable all sectors of education and training to contribute to the growth and vitality of Australia's society and economy. http://www.aictec.edu.au/

[41] MCEETYA comprises State, Territory, Australian Government and New Zealand Ministers with responsibility for the portfolios of education, employment, training and youth affairs. It coordinates strategic policy at the national level, including the negotiation and development of national agreements on shared objectives and interest, sharing information and collaborative use of resources towards agreed objectives and priorities. Further information is available at: http://www.mceetya.edu.au/aboutmc.htm.

On the other hand, the new generations of younger students entering university are very ICT literate, and expect a high level of on-demand, on-line access to learning materials, assessment, and administration. The majority of first year students surveyed in 2004 used online course resources, email and software designed for their course. A minority used online discussion opportunities (Krause et al. 2005). All universities are investing substantial amounts in these types of initiatives.

Information and communication technologies (ICT) and supporting infrastructure needs to be a high priority for the Review Committee in considering the future of higher education. Several organisations believe a national approach to ICT for education and lifelong learning should be a key priority for the Australian Government. This would require the formulation and administration of a national approach to key areas of ICT infrastructure and the integration of a number of existing initiatives, projects and reviews.

Education.au recently commissioned some research, published in the 2008 report '*Educators and ICT Usage*', relevant to this Review. The report reveals the integral role information and communications technologies play in the education sector for teaching, for research, and for administrative tasks; that is, ICTs are a core enabler for the functioning of learning organisations.

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Issues encountered and responses to social software tools

There are a number of issues that are encountered for student use of the social web that need to be taken account of when deploying **the social web including:**

Changing pedagogical practices

Extending paradigms of tertiary teaching and learning

Learning management systems (LMS) that integrate geographically dispersed learners in asynchronous educational interactions have been widely available for a number of years. However, many higher education institutions are discovering that new models of teaching and learning are required to meet the needs of a new generation of learners. Today's students seek greater autonomy, connectivity and socio-experiential learning. Taking a broad view of the affordances – sharing, collaboration, customisation, personalisation, etc. – has given rise to a number of alternative paradigms for learning, examples of which follow. The first example is the concept of a *Personal Learning Environment,* or PLE. Downes (2005) describes a learning environment as an approach, not an application, one that protects and celebrates identity, supports multiple levels of socialising and encourages the development of communities of

inquiry. The PLE is an example of such a learning environment, in which learners manage their own learning by selecting, integrating and using various software tools and services. It provides contextually appropriate toolsets by enabling individuals to adjust and choose options based on their needs and circumstances, resulting in (ideally) a model where learner needs, rather than technology, drive the learning process.

Limitations of institutional learning management systems

The current generation of LMS allows each student to have their personal view of the course(s) they are enrolled in, but many do not accommodate the social connectivity tools and personal profile spaces that students might choose. They conform to a classroom metaphor, which may explain, at least in part, why we "can't … stop lecturing online" (Sheely, 2006). Many earlier e-learning efforts simply replicated traditional models of learning and teaching in online environments; by contrast, Web 2.0 tools and technologies offer rich opportunities to move away from the highly-centralised industrial model of learning of the past decade, towards achieving individual empowerment of learners through designs that focus on collaborative, networked communication and interaction (Rogers, Liddle, Chan, Doxey & Isom, 2007; Sims, 2006). While some LMS now incorporate purportedly "Web 2.0" tools and features, these are typically situated in a "walled garden" within the "safe" confines of the institution's systems and networks. As such, online learning environments continue to be firmly set in frameworks and decisions made by teachers and administrators, who still have complete control over the tools available and the ways in which they can be used.

Alternative paradigms that are emerging

In addition to the PLE, another alternative pedagogical approach that takes advantage of Web 2.0 affordances is the knowledge building paradigm, proposed by Scardamalia and Bereiter (2003), based on the dynamics of how communities work. It privileges a less hierarchical form of learning based on small teams, sharing, content creation, and the use of ICT to access, create, share and continually improve ideas. Learning processes evoke a number of possible scenarios or metaphors; Sfard (1998), for example, distinguished between two metaphors of learning, the acquisition metaphor and the participation metaphor. The former views learning as a process of acquiring chunks of information, typically delivered by a teacher, while the latter views learning as a process of participating in various cultural practices and shared learning activities. According to the participation metaphor of learning, cognition and knowing are distributed over both individuals and their environments, and learning is situated in relations and networks of distributed individuals engaging in activities.

The participation metaphor is characteristic of how, using social software tools, learners engage in the processes of social interaction, dialogue and sharing, all of which are linked to socio-cultural theory (Lave & Wenger, 1991; Vygotsky, 1978). However, learners are also capable of creating and generating ideas, concepts and knowledge, and the ultimate goal of learning in the knowledge age is to enable this form of creativity. Current views of learning regard the notion of a teacher-dominated classroom and curriculum as obsolete, and embrace learning environments and approaches where students take control of their own learning, make connections with peers, and produce new insights and ideas through inquiry. Thus, to keep pace with the content creation processes enabled by Web 2.0 and social software, it appears to be necessary to go beyond the acquisition and participation dichotomy. Paavola and Hakkarainen (2005) propose the *knowledge creation metaphor of learning*, which builds on common elements of Bereiter's (2002) theory of knowledge building, Engeström's (1987; 1999) theory of expansive learning, and Nonaka and Takeuchi's (1995) model of knowledge creation.

In order to overcome the limitations of existing models of teaching and learning, and exploit more fully the affordances and potential for connectivity enabled by social software tools, it is possible to depict how an individual might operate and learn in a networked society, having access to ideas, resources and communities, and engage primarily in knowledge creation rather

than consumption. Figure 1 displays the various networks and resources that enable what the authors of the present paper have dubbed *Pedagogy 2.0*. It shows how individuals link with communities and networks in the process of knowledge sharing, construction and understanding. The interdependence between ideas, individuals, communities and information networks, supported by technology, underpin the demands of Pedagogy 2.0, and offer a range of choices to individuals to suit their personal needs and goals. This reiterates the core principles of the Web 2.0 era – that the Web is about linking minds, communities and ideas, while promoting personalisation, collaboration and creativity leading to joint knowledge creation.

Barriers to the implementation of web 2.0 in higher education in Australia

In summary, the Digital Education Revolution does not appear to have reached the university sector, and pedagogies are changing slowly. To be effective the digital revolution needs to:

- be cross-sectoral and be a philosophy rather than be project-oriented or based on a 3-year plan. People need to be able to move seamlessly from one sector to the next and to be supported by similar kinds of enabling technologies, systems, processes and practices. These technologies, systems, processes and practices need to be addressed at a national level, and cross-sect orally.

- supported by a national commitment to a DER in the VET and higher education sectors, and ultimately into the community through libraries and community centres.

- to go beyond ICT hardware infrastructure and address enabling technologies, software solutions, digital pedagogies and other associated issues.

- move outside of the formal education environment into our libraries and community to support of the true digital citizen who is able to participate effectively in the electronic-based economy and world of work.

- overcome intellectual property issues in the higher education sector in relation to sharing T&L materials.   The sharing of T&L resources is discouraged by organisational or jurisdictional ownership of those resources and that agreements should be sought with institutions and jurisdictions to enable T&L resources to be shared across the education and training sector.

- cultivate a spirit of openness and a willingness to share and collaborate, supported by an enabling culture both within universities and sectors. Web 2.0 thrives on a culture of openness and sharing that is not prevalent in Australia's competitive higher education system, where resource sharing is not common.

At present most ICT innovation in higher education is project based, institution specific or discipline based, or a response to a particular identified need, rather than a whole of sector strategic approach. Education Au recommends a national approach ICT infrastructure for education that would help position Australia globally and support innovation all levels.

Higher Education in Australia: The Vocational Education and Training Sector (VET)

The 2005-2006 Australian Flexible Learning Framework was developed. The Framework is the national training system's e-learning strategy which is collaboratively funded by the Australian Government and all States and Territories. It provides the VET system with e-learning skills, professional development opportunities, products, resources and support networks to meet today's increasingly technology-driven learning environment. A report titled Networks,

Connections and Community: Learning with social software (2007) recognises the benefits of emerging technologies and web 2.0 tools and describes these as follows:

- a new generation of learners and workers, a new understanding of knowledge acquisition and a new genre of technologies are converging and are linked. Educators and organisations need to respond; planning for training and education is essential

- There is strong evidence that organisations worldwide are embedding the use of social software in the way they work, and in the way they gather and share knowledge. Innovative educators in Vocational Education and Training (VET) across Australia are doing the same.

- A sense of urgency from those using social software was evident, as few VET practitioners were fully aware of the possible implications that web 2,0 tools could bring.

- This report advocated the adoption of more socially-oriented online practices, and attempts to identify the enablers and appropriate knowledge sharing and VET delivery strategies to support VET organisations and practitioners wishing to pursue the use of social software.

- There is acknowledgement that a new paradigm of learning based on networking, connecting, and community are philosophies driving the use of social software, underpinned by the theories of constructivism and connectives, and that these require a rethinking of pedagogies and practices.

- There was compelling evidence from the research conducted that that social software is valuable in enhancing and enriching knowledge sharing, capability development and the teaching and learning experience, and it should be seen as 'another tool' in the organisation's and VET practitioner's toolkit.

However, the adoption of the Web 2.0 philosophy is based on a spirit of openness and a willingness to share and collaborate, supported by an enabling culture both within the organisation and the 'classroom' environment. AS noted above in the section on higher education, this culture of openness and sharing is not prevalent in Australia's competitive higher education system.

The reports considerably more optimistic about the adoption of social software and expresses the view that   that social software will become ubiquitous largely because it is the tool already widely used by the 'Net Gen' – a new generation of workers and learners.

The use of social software in VET delivery is in its early days of adoption and hence the different applications of social software technologies are still being trialled by the innovators and early adopters, Nevertheless some drivers are apparent:

- There is emerging evidence that it can be applied to all levels of the Australian Qualification Framework (AQF) and is offering learning opportunities to learner groups previously unable to participate, eg some disabled, disengaged and remote learners not previously learning in traditional classroom environments.

- The of social software in VET for knowledge sharing and capability development is in its infancy. Some case studies show that it can be used successfully for project management, knowledge sharing and the capability development of VET practitioners and in broader context of organisational learning.

- For some practitioners and institutions, gaining attention and global profile through the use of social software was seen as important for success. This has significant

implications for the marketing of courses, providers and relying on media coverage is considered too slow for today's markets.

Examples of use in academic and administrative support areas

The social web appears to be mostly being used in an ad hoc manner at the moment, with few, if any, institutions having rolled out the social web in a strategic manner to support learning, student support or administration. However, universities appear to be increasingly making provision for the social web by the inclusion of tools within virtual learning environments, portals or as standalone tools, as well as the use of externally hosted provision. This section will look at some of the uses that are currently being made in each of the countries and the approaches being used, and will be supplemented by the results of the survey .

In Australia, at present most ICT innovation in higher education is project based, or discipline based, or a response to a particular identified need, rather than a whole of sector strategic approach. A national approach ICT infrastructure for education is missing but would perhaps help position Australia globally and support its research endeavours. Universities make individual technology decisions about what ICT to use for teaching and learning. The use of social software and Web 2.0 tools for that knowledge sharing across the sector could reduce the costs and risks involved in decision making and implementation of T&L software, gadgetry and hardware. There has been some national activity of this type - for example the Australian Sustainable Repositories Project, (Australian Sustainable Repositories Project) but this project focused on repositories only and on the management of research materials only, and was project based and now the project is at an end that effort has been largely discontinued. Recent research on Web 2.0 (McLoughlin & Lee, 2008) has found that higher educational intuitions are slow to take up social software and web 20 tool and that those who do are largely early adopters, or a using short term-project based funding to do so. Most universities do not have strategies plans in place to integrate web 2.0 tools into traditional pedagogies because there is a lack of convincing research on the digital literacy skills of students commencing university. Kennedy et al (2008) found that in their study of the digital literacy skills of students, a homogeneity in the incoming first year student population with regards to technology and a potential 'digital divide' between students within a cohort of a single year level. They found that while some have embraced the technologies and tools of the 'Net Generation', this is by no means the universal student experience. Beyond established technologies and tools (e.g. computers, mobile phones, and email), the patterns of access to, use of and preference for a range of other technologies show considerable variation. These findings run counter to key assumptions underpinning Prensky's (2001a) construct of the Digital Natives. Given this, the widespread revision of curricula and adoption of Web 2.0 tools to accommodate the so-called Digital Natives does not seem warranted.

Universities are alert to the level of technological diversity in students, and while it is recognised that though the majority of incoming university students possess a core set of technology based skills, many do not have advanced digital literacy competencies and may not be familiar with Web 2.0 tools. .This concurs with the views of Kirkwood and Price (2005) who argue that "few students have high levels of competence across a wide range of applications" and that "familiarity with the use of email does not imply expertise in rigorous online debate and discussion" (p. 271). Similarly Lorenzo, Oblinger and Dziubam (2006) state: "Higher education comprises a highly diverse and growing student body with a wide variety of information literacy capabilities." (p. 4). So, while Australian universities seeks to optimise learning experiences in university settings, and the review of Australian Higher Education seeks further submission with regard to this, the adoption of web 2,0 tools and innovative pedagogies across Australia is not widespread, not does it appear to be driven by strategic initiatives to integrate social networking tools into the teaching-learning experience.

Oliver (2007) reports on the benefits of mobile technology in higher education, and many universities are providing mobile learning opportunities to students as this I seen to offer benefits. For example:

- the use of mobile learning involving audience response systems provided engaging and interactive learning opportunities for students in a large lecture setting;

- laptops are used to provide meaningful and supportive contexts for students to undertake scaffolded and supported extension activities in place of conventional structured programs;

- laptops are also used to support at-risk students in a large first year class through training and support for self-sufficiency and learner independence; and

- vidcasts and podcasts are used to provide flexible options for learners in a large class supporting any time and any place learning.

The following examples of social software adoption were found in Australian Universities:

Author(s)	Institution	Description of technology use	Web 2.0 tools used	Key pedagogical features
Elgort, Smith & Toland (2008)	Victoria University of Wellington	A mixture of on-campus and distance education students undertaking a Master of Library and Information Studies work in groups to collaboratively produce Web-based resource guides using a wiki. Each group is required to produce three deliverables: the resource guide (a web site providing links to and evaluations of information resources in a specific subject area); presentation of the completed guide to the class; and an online reflective journal, in which students were asked to document the process of creating the guide and reflect on their personal contribution to the project.	Wikis	Student-generated content; authentic, project-based learning; joint creation of knowledge artefacts
Samarawickrema (2007)	Deakin University	Students from the Faculty of Health, Medicine, Nursing and Behavioural Sciences work in small groups to develop a guide for parents of intellectually-disabled children on the support services available to them. The end product of the activity will be published in print as a booklet.	Wikis	Student-generated content; authentic, project-based learning; joint creation of knowledge artefacts

Author(s)	Institution	Description of technology use	Web 2.0 tools used	Key pedagogical features
Peacock, Fellows & Eustace (2007)	Charles Sturt University	Students studying a subject on computer-supported collaborative work (CSCW) learn with and about collaborative groupware tools and information environments and groupware tools, including a range of both Web 1.0 and 2.0 technologies. Students are placed into groups of three or four students, and each group is given a fortnight to complete each of four collaborative exercises. A wiki is used as a platform for interaction and knowledge construction within and across groups. Students are required to contribute 500 words for each of the activities, however the distribution of these 500 words is not stipulated - For example, the words could be "spent" creating a new article, adding to an existing article, or pooled with a group of people to generate a larger article. The wiki is augmented with a page rating mechanism, which is used by students to collaboratively evaluate the quality and usefulness of one another's work using a standard 5-star rating system. In this way, students are encouraged to search, rate, contribute to and learn from one another's content.	Wikis	Student-generated content; learning community; collaborative writing, publishing and peer review; peer assessment; open-ended learning environment
Luca & McLoughlin (2005; 2007)	Edith Cowan University	Final-year multimedia students undertaking the unit IMM3330/4330 Industry Project Development work in teams in which they take on the roles of programmers, graphic designers and project managers. Each team negotiates a topic with their tutor, which is aimed at meeting industry needs. They then work with clients to create solutions to design problems and develop a project brief based on elicited requirements. Project teams are also required to report on their progress to other teams, compare project plans and reflect on learning processes, assessment processes and team dynamics. Blogs are used as a project management tool to promote clear and transparent communication between team members for the purpose of sharing given tasks, while creating a sense of ownership and responsibility. This approach also promotes fair and equitable teamwork, as well as supporting the social processes of learning by enabling students to easily see how their peers are progressing with agreed tasks.	Blogs	Authentic learning; project-based learning; self-directed learning; reflective learning; development of generic skills (e.g. communication, teamwork)

Author(s)	Institution	Description of technology use	Web 2.0 tools used	Key pedagogical features
Lee, Chan & McLoughlin (2006)	Charles Sturt University	Second year undergraduate students take charge of producing talkback radio-style podcasts to assist first year students undertaking a unit of study that the former group previously completed. The brainstorming and researching of script ideas, as well as scriptwriting, editing, and recording of the podcasts was driven by the student producers, with minimal intervention from their instructor, whose role was to provide general guidance and assistance only on request. By engaging in a process of collaborative peer review and critique of podcast scripts, in which the scripts were gradually and iteratively improved and refined, students extended and adapted content for distribution to an audience of peers.	Podcasting	Learner-centred instruction; student-generated content; self-regulated learning; inquiry-based learning
McLoughlin, Brady, Lee & Russell (2007)	Australian Catholic University	Pre-service teachers studying secondary teaching courses use podcasting and blogs to engage in peer mentoring with their classmates while undertaking their teaching practicum, during which they are assigned to geographically dispersed schools throughout the Australian Capital Territory. They share experiences, stories and anecdotes, as well as offering support, feedback and encouragement to one another.	Podcasting Blogs	Peer-to-peer mentoring and support; blending of formal and informal learning; authentic learning and assessment; community of learning / practice
Chan, Frydenberg & Lee (2007)	Charles Sturt University	Undergraduate students studying a first year introductory information technology subject work in cross-institutional teams with students from Bentley College, USA. Each team is given the task of collaboratively producing a short podcast, to be recorded over the voice over Internet Protocol (VoIP) tool Skype (i.e. a "Skypecast"), in which members discuss issues of relevance to topics that are common to the curricula at both institutions. A wiki is used to provide a shared workspace for each group, which students use to facilitate the scheduling of meetings and to maintain a collaborative journal to document and reflect on their learning throughout the project.	Skypecasting Wikis	Cross-cultural, Internet-mediated collaborative learning and exchange

Author(s)	Institution	Description of technology use	Web 2.0 tools used	Key pedagogical features
Oliver (2005)	Curtin University of Technology	Interdisciplinary groups consisting of Engineering students studying at Curtin's Perth and Sarawak (Malaysia) campuses, as well as students studying a Curtin Business unit through a partner institution of the university in Addis Ababa (Ethiopia), use handheld computers to form transnational learning communities that focus on their achievement of key learning outcomes. Through the handheld computers, the students communicate and share their learning experiences asynchronously via a group blog and podcast feed, and synchronously through VoIP telephony (Skype). Students are also provided with tools to capture add video and still images to their blogs, and all blogs are interlinked to form a social network in which students can observe and participate in the discourse of other groups through constructive comments/feedback.	Mobile blogs (moblogs) Skype-casting Podcasting	Mobile ubiquitous learning; cross-cultural, transdisciplinary collaborative learning and exchange; community of learning / practice
Samarawickrema (2007)	Deakin University	Web 2.0 tools are used to complement teaching and learning activities based within the university's learning management system (Blackboard Vista). Second-year undergraduate photography students collaborate with students at another Australian university to create and manage their own virtual galleries / albums. They also make use of the commenting feature of the software to provide constructive feedback and critique on the work of others.	Media sharing (images)	Student-generated content; cross-institutional collaborative learning; peer review and feedback
Samarawickrema (2007)	Deakin University	Faculty and students use the Joomla!-SMF content management system (CMS), which allows simple website creation and maintenance, and incorporates and social networking features. For example, second-year undergraduate Education students use the system to engage in social interaction and communication, as well as a platform on which to practise online teaching with counterparts in Pakistan and Iran. Final year undergraduate Science and Technology students studying in on-campus, off-campus and off-shore modes form groups and engage in online role-playing activities using the social networking features of Joomla.	Social networking	Social learning; peer mentoring; reciprocal teaching; authentic learning; cross-cultural, collaborative learning; community of learning / practice; role-playing

Table 5: Examples of social web applications in Australian Universities

Other researchers in Australia recognise that innovation and adoption of emerging tools and social software may not always improve the learning experience and that three elements for quality e-learning - digital pedagogies, digital learning materials and effective learning spaces.

Universities are encourages in these three areas by a number of drivers, of these the most important is the Teaching and Learning Performance fund (DEEWR, 2008) which provides substantial monetary rewards to universities in return for evidence of improve student retention, overall satisfaction with teaching, integration of generic skills and numbers of students processing to postgraduate study. There is no explicit reward or incentive for universities to adopt innovative technology supported pedagogical reforms or initiatives. These are mostly carried out by individual academics or departments with either internal teaching-learning grants, or with external grants, such as those offered by the Australian Learning and Teaching Committee.

There are therefore not many drivers for innovative pedagogies within Australian Universities, except for small scale funds for local institutional wide projects, or for larger projects that may have impact beyond the context in which they are developed (Australian Learning and teaching Council http://www.altc.edu.au/carrick/go/home/about).

Adoption of Web 2.0 tools by universities for recruitment of students

Education is Australia's third largest earner of export dollars, and as a result, universities are becoming increasingly involved in internet marketing. In the last 18 months, more web 2.0 applications have been adopted for recruitment of students in Australia and overseas.

Now called Recruitment 2.0, universities are e Universities are using Web 2.0 tools and applications for advertising and student recruitment. Vice-chancellors at Macquarie and James Cook Universities are writing blogs to communicate with staff students and the general public.

Increasingly, universities are using Web 2.0 tools such as Facebook, YouTube, blogs and wikis to increase stickiness, ie trying to get users to return to the page more frequently, rather than as a one off visit. They're using podcasting, YouTube, vidcasting and other media in order to advance their client base.

Recruitment 2.0 is where institutions engage prospective students for up to 2-3 years prior to actual enrolment. These students want colleges and universities to engage with them not with print brochures but with dynamic interactive and personalised accounts of student life using multi-media formats, video, and music. Marketing strategies in universities are recognising that generation Y students digest seek and share information via podcasting and video casting rather than through print. The other trend that is emerging is that students want to hear reviews and feedback from other students, not from the university hierarchy, indicating that peer-to-peer feedback has more credibility and authenticity.

Web advertising has clearly superseded print as the medium of advertising.

Issues such as declining demand for undergraduate places, changes in the expectations of students and factors such as the gap-year phenomenon are creating challenges for universities, along with increased global competition. Within this shifting landscape there are also opportunities for institutions that are responsive to Netgen preferences, able to provide a rich media experience and nimble enough to take advantage of the technologically saturated environment.

Some examples are as follows:

- In November 2007, UNSW became the first Australia University to start its own YouTube partner channel, featuring research, learning and teaching initiatives and student work. Notably, the ethos of the GTV channel is not "top-down, but instead features student as producers and user generated content, ie created by staff and students. The University home page for international students located at http://www.international.unsw.edu.au/ features YouTube video clips of lecturers using virtual reality technology and web 2.0 tools to teach theory subject.

- Universities marketing strategists in Australia talk about the "viral effect" of using such sites, evidenced by the sharing and posting of recruitment videos and podcasts to deli.cio.us. Universities are also capitalising on the viral effects by linking their print resources to social networking sites such as Facebook, so that students can discuss these, and share with others.

- The Australian National University has created a Wikipedia entry with descriptions of course, choices and life in Canberra.

- RMIT is encouraging students to upload utopian video visions of the future university to YouTube.

- Queensland University of Technology (QUT) is using YouTube and creating virtual experiences for students on open day, and are also embracing mobile technologies and tools.

- The University of New South Wales will start its own television station next year, and Melbourne university has created vodcasts and vidcasts which can be downloaded by as many as 10,000 users a month, many of whom are based in the US and Asia.

ITunes U: Australia

Students around Australia can access lectures, guest speeches and videos from The Australian National University, Griffith University, Swinburne University, University of Melbourne, University of NSW, University of WA and Otago University using iTunes U. Students at ANU, Griffith University, Swinburne University, University of Melbourne, University of NSW, University of WA or Otago University can avail themselves of the service as Apple, in cooperation with these has just launched iTunes U. iTunes U lets Universities make their audio, video and even written content available to iTunes users, and all students. See http://apcmag.com/itunes_u_hits_australia.htm.

Facebook

Swinburne University has advertised on Facebook and maintains a page for its international students. Most universities now have a presence on this site (UQ, Sydney, UWA, La Trobe, UTS, and Melbourne.

Each universities has multiple interest groups, such as alumni, departments, sport, student clubs and halls of residence, examples of online communities where students network with peers, often on overseas campuses or in some case, with prospective students.

Libraries using Web 2.0 tools

There are quite a lot of libraries using web 2.0- but apart from a few, none are directly involved in providing learning support to students. Academic support has traditionally been the province of academic units of study, learning skills advisers and learning and teaching development units. Most universities are seeking to preserve these boundaries, ie the library's role is to asst students who need resources and information for their study, while academic units provide assistance with literacy and learning skills. However, as these services are increasingly being offered online, it's only a matter of time before students begin to expect a one stop shop for services relating to completion of assignments. In most universities these services are now co-located. For examples, Murdoch University now has a space called "The Learning Common" where students can seek assistance from the library, academics support services and the first year experience coordinator.

Libraries are also crossing boundaries in the services they offer, by providing student assistance in and support for e-research, and opening up opportunities for collaborative research. It is likely that more will do so as "library 2.0" becomes more widespread (Cohen, 2007). Increasingly libraries across Australia are providing information sources to help research and to build access to collections in all formats, and the trends on new types of access, user contributed content and multipurpose information tools such as wikis may well continue. New models of information literacy (digital literacy) are gaining ground, and place greater emphasis on students.

A lot of libraries have blogs- for library services, resources, help - and encourage students to comment on resources and services: examples include:

- Swinburne http://blogs.swinburne.edu.au/library/

- CSU - http://yourlibrarycsu.blogspot.com/

- ECU http://eculibrary.blogspot.com/

- UTAS http://utaslib.wordpress.com/

A lot of university libraries use RSS to push news and information. For instance, Murdoch University library has a new library tool bar http://wwwlib.murdoch.edu.au/mylibrary/tools.html

Deakin University library has taken a few more steps towards integrating Web 2. tools and developing a holistic response to Web 2.0 integration and a slogan that says "Keeping current and organising information your way".   Their concern with the student experience has prompted them to personalise their offerings and services and to offer students their own web portals where they can receive RSS feeds and alerts about new resources, workshops in searching etc. The links between Library 2.0 and Web 2.0 need to be leveraged further according to Miller 20005 "… approaches typified by Web 2.0's principles and technology offers libraries many opportunities to serve their existing audiences better, to reach out beyond the walls and websites of the institution to reach potential beneficiaries where they happen to be, and in association with the task they happened to be undertaking".

Mobile and Web 2.0 adoption in Australia to support student learning

Across Australian higher education institutions, the predominant use of mobile and web 2.0 technologies still reflects traditional approaches to teaching and learning. The use of podcasting lectures, for example, is a common practice in many universities, but this is merely digital recording of lectures by students and reflects a transmissive approach favouring learning by listening and transcribing (Tynan & Colbran, 2006).

Alternatively, web 2.0 technologies offer natural extensions for 'digital learners' enabling them to capitalise on their existing skill sets and preferences for ubiquitous connection to one another and information sources. As proposed by Lee, McLoughlin & Chan (2008), , students can be active participants in the design and development of knowledge as part of the learning process as co-creators of content, particularly through access and contribution to the increasing number of sharable and reusable learning objects (e.g., MIT, iTunesU).

Avenues for communication and sharing have increased with Web 2.0 tools such as wikis and blogs. Additionally, a wealth of educational applications for mobile devices provides a rich pool of resources with which to engage active learners. Currently, there exists a growing and significant literature base describing web 2.0 learning projects in higher education that reflect social constructivist theories of learning, generational approaches to learning and engagement with technologies, and the affordances for learning of mobile and Web 2.0 technologies.

Universities using Web 2.0 tools and applications to support students

Podcast episodes of academic skills have been developed by the ANU's Academic Skills and Learning Centre in Canberra. http://academicskills.anu.edu.au/

Each episode of SkillSoup contains a mix of academic skills tips, feature interviews and other useful information for students. Students can listen to SkillSoup a number of ways.

1. Stream the audio directly to a computer;

2. Download the audio as an MP3 file and put it on an iPod or MP3 player (or listen to it on your computer);

3. Paste the xml address into your podcatcher (such as iTunes) http://academicskills.anu.edu.au/podcasts/aslc_skillsoup.xml and receive each new episode automatically.

The University of New South Wales (UNSW) offers a range of study skills online including RSS feeds to study tips and resources, along with tags on delicious http://delicious.com/TheLearningCentreUNSW.

Charles Sturt University has a blog style online forum where students can login in and chat to other students about learning needs and issues with academic support, along with a comprehensive range of online resources.

While most universities now have online resources for study skills, very few have ventured past podcasting or blogs, using these mostly to create avenues for students to link with each other, or provide feedback to the university on services

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Review of Higher Education Discussion Paper
http://www.dest.gov.au/sectors/higher_education/policy_issues_reviews/reviews/highered_review/#Review_of_Australian_Higher_Education_Discussion_Paper_June_2008 or
http://tinyurl.com/5t4x6y

Web 2.0 in Higher Education in the Netherlands

Wim Westera, Open University of the Netherlands

Introduction

This chapter outlines the current position and prospects of Web 2.0 in the Netherlands' Higher Education. After a brief description of the national conditions for Web 2.0 services, the chapter zooms in to the Dutch Higher Education area and the agencies for driving its innovation. A topical evaluation of Web 2.0 in Higher Education is based on a quick scan amongst higher education representatives that was carried out on behalf of this survey. In conclusion, a brief description of topical Web 2.0 cases will be given.

The national context

The Netherlands are a nation of public consensus. Any potential source of conflict, be it in politics or in everyday life, is discussed at length in order to arrive at some common understanding and agreement. Probably, the proverbial autonomy and wilfulness of the Dutchman can only be preserved by displaying sufficient empathy, tolerance and helpfulness. Internationally renowned are the extended consultations between the government, employers and labour unions to agree upon wages, taxes and prices. This so-called "Polder-model" which effectively appears to avoid strikes and revolts, exemplifies the importance of collaboration, vivid democracy, argumentation and mutual commitment as important values in the Dutch society. These values make a great starting point for Social Web services, because of their shared focus on supporting bottom-up initiatives, self-fulfilment, democracy, social cohesion, discourse and exchange of ideas. It is not just a coincidence that one of the major peer-to-peer media sharing services Kazaa (http://www.kazaa.com) was developed in the Netherlands. Also Hyves (http://www.hyves.nl) which is a highly successful social networking service, was developed in the Netherlands.

A second important enabler for the application of the Social Web is the high quality cable network infrastructure in the Netherlands. According to the Eurostat monitor[42] the Netherlands is the leading country in Europe with 83 % of the homes connected to the internet. This substantially exceeds the average in Europe which is 54%, or the world average which is only 6.4% [43]. Sweden (79%) and Denmark (78%) are second and third respectively. The Netherlands also has the highest rate of wideband internet: 74%. Currently, in various areas of the country the infrastructure is being upgraded to optical fibber networks.

For students no recent data are available about their computer and internet access, probably because this is not really an issue anymore. Already in 2002 it was established that the majority of the students have a computer at home[44]. In view of decreasing prices of hardware over the

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[42]   Smihily, M. (2007) *Eurostat Data in focus, Internet usage in 2007 Households and individuals*, 23/2007. Accessed July 28, 2008 from http://www.nederlandbreedbandland.nl/uploaded/FILES/Internet_Usage_2007_Europa.pdf or http://tinyurl.com/57ahhl

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years and various institutional initiatives for providing students with cheap laptops, penetration will be up to 100 %.

There is very little topical and consistent data available about actual use and appreciation of Web 2.0, but the trend of increased popularity is unmistakable. The Eurostat report distinguishes between different internet activities. Typical Web 2.0 activities like peer to-peer file sharing, online discussion or publishing a web page are carried out in the Netherlands by about one third of the users. An extensive survey has been carried out by Ruigrok | Netpanel [45], which addresses various Web 2.0 issues. It turns out that the majority of the population is not familiar with the term Web 2.0: only 13% knows what it means. Interestingly, however, Web 2.0 services are being used substantially. It appears that 40% of the Dutch participate in one or more online networks. Half of this group logs on to the community each day. These networks concern mainly general social networks (83%). Less popular are multi-user games (14%), dating sites (12%) and business networks (11%). Popular networks for participation are Wikipedia, YouTube, Hyves, Videogoogle, Myspace, MSN and Flickr. Half of the Dutch share their photo's on the internet. Blogging is less popular, but still 1 out of 8 users has its own blog. The social network site Hyves is labelled the most popular social networking site (83%). By the end of 2007 Hyves welcomed its 5 millionth user. Recently, Hyves' commercial value was estimated by Arrington[46] between 90 million and 544 million Euros. The results of the Ruigrok survey fairly match to outcomes of a survey by Multiscope[47], which applies user logging statistics. This survey shows that Google, Marktplaats and Startpagina remain the most popular sites, but that social sites like Hyves, Wikipedia, Web-log, YouTube, MSN, Digg, Google Video and Flickr are attracting more and more users. Interpretation of the data, however remains problematic because the degree of user involvement (or the lack of it) is not taken into account. Similar problems concern the supposed popularity of Second Life, where most users drop out after a while without unsubscribing.

Dutch Higher Education

In 2006-2007 the total number of students in Dutch higher education was 572.000, which corresponds with 3,6% of the population[48]. This number includes 366,000 students at professional universities and 208,000 students at regular (academic) universities (2,000 of which combine two subscriptions). Some 85% of the students follow a full-time programme. Over the last years the number of female students in higher education has grown substantially. Today female students slightly outnumber male students: 52% against 48 %. The number of students from abroad is about 4% (2003); it tends to increase somewhat over the years.

The Dutch school system enables diverse routes to higher education. Overall, some 62% of the children that enrol at primary school level eventually achieve a secondary school diploma which allows access to higher education. The majority of these children (82%) indeed move on to higher education, which corresponds with 51% of the original group. Some 33% of the initial pupils successfully achieve a higher education degree, which yields a higher education success ratio of 65% (i.e. 33/51).

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Agencies driving higher education innovation

In the Netherlands, there are many parties and agencies involved in higher education innovation. These include separate universities, like the Open University of the Netherlands, but also the ministry of Education, associations and alliances of Universities, research institutes, industry parties and funding agencies like the National Organisation for Scientific Research. We will describe two dominant bodies, that have some importance for Web 2.0/ Social Web in Higher Education .

An important governmental body for supporting the knowledge economy is the national Innovation Platform (http://www.innovatieplatform.nl). The Innovation Platform which is chaired by the prime minister, stimulates various innovative activities. These include internet and social networking. Amongst various initiatives two can be explained here. First, the Innovation Platform has assigned the creative industry to an national priority. This sector includes, the gaming and television industry, as well as cultural institutions. Relevant topics are strongly related with social networking. Currently, partners from industry, cultural institutes, universities and research laboratories are preparing a strategic agenda for joint development of the sector. Second, the innovation platform has supported the initiative of a summer school about teaching the learning-2.0. This initiative marks the ambition to procure relevant changes and improvements of current educational approaches at schools. The underlying model is the realisation of a networking school. Naturally, Web 2.0 approaches are envisioned to play a dominant role.

A second important player is SURF (http://www.surf.nl), which is the collaborative organisation for higher education institutions and research institutes, aimed at breakthrough innovations in ICT. Its efforts of educational innovation are covered by a special SURF unit and go with funding opportunities. Over the last years, social software has been a priority topic on the agenda of annual SURF conference, the SURF Onderwijsdagen. About half of the higher education institutes are reconsidering their virtual learning environment[49]. The option of social web services is one of the important considerations. Importantly, the SURF-foundation supports these discussions by arranging seminars, workgroups and funding VLE-projects. SURF chairs a special interest group on Sharepoint and also hosts Sharepoint services on a national scale (www.surfgroepen.nl). Its 2.0 version offers typical Web 2.0 services like wikis, blogs and RSS-feeds, for all students, teachers and researchers of higher education in the Netherlands. Together with the Kennisnet organisation (secondary education) SURF runs an innovation programme directed at the development of educational Internet applications for the Dutch education community. The programme is sponsored by the ministry of Education, and covers video, gaming and electronic co-operation.

Questionnaire

On behalf of this report, a web questionnaire was published and notified to 361 higher education professionals and officials in order to collect additional ideas and information about social web initiatives in the Netherlands' higher education. A Dutch translation of the English questions has been used; these are all open questions. This target group was composed of formal educational ICT-representatives of all higher education institutes, visitors of the SURF-Onderwijsdagen 2007 (a key conference on ICT in the Netherlands' higher education) who are affiliated to higher education institutes, and some dozen of experts suggested by the personal network. Response was low (6%), which was probably due to the summer holidays (July, probably the most unpropitious month of the year, was the only option because of the overall planning of this report). However, the response covers 14 out of 65 higher education institutes in the Netherlands, thus covering 22 % of the higher education area. Quality and extensiveness of the

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responses were high, providing detailed and useful information. It seems that all respondents are actively involved in Web 2.0. For the purpose of this survey, the nature of the questionnaire was qualitative in kind. Its results outline a rough impression of the current situation, but cannot be used for detailed numerical analysis. Below we will summarise these qualitative results.

Application of Web 2.0

Weblogs, wikis, social bookmarking, RSS-feeds, photo sharing and public video-resources are increasingly being used by higher education students and teachers as part of their educational settings. Occasionally, portals include Web 2.0 tools for student profiles, blogging, and video messages. Discussion forums and real-time chat are mentioned as very common tools over the last decade, but these are existing collaboration tools rather than new Web 2.0 examples.

Weblogs are being used for e-portfolios, tracking of competence development, personal presentation and discussion. Also weblogs are used for reflection and feedback on behalf of students abroad, the promotion of social cohesion between students, teachers and their institutions, the support of student projects and for keeping in touch with alumni. Wikis are used for collaborative work between students, for providing support for courses, for supporting individual students at their graduate work. Sometimes a wiki is used by both students and teachers to build a shared knowledge base (for instance marketing and retail, or social-psychiatric nursing). Both wikis and weblogs are used by teachers for knowledge sharing, for instance applying a wiki for supporting curriculum redesign. Both internal facilities (Elgg, Sharepoint) and external services (i.e. Hyves, SURF-groepen, LinkedIn, Del.icio.us, Slideshare, MSN, YouTube, Flickr) are used. In one occasion students created a Hyves social networking page on behalf of their educational institution.

Student using Web 2.0 / Social Web

Respondents were asked how their students are using Web 2.0 / social web as part of their informal learning processes. Respondents argue that there is hardly any data available, but, fostered by their contacts with students, their general impression is that students are frequent users of external Web 2.0 services. These include MSN, Hyves, Flicker, iGoogle, YouTube, Google docs and Google Sites, to mention a few. Yet their educational use is assumed to be very limited. Incidentally, students initiate using these tools for the support of collaborative learning activities. But most respondents indicate that students wish to separate their (formal) learning from their private world: students share these tools with their fellow students, but mainly for their informal contacts, their social lives and entertainment. The idea that students frequently use Web 2.0 services is indirectly supported by the Ruigrok | Netpanel survey (Vos & Geel, 2007) which showed that 40% of the whole population uses these services, most of which are people below 35 years old.

Description of Web 2.0 / Social Web practices in higher education

As was noted before, large scale implementations of Web 2.0 /Social Web in higher education are lacking. Yet, there are many small scale initiatives that mark the interest in these new approaches. Below we will give a brief description of different practices which represent a cross section of Web 2.0 /Social Web initiatives.

RetailWiki: creation of a shared and sustainable knowledge base

As part of a series of courses on retail and merchandising, students of the Leisure Academy of the NHTV International School Breda use a wiki to collect relevant resources of the domain[50]. The idea is to establish a sustainable and topical knowledge base for the domain in order to support student projects and research. Students make content contributions and are supposed to moderate the articles and article threads. The retailwiki offers open content. Contributing to the wiki requires registration. Besides students of NHTV, various companies are involved. Currently the wiki contains over 3500 pages. Each year, about 30 new students that enrol the course take over the work.

TelematicaWiki: collaborative writing of papers

At Tilburg University wikis are used for collaborative learning in a telematics course which is part of the bachelor programme Economy and Business Administration. This TelematicaWiki [51]was tailored for the course and was integrated with assignments and lectures. It involved 45 students, the majority of which had never been using a wiki before. The wiki was used for jointly writing a paper by groups of 3 students. Participation of students is reported to be very high (about 25 visits per student per month; up to 51 actions per visit, i.e. "edit", "upload", "comment" etc.; each visit takes on average 20 minutes). The evaluation amongst students shows that students easily learn to operate the wiki and learn to understand the underlying wiki concept. They have confidence in the tool and consider it as productive for their work. It is also concluded that the wiki contributes to improved sense of community. Students also report some disadvantages of the wiki. One of the problems is the ever-expanding amount of wiki pages, which affect the overall structure and navigation; this is a confusing and difficult to handle side-effect of wikis. Also, various technical issues were reported to hamper student collaboration. These comments were strongly linked with the applied wiki platform (Wikkawiki) for instance limited text formatting, limited file exports, limited text imports, limited discussion thread annotation, no integration with other collaborative tools (agenda, group work logging and tasks overview).

Hyves social networking

At Utrecht University the master programme New Media and Digital Culture uses various social networking tools both as a virtual learning environment and as the object of study. As part of their programme students explore various tools, like weblogs, mobile technologies and multi-user virtual games (World of Warcraft). Students that apply for the master programme have to complete a course module that focuses on social networking. Students have to register and work in the Hyves environment. Over 100 students have now participated in this course. The evaluation shows that the platform is very suitable for brainstorming and discussion because it supports swift communication and interaction. Since students use the system for both private and educational purposes they check there accounts frequently (multiple times per day). Also, email or SMS notifications of new postings amplify the dynamics of communication. Teachers can easily monitor activities in different student groups and may subscribe to dedicated notification services. The potential of such platform is recognised, but there is no clear educational scenario available. It is concluded that the Hyves platform should not be mistaken for a virtual learning environment or a learning management system; it doesn't support student

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[50]   Retailwiki (2008) retrieved online August 01, 2008 at http://www.retailwiki.nl/

[51]   Jansen, J.P.J. (2007) Wiki in het Hoger Onderwijs, Een onderzoek naar wiki ter facilitering van CSCL, Master thesis, Tilburg University; retrieved online August 01, 2008 at www.livre.nl/download-document/71-wiki-in-het-hoger-onderwijs.html

tracking, it doesn't offer document sharing and it doesn't integrate with existing infrastructures. The students liked it, but they had clearly special interests in new media.

Blogs for reflection on internships

In 2006, a consortium of universities (the former Digital University Foundation), ran a project that used weblogs as a tool for reflection[52]. A pilot study was carried out at the Teacher Education Faculty of Fontys University and the Teacher Education Department of VU University Amsterdam. Blogs were used by 20 students (3 groups) for logging of their activities during their internships at schools. Usually students experience severe problems in aggregating the right information for their final reports on the internships. Often, this creates a lot of last-minute stress. The basic idea of the project was to facilitate reflection by a blog because it is much more dynamic than common logging, since it allows interaction with others. The set-up was based on a simple categorisation of competences (e.g. organisational, inter-personal, pedagogical) and instructions about reflection. Students were given the assignment to produce a reflection blog after each lesson they gave. This was not self-evident, yet the evaluation was quite positive. Students were more or less urged to evaluate their experiences right after their lessons rather than wait a few months. Helpful comments from fellow students improved the reflection (which is indeed about making things explicit). It was observed though that the number of comments decreased substantially during the pilots, so the viability of the approach is questionable. Also issues were encountered about privacy (what should be open, what should remain personal?), responses (can we really expect students to keep commenting regularly?) and structuring (how tight should the reflection format be?). Although the projects has ended, blogs for reflection are still being used by the teachers involved. Also the approach is adopted by a few other domains, but these are all small scale implementations, with only few students and teachers involved.

Social bookmarking for collecting relevant literature

Social bookmarking has been used by students of the master Programme Active Learning of the Open University of the Netherlands, in preparation of the annual student conference of 2006 [53]. Students used a localised version of Scuttle (scuttle.org) for sharing their bookmarks of papers and other resources of relevance for the conference's theme: "Significance of multimedia in education". Students were asked to bookmark their favourites and use the shared bookmarks for preparation for the conference. After the conference the students had to write a paper about the conference's theme. In this experiment 21 students participated as well as 2 teachers. External visitors of the conference was also given access to the bookmarking site. Initially teachers made a subset of bookmarked papers available. Most of the students involved added their own bookmarks; on average 5.6 bookmarks per student. The total collection of different tags amounted 156. A questionnaire amongst participants showed that the majority appreciated the social bookmarking approach as a valuable one, be it that they found it difficult to establish the appropriateness of the bookmarks. For most of the students the tool drew their attention to interesting resources that they would never have been able to track themselves. Bookmarks of fellow-students were appreciated much higher than bookmarks of teachers. The majority of the students prefers to use the bookmarks of fellow students rather than adding their own bookmarks. The evaluation report raises the question to what extent such a small scale application of social bookmarking, which is restricted to a specific educational context, is viable. Despite the positive outcomes, it appeared that this pilot did not produce a robust, shared set of tags. As a consequence, accessibility of the collection and search options were very restricted. It

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[52]   Project site Weblogs for reflection (2008) ; retrieved online August 01, 2008 at http://www.reflectieblogs.info/ (English texts available)

[53]   Hermans, H. & Firssova, O. (2006) *Casestudy Social Bookmarking in het onderwijs; Verslag van een pilot binnen de Masteropleiding Actief Leren van de OUNL*. Utrecht: Stichting Digitale Universiteit.

is suggested to raise the application level of such tools to a substantial set of courses or even to curriculum level.

PAIR: online knowledge dating for the arrangement of peer tutoring

In online learning environments, the learners' expectations of obtaining frequent, one-to-one support from their teachers tend to increase the teachers' workloads to unacceptably high levels. The Pair project (Peer-allocated instant response) involves a network-based allocation mechanism to arrange real time support by fellow-learners[54]. Rather than posting a call for help in the uncertainty of the community, the requesting student is actively paired by the networking mechanism which selects the best peer candidate to provide online support. Pilots were arranged at the Open University of the Netherlands (statistics course for psychology students) and at Fontys University (students of ICT Media Design). The evaluation established that students would evaluate such synchronous peer-tutoring system as a practical and convenient way of providing and receiving support. Until this moment, however, experimental results are incomplete; in the pilots large scale use by the students failed to occur. The reasons for students to avoid the tool are strongly linked with the educational context: 1) students knew each other too well and wouldn't need a tool to find the right peer, 2) the course contents gave rise to trivial questions rather than non-trivial ones, and could be answered easily by using an internet search engine, 3) regular face-to-face meetings greatly interfered with the suggested pairing mechanism by providing alternative consultation channels, and 4) initial participation was low and this created a self-establishing effect because often only few students were online to act as an appropriate peer. So, the approach should preferably be directed to large distributed student populations, deprived of face-to-face contacts, little availability of teachers, and content that raises conceptual questions rather than factual questions.

Motives

Educators display various motives for applying Web 2.0 services in their teaching. First, and most importantly, educators refer to pedagogical principles. Web 2.0/Social Web is claimed to greatly support social constructivist starting points which are widely adopted today. Web 2.0 services support knowledge sharing between students, various didactic scenarios (i.e. action learning), improved interactivity which makes learning more interesting, exciting and meaningful, efficient access to information resources and collaborative work which is supposed to be essential for professional workers. These Web 2.0 services provide important extensions to common learning management systems and virtual learning environments. Furthermore, they offer new opportunities to connect learning assignments with the outside world and thus support connecting learning with working and living. Respondents also indicate the importance for higher education students to regulate their own learning. These motives reflect the tendency of the institutions to transfer the control and responsibility of learning activities from teachers to students. Also strategic motives are mentioned, which include the need to achieve greater involvement of students, the need to anticipate future work environments which certainly involve online communication and collaboration tools, and the development of required expertise by university faculty. Finally, various pragmatic motives are stated: Web 2.0 is trendy, the Social Web services are easy accessible, and their operation is direct, fast and convenient. Also, these distributed tools make interactions with students more flexible; they help keeping in touch with students outside office hours. The institutions clearly recognise the opportunities to involve students in the development of learning content.

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[54] Westera, W. and Wagemans, L. (2007) Help me! Online Learner Support through the Self-organised Allocation of Peer Tutors, Conference paper, *Book of abstracts Online Educa Berlin 2007*.

Barriers

Educators observe various types of barriers for using Web 2.0/ Social Web in their teaching. These include technical barriers, cultural barriers, lack of skills, organisational barriers and practical issues.

Several technical barriers are noticed, in particular the technical linking and integration with existing IT infrastructure which is rigid and not prepared for Web 2.0. The underlying problem is that the existing IT-architectures are based on learning paradigm(s) which may conflict with the open, user-centred approach of Web 2.0. Even when current virtual learning environments increasingly provide additional tools for blogging and tagging, its closed architecture seems to violate the open philosophy of Web 2.0 / Social Web approaches. One respondent states that current pedagogy is greatly interlinked with existing closed learning environments and hardly matches new pedagogies associated with Web 2.0. Also, the lack of standards hamper easy integration and involve severe risks for future compatibility. This holds for instance for imperfect or lacking linking to LDAP directories, which urges users to multiple usernames and passwords. Furthermore, respondents observe problems with system stability and performance.

With respect to the institutional culture it is noted that the majority of teachers are very reserved about new technologies in education. After many years, innovations like VLE, email and video lectures are now accepted and integrated. These need not be replaced because they function satisfactory. Consequently, the basis for Web 2.0 innovations is quite small; only a small group of front runners is prepared to explore the options. This reservedness goes with a lack of awareness. Clearly, the majority of teachers lack the required ICT-skills to use such tools in their teaching. It is also suggested that the preparedness of teachers for developing their skills is very limited. In addition, it is stated that students' ICT skills are easily over-estimated. For both students and teachers, the use of external open content raises questions about content quality.

Practical barriers concern lack of time and money to realise these innovations. Because central support units often don't offer Web 2.0 support and hosting, pioneers are urged to sort out, arrange and host their own applications.

Finally, some of the respondents suggest that the adoption the Web 2.0 tools as regular components of the virtual learning environment and the educational offerings is likely to deprive these tools from their charm and attractiveness, because of its institutionalisation and the inevitable need for Web 2.0 regulations: since Web 2.0 is essentially a platform for informal communications, it wouldn't make sense for teachers to integrate these in their courses.

Web 2.0 / Social Web tools that are used by teachers

A wide variety of tools is being used; most of these are wikis and blogs. Popular wiki tools are Wikimedia, Wetpaint, and Sharepoint 2007. Wikimedia (http://www.wikimedia.org) is the originator of the most popular open content wiki: Wikipedia. Wetpaint offers collaborative websites that integrate wikis and blogs for the creation of online communities (http://www.wetpaint.org). Sharepoint is a popular Microsoft platform for online collaboration and content sharing. The 2007 version of Sharepoint includes modules for wikis and blogs. In the Netherlands, the platform has been adopted and hosted by SURF as a free service for higher education institutes. One of the advantages of Sharepoint is the easy integration with Microsoft Active Directory for the management of user access and with Microsoft Exchange Server groupware. For blogging also Wordpress, Elgg and Drupal are reported. Wordpress claims to be the world largest self-hosting blogging tool in the world (http://www.wordpress.org). Elgg is a multipurpose, open, social software application, which can be used as a functional engine for any socially-aware application (http://www.elgg.com). Drupal is an open source content management platform, which recent versions include blogs and collaboration tools (http://www.drupal.org). Other social software tools that are actually used are IBM's Lotus Quickplace and Lotus QuickR for online team co-operation, IBM's Lotus Sametime for integrated

presence via instant messaging, telephony and web conferencing (http://www.ibm.com) and Librarything which is a social networking site that connects people based on the books they share (http://www.librarything.com). Other tools and services that are used by teachers are Blip.tv, various Google sites, Del.icio.us, RSS feeds, podcasting, Slideshare, MSN, Facebook, Hyves, LinkedIn and YouTube.

Volume of Web 2.0 in Higher Education

In general, the use of Web 2.0 in higher education is still very limited. It is difficult to give an overall percentage for the institutions, since its use is determined by individual teachers (pioneers) rather than by institutional policies. All respondents recognise that there are very little quantitative data available. Displaying lots of disclaimers, their estimates of Web 2.0 usage in courses range from 0% to 30%. Similar percentages hold for the number of students that are confronted with these tools. Using the intermediate value of 15% would yield up to 100,000 students as compared with the whole population (572,000). This would correspond with some 1500 students on average per institution. These include small scale pilots of pioneering teachers. Only few respondents claim already substantial and regular use in their own teaching, particularly associated with student support and student internships. Informal use of Web 2.0 by students is assumed to be much higher, up to 70 % – 80%. Within the scope and constraints of this survey, however, it is not possible to present accurate and more specific quantitative data. It is generally noted that the interest in Web 2.0 services is rapidly growing and that there are many chances for increased appliance. Currently, more Web 2.0 tools are being made available inside the institutions, as part of the learning management system or as separate tools.

Advantages of using Web 2.0 / Social Web

A variety of advantages are mentioned. Most frequently mentioned (30%) is the advantage of matching the students' experience: the net generation students seem to be well acquainted with these kinds of tools and expect their appliance in the learning environment. This is assumed to improve student motivation. A second advantage of Web 2.0 tools is their support of collaborative work. This includes various types of collaboration. It supports collaboration of student groups as part of an educational programme or course. Teachers appreciate these tools because they extend the official schedules of face to face meetings and group work with an informal and easy accessible communication and collaboration channel. This is supposed to reduce the work load of teachers. Also, Social Web tools support communities and collaborations of students across educational programmes, across educational institutes and across national borders. The latter is important because of increased internalisation of higher education. As a third advantage, some 20% of the respondents mention improved pedagogy. The use of Social Web tools is assumed to enrich current virtual learning environments. This especially applies to the increased interactivity, increased community building, the sharing and exchange of resources and the arrangement of productive learning tasks ("the student as a prosumer") which can now be supported very well online. Also, Web tools provide extra functionalities, which can be easily accessed and applied by students without extensive introduction or training. Fourth, from a organisational perspective it is noted that many of these tools are publicly available without the burden of local hosting and maintenance. Many of these online tools and services are free; this also holds for a variety of knowledge resources.

Disadvantages of using Web 2.0 / Social Web

The following disadvantages of Web 2.0 are mentioned. Pedagogically, there may be a problem with the arrangement and management of learning activities. This is not only related to the lack of integration with the institution's virtual learning environment, but also with the fragmented nature of Web 2.0. Moderating and keeping track of new posts is time-consuming for teachers. In addition, while Web 2.0 supports content creation by students, it is very difficult to preserve the quality of such content; poor and fallacious learning content is likely to persist. One

respondent notes cynically that this so-called user-generated content of Web 2.0 is nothing new; it has been applied for decades and it was called "productive learning" rather than Web 2.0. The diversity of Web 2.0 tools and their lack of transparency is not very helpful for their users. It is often difficult to retrieve the right content ("where is my content?"). Large groups of users are still unfamiliar with Web 2.0 and there is a serious lack of good practices in education. One respondent notes that the commercial nature of some Web 2.0 tools using banners and commercial adds makes them less appropriate because they may guide students away from learning content. From a user perspective it is observed that Web 2.0 demands great user involvement. This may be a pro for educators, but for learners it may cause unnecessary social pressure to be online all the time. Technically, these tools are difficult to integrate within regular virtual learning environments and they cause problems with scaling, stability, authentication and privacy. Since central hosting and support services within the institutes are often lacking, teachers are compelled to try out things for themselves, which takes a lot of time and efforts.

Policies in Higher Education

One of the questions of the questionnaire was to what extent the use of Web 2.0 has any form of official sanction, i.e. policies, validation, strategies, within the higher education institutions. Only 20% of the institutions has an innovation policy which explicitly includes Web 2.0 appliance. Over the years, educational innovations have not been very successful and many teachers are sceptical about another new innovation: possibly, Web 2.0 is no more than a hype which soon will fade away. Also, teachers are overloaded with work, which makes them less susceptible to changes, new policies, or new strategies. Some institutions define separated explorative Web 2.0 projects or stimulate bottom-up initiatives by project sponsoring and the arrangement of central facilities. Despite the absence of policies, most of the institutes are discussing the new opportunities of Web 2.0. Sometimes such discussions are linked with institutional communication strategies, but more and more Web 2.0 is involved in the development of e-strategies and the future virtual learning environment. In some cases, institutions join a national project under the direction of SURF for further development of VLE-services, in particular aligned with the Sharepoint platform.

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Web 2.0 in Higher Education in South Africa

Philipp Schmidt, University of the Western Cape

Acknowledgements

National Context

Around the world, Web 2.0 technologies are taken up by (mostly younger) users at amazing growth rates. This is not just true in developed countries, but the desire to communicate and collaborate using technology holds similar appeal to users in developing countries. While OECD member countries have the most advanced economies, the highest computer ownership and often the most open societies it is important to consider what is happening in other countries.

South Africa is a particularly appropriate country to choose as it combines first-world and third-world infrastructure, and has a rapidly growing middle-class that increasingly is seeking higher education both at home and overseas (including the UK).

While the open participatory web offers many opportunities to accessing information and support, interacting and collaborating with others, and getting ones voice heard – this also means that those without the means to join the Web 2.0 world risk being left even further behind. The ability to use Web 2.0 technologies goes beyond having basic skills and access, and includes the cognitive skills needed to analyse and use information, and the communication skills to interact with others in a globalised, connected world - both synchronously and asynchronously.

The predictions of positive societal changes that this new technology will bring (for example, the ability of oppressed groups to communicate more effectively, and higher accountability of political leaders, etc.) might well be overstated – after all we have a history of overestimating the effect of technological change on social progress (O'Neill 1981). However, we can predict with some level of confidence that those participating in the global economy are likely to be using web 2.0 tools in the near future.

Yet, large parts of society in developing countries lack the required levels of access and skills, and are likely to find themselves on the wrong side of yet another divide; further exacerbating the challenges in climbing the ladder of opportunity.

Until recently, most of the applications for education have focused on the information aspects of Information and Communications Technology (ICT), and social software provides opportunities for leveraging the communication element. Social learning software poses numerous exciting possibilities for the provision of onsite support, collaboration and sharing between educators and learners. Collaborative creation and sharing of educational content in fast and effective ways can significantly enhance learning and teaching efforts, and access to communities and networks within the field provides individuals with expansive opportunities to learn from and provide support to one another.

Education and psychology theorists (Vygotsky, 1992; Saljo, 1998; Daniels, 2001; Kozulin, 2003; Hedegaard, 1998) as well as others more concerned with learning and collaboration in contexts outside of educational institutions (Snyder & Wenger, 2003; Wenger 2000) point to the importance of collaborative learning, and mediated learning between learners and teachers and / or more capable peers. The Internet provides possibilities for connecting and working together

with others by breaking the boundaries of space and time in ways that can be of great assistance for achieving pedagogic objectives.

This report focuses on Web 2.0 in higher education. However, some of the interesting Web 2.0 projects in South Africa involve secondary schools – often in collaboration with higher educational institutions. For this reason, we include some data on access and use in secondary schools. An informal email survey was conducted with some of the key people working on Web 2.0 projects and their statements are referred to throughout the report.

Higher Education

The higher education environment in South Africa is under severe strain to meet the needs of an emerging economy, equip students with the skills needed to avoid poverty, and implement an ambitious transformation plan to overcome legacy inequalities.

Following a period of transition and mergers, there are 22 institutions of higher education in South Africa, including 'traditional' universities, universities of technology (former technikons) and 'comprehensive' universities combining academic and vocationally oriented education.

Institution	Headcount student enrolment (contact and distance students)	Black students as proportion of total headcount (contact only)
Cape Peninsula University of Technology	28,961	78 %
University of Cape Town	21,764	49 %
Central University of Technology, Free State	10,320	82 %
Durban University of Technology	22,779	93 %
University of Fort Hare	8,760	92 %
University of the Free State	24,659	65 %
University of Johannesburg	45,544	70 %
University of KwaZulu-Natal	40,704	83 %
University of Limpopo	17,579	99 %
Nelson Mandela Metropolitan University	24,157	69 %
North West University	38,596	52 %
University of Pretoria	46,351	40 %
Rhodes University	6,322	52 %
University of South Africa	207,931	63 %
University of Stellenbosch	21,702	27 %

Institution	Headcount student enrolment (contact and distance students)	Black students as proportion of total headcount (contact only)
Tshwane University of Technology	60,407	86 %
University of Venda	10,497	100 %
Vall University of Technology	17,408	94 %
Walter Sisulu University Eastern Cape	24,496	100 %
University of Western Cape	14,580	94 %
University of Witwatersrand	23,626	64 %
University of Zululand	10,398	99 %
Mangosuthu Technikon	9901	100 %
Totals / Averages	737,472	74 %

Table 6: Headcount and proportion of black students in South African higher education; Source 2005 HEMIS (Higher Education Management Information System) database, cited in PHEA 2008

Poor performance at all levels of education highlights the extent of the challenges. Pass rates of secondary school students are low and have been falling (CHE 2007:35). Of the 1995 cohort (sometimes referred to as "Madiba's Children"), only 16% obtained senior certificate (high-school diploma) and only 5% obtained an endorsement, required to access 'traditional universities'.

Gross enrolment rates in higher education are between 14 and 15% (UNESCO-UIS 2007). For those that complete high school and continue into higher education, attrition rates are high (highest for black students), and only one in five students graduate in regulation time (CHE 2007:27). For first-time entering students in the 200 cohort, the overall attrition rate after the first year of study was 29% (CHE 2007:28).

Group	Enrolment rate
Overall	16%
White	60%
Indian	51%
Coloured	12%
Black	12%

Table 7: Gross participation rates in tertiary education: Total enrolment as percentage of 20-24 age group; Source: CHE 2007

CESM[55]	Black	White
04: Business/Management	33%	72%
15: Life and Physical Sciences	31%	63%
16: Mathematical Sciences	35%	63%
22: Social Sciences	34%	68%
12: Languages	32%	68%

Table 8 Graduation within 5 years in general academic first Bachelors degrees, by selected CESM and 'race': First-time entering students excluding UNISA (distance education); Source: CHE 2007

The high attrition rates in higher education can partly be explained by shortcomings in the preparation of students at secondary level. An empirical study of 9 higher education institutions reports that "The data … give a chilling picture of the very low levels of preparation in incoming students to South African higher education institutions" (Yeld 2003:46, in CHE 2007).

South Africa is also a popular destination for foreign higher-education students. In 2005, 6,389 South Africans studied abroad, compared to 50,449 foreign nationals (mostly from other African countries) who were studying in South Africa (UNESCO-UIS 2007). Such higher number of inbound students are characteristic of developed country education systems, and places further stress on the South African education infrastructure.

Technology Access and Use

The uptake of ICTs in education is necessarily reflected against the overall levels of access and use in South Africa.

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55   CESM stands for Classification of Educational Subject Matter, a term used in the Higher Education Management Information System. (CHE, 2007)

Province	Households with cell phone (%)	Households with landline (%)	Households with access to PCs (%)	Households with access to the Internet (%)
Western Cape	46.7	55.3	33.8	23.4
Gauteng	48.7	28.5	25.2	20.0
KwaZulu-Natal	35.2	31.7	13.3	8.2
Free State	33.9	21.8	10.3	7.3
North West	35.3	15.0	9.9	5.0
Northern Cape	20.1	20.0	9.8	3.9
Eastern Cape	25.7	15.9	7.9	5.5
Mpumalanga	26.3	17.6	7.6	5.5
Limpopo	26.1	7.1	4.4	3.0
National average	**33.1**	**23.6**	**13.6**	**9.1**

Table 9 Table: Percentage of household access to different forms of ICT by province; Source: Tlabela, Roodt, Paterson & Weir-Smith (2007: 13, 22, 26), cited in PHEA (2008)

South African technology use follows a clear pattern of division between those that are connected, and those that are not. This pattern reflects not only technology access and use, but also education levels, income, race, and other variables. Recent studies (see for example Barrantes 2007) are beginning to show some upward mobility, where the transition from digital poverty to digital wealth may surpass mobility across economic strata, but there is no data to support this point for the South African context.

ICT in education

The South African Government supports the notion that knowledge - rather than natural resources - can be a key driver for social and economic development of the country in a globalised economy, and recognises the crucial role that education plays in this knowledge economy.

The South African Department of Education embraces the opportunities afforded by ICT to positively transform teaching and learning, and focuses its efforts with respect to ICTs at the secondary school level. The South African White Paper on E-Education (DoE, 2004) is the key policy document describing the link between technology and education. The White Paper is supported by a monitoring framework that includes a State IT Agency (SITA) study for the Department of Education, which aims to create a baseline data set for those schools that have some form of ICT. Higher Education is largely excluded from both the implementation plan and monitoring framework of the White Paper.

As for policies focused on higher education, The White Paper on Higher Education (DOE, 1997) does not emphasise ICT integration, and there are no national or provincial policy documents that specifically consider the use of social networking and other Web 2.0 tools in education.

With respect to access and use of ICTs in education, different sources of data can be combined to provide a first overview, but comprehensive and reliable data for all higher education institutions does not exist. Detailed data for the Western Cape shows the differences that exist even between institutions within one province. Similar differentials exist across the country, and can be explained to some degree by historical funding preferences for *"white"* Universities, but more recent policy and strategy are beginning to have an effect.

Institution	Student enrolment	Number of student computers	Student-computer ratio
Cape Technikon*	18523	1588	11:1
Peninsula Technikon*	10040	1654	6:1
University of Cape Town	21716	3042	7:1
University of the Western Cape	14873	1455	10:1
Stellenbosch University	22082	1631	12:1

*Note: The Cape and Peninsula Technikons have since merged to become the Cape Peninsula University of Technology

Table 10 Table: Student-computer ratios at higher education institutions in the Western Cape, 2005; Source: Brown, Arendse & Mlitwa (2005), cited in PHEA (2008)

In addition to general student-computer ratios, the ability to use a computer independently and outside of formal classroom teaching is one requirement for use of Web 2.0 services.

E-learning

A variety of e-learning projects exist across South Africa's higher education community, ranging from very large-scale institutionalised learning management systems (for example at the University of South Africa, which supports over 200,000 students) to small, experimental, research-driven projects (for example the Rip-Mix-Learn group at the University of the Western Cape).

Despite this diversity, all institutions have dedicated ICT service divisions (most also have specialised e-learning groups), and use some form of e-learning applications, typically learning management systems. Of South Africa's 22 institutions of higher education, 13 use proprietary Web CT (or Blackboard) software, four use open source software (Sakai and Moodle respectively), and two Universities have developed their own open source systems (KEWL at University of the Western Cape, and OLS at University of Kwazulu Natal). North West University has developed a proprietary learning management system.

Use of Web 2.0 Technologies in South Africa

Some of the first wave of e-learning projects promote top-down "traditional" methods of using technology to deliver course content to students, rather than weaving technology into the collaborative practice of teaching and learning and encouraging student-driven learning.

More advanced applications of technology in education are typically taking place within small research groups or pilot experiments – often without institutional support and driven by individual lecturers or students. These small projects might use available Web 2.0 tools rather than the traditional learning management systems provided at their institutions.

"In South Africa, a wide range of initiatives spread across a range of institutions falls into this category. When combined with a critical understanding by academic staff of the specific skills and learning processes needed by students in the different disciplines, such projects display the real potential of new technologies." (PHEA 2008)

Within the group of South Africans that has access to technologies, Web 2.0 technologies are popular. For example, social networking sites such as Facebook, Hi5 or MySpace, and mobile chat services such as MXit are among the most widely used services.

MXit, an open-standards based chat solution, is accessed using a Java client that runs on data-enabled cell-phones (GRPS or 3G). Since MXit messages are transferred as data, the costs per message are only about 1 or 2 cents and considerably lower than sending individual SMS (text messages). MXit also offers advanced features for communicating in chat groups, and sending media attachments. "Current statistics on the number of people using MXit indicate that there are more than 3 million users in South Africa. Of those 3 million, nearly 45% are between the ages of 12 and 18." (iafrica.co.za website, cited in Butgereit 2007) In October 2007 MXit estimated that over 100 Million messages were sent per day, and the community growing by about 10,000 new users every day (MXit estimates, cited in Bosch 2008). A non-representative study among Grade 11 learners in a township school outside of Cape Town found that 29% of respondents access Mxit on a typical day (Kreutzer 2008:21).

Social networking sites are also popular with South African users. According to Alexa, Facebook is the most frequently accessed content website from South Africa, second overall only to Google search.[56] The South Africa Network on Facebook counts 687,254 users, which is roughly 14 % of all South African Internet users (which is a higher percentage than in the U.S. or U.K. where about 10% of Internet users are Facebook users).[57]

Market researchers BMI-TechKnowledge Group started to compile a Digital Lifestyle Predictor report in 2008. The report combines data from 800 middle- and upper-income households (household income above ZAR 8000 / month) in 3 major urban areas. According to the public summary of the report, over the past 3 months prior to publication, 61% of respondents between 16 – 24 years used MXit, and 27% in the same age bracket used Facebook. In the age group of 25 – 34 these numbers were slightly lower with 47% of households having used MXit and 18% Facebook during the previous three months.[58]

South African youth do not *just* use social networking tools to connect with their friends and meet new people, but also to address and discuss important social issues, including that of race. At one point, the most accessed user in the South Africa Facebook network regularly published video commentary on topics such as affirmative action. A recent incident of racially-motivated

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56   http://www.alexa.com/site/ds/top_sites?cc=ZA&ts_mode=country&lang=none, accessed 23 July 2008.

57   Facebook South Africa network stats from http://www.facebook.com/networks/67109356/South_Africa/, accessed 23 July 2008; Also see this post on Facebook statistics from 2007: http://www.cosmedia.co.za/facebook-statistics-for-south-africa/, accessed 23 July 2008; and this post on UK and US users: http://media.guardian.co.uk/newmedia/table/0,,2086353,00.html, accessed on 7 August. 2008. Finally Internet statistics from Nielsn and ITU, taken from http://www.internetworldstats.com, last accessed 7 August 2008.

58   http://www.bmi-t.co.za/bmi/Content/Reports/DLP/DLP.html, accessed 23 July 2008.

abuse in the form of a "mock initiation" video created by students from the University of the North West caused online discussions on Facebook.[59]

In addition to the active use of social networking sites, South Africa has an active blogosphere. AMATOMU reported that the blogs it tracks registered a combined 7,641,216 page view during the last month (15 July 2008 – 14 August 2008).[60]

Finally, South Africa has seen rapid diffusion of mobile technology including to those that lack access to computers and Internet (via computers). Representative data on use of mobile technologies in the context of Web 2.0 is missing, but a number of studies indicate that the mobile phone might provide a more promising trajectory for integrating the social web into education as students generally have access to the necessary technology and the skills to use it. A non-representative pilot study among Grade 11 learners in a township outside of Cape Town found that 83% of respondents within the sample use their phones to access the Internet (aggregating use of instant messaging, web-browsing, and email) on a typical day (Kreutzer 2008:23).

Research on Web 2.0 in education

Research on the use of Web 2.0 is emerging from a small group of academics at the forefront of technology-enabled learning. Publications are concentrated among researchers in only 5 of South Africa's universities, all of which are traditionally white universities (PHEA 2008:106). However, this is as much a continuation of the historical inequalities with respect to research outputs, as it is related to the changing nature of experimentation and practical research in technology-enabled teaching and learning. Some of the most interesting experiments are undertaken not by educational technology specialists, but by interested faculty from a variety of disciplines, who are interested not in publishing on ICT in education, but in improving their use of technology. The Center for Education and Technology at University of Cape Town and various groups at University of Western Cape have been active promoters of Web 2.0 research and have begun speaking about work in progress, organising conferences (see for example e/merge 2008[61], and publishing first papers (see for example Keats and Schmidt, 2007).

Drivers for use of the social web

From youth culture to institutional policy, the drivers of Web 2.0 technology use operate at varied levels in South Africa's tertiary institutions.

Policy

So far, most use of Web 2.0 takes place in small scale projects, pilots, or driven by students. In this context, policy has not been identified as a significant enabler (or barrier) so far, with a few exceptions. Some of the policy-related challenges are covered in the following section, "Issues encountered".

However, as we conceptualise more widespread use of web 2.0 technologies in education, the role of policies that govern access to and use of technology and copyright will become more important. Most South African universities have policies related to the use of ICT for administrative and academic use, which typically include usage policies that set out permitted

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59   http://www.iol.co.za/index.php?set_id=1&click_id=13&art_id=vn20080303055739121C220692 or http://tinyurl.com/6ras6x, accessed 7 August 2008.

60   Pageviews for the last month respectively area available from http://www.amatomu.com/index.php, accessed 14 August 2008.

61   http://emerge2008.net, last accessed 14 August 2008.

behaviour and use, and broadly outlined statements of support for the use of ICT in teaching and learning. These policies affect the use of web 2.0, but do not specifically address the opportunities these technologies offer for teaching and learning.

The University of the Western Cape is currently the only institution that has an official Free Content, Free / Open Courseware policy that sets out guidelines for publishing university outputs under creative commons licenses[62]. In addition, the Director of Teaching and Learning is specifically considering the results from Web 2.0 pilots for the new Strategy on Teaching and Learning she is developing. Other universities have established projects to investigate the opportunities that a more "open" approach to publishing research offers in terms of visibility and impact. The University of Cape Town's Opening Scholarship project is moving into its second phase, which will advocate such open practices[63].

Youth culture and social use

Adoption of Web 2.0 technology in South Africa is largely driven by youth culture. Usage levels of Web 2.0 technologies are disproportionately high among the educated South African youth, but it is not always the case that these users are willing to engage for educational purposes. Technology use clearly relates to the development and communication of a young person's identity, and there are social and cultural boundaries along which young people might choose to exclude others, such as adults, or teachers. Czerniewicz & Brown (2005) note that "by coming to grips with the digital identities of local youth and by understanding what kinds of new practices students bring, we can better design appropriate educational interventions."

Students' educational use

The enthusiasm reported by students who participate in Web 2.0 projects – including the participants in the Rip-Mix-LearnERs project at University of the Western Cape and drama students at University of Cape Town who are using Facebook – suggest that students' interest in new technologies is not limited to social purposes, but includes educational use.

Anecdotal evidence supports that students use a much larger and more diverse set of Web 2.0 tools than lecturers and are able offer sophisticated and informed opinions on shortcomings of existing tools and ways that these tools could be used for education purposes.

While students would primarily indicate social use of Web 2.0 technologies, many use it for basic co-ordination and announcements to groups of friends, and some make use of the advanced collaboration opportunities these tools provide.

Pedagogical Drivers

Many of the academics that experiment with Web 2.0 tools are innovators, who are deeply committed to improving teaching and learning practices, and using appropriate tools to do so. In South Africa, the number of lecturers who are comfortable enough with these new tools to conceptualise their use in teaching and learning is still relatively small, but growing as the pioneers report on successes, and students demand the use of modern technology.

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62   Available for download at http://ics.uwc.ac.za//usrfiles//users/8990060109/Strategies/freecourse-0.4.pdf or http://tinyurl.com/5noky4, last accessed 7 August 2008.

63   The project blog is at: http://blogs.uct.ac.za/blog/openingscholarship, last accessed 14 August 2008.

Increase collaboration and interaction

Those lecturers using Web 2.0 technologies mention the ease of creating collaborative and interactive spaces for students as one major benefit. The fact that large parts of the collaboration and interaction takes place in *open* spaces, allows lecturers to observe their levels and quality of contributions to collaborative work. The tools make learning collaborative by definition, but make it easy to identify individual contributions. One lecturer also mentioned that "students like to interact with each other and create things together" and that web 2.0 tools support this.

New ICT – most notably, web 2.0 technology - offers increased opportunities for a range of collaborative learning activities. Asynchronous (enabled by email, listserves, blogs, wikis and social networking software) and synchronous (through IM (instant messaging) / chatting, VoIP (Internet telephony), online collaborative documents, conferencing and online learning environments) means of communicating, sharing information and collaborating have catapulted the field far beyond its early beginnings, looking at a small group of people working around one computer (Crook, cited by Mercer & Wegerif, 1999).

Increase feedback and support

As reported above, many students arrive at university ill prepared for advanced scholarly work. They require levels of support and guidance that lecturers are typically unable to provide – due to high teaching loads and research requirements. As a response, some of the experiments with Web 2.0 technology are designed to enable and encourage students' provision of peer-to-peer support. Such support services range from tutoring and mentoring, to sharing of notes, but also include that which is not strictly educational, such as advice on relationships and health concerns.

For example, two participants in the Rip-Mix-Learn project (see above) who were teaching a class of roughly 300 students, implemented a peer-assessment solution, to increase the amount of feedback that their students would receive throughout the course.

Issues encountered and responses to them

Many of the examples above use Web 2.0 technologies outside of formal education. For this reason, the issues encountered focus on broader topics that are often unrelated to the traditional institutional education environment. This is likely to change as more institutions are starting to investigate how to "formalise" the use of Web 2.0 technologies with their students.

Bandwidth

The single most important barrier to use of Web 2.0 tools is the high cost of access to computers and Internet in South Africa. While this report focuses on examples of technology use in education, we need to remember that the majority of South Africans remain disconnected from the opportunities that the social web offers. And even for those who are connected, the possibility of accessing more media-heavy services is not always available.

Technology

Feedback from South African Web 2.0 users included a range of comments related to technology. One respondent mentioned the incompatibility between different multi media formats, that hindered free exchange and collaboration. Others commented on particular features in the software they were using, for example the lack of a What You See Is What You Get (WYSIWIG) editor in the Sakai Wiki, which made it difficult to use for novice users. Some of the emerging online services require users to have accounts to be able to participate – for example google documents has in the past required users to have google accounts in order to

collaborate, viewing documents has always been possible even without a google account – which creates silos of users and makes it difficult to invite new collaborators. A tacit finding in the Rip-Mix-Learn research group was that *good* (user-friendly, and reliable) technology becomes invisible and "just works", while *bad* technology creates significant hurdles and discourages new users from participating. As one respondent put it: "successful implementation and use rests on a stable ICT infrastructure and timeous support as students' interest wanes quickly if they encounter obstacles."

Identity

The use of Web 2.0 tools blurs the boundaries between social and professional/educational spaces and students' identities and practices in these different environments.

Some students and communities are comfortable integrating the two; others prefer to keep them separate. For example, the drama students in the Humanities faculty of the University of Cape Town invited their professors into their Facebook group. At one point, an impersonator pretended to be one of the senior professors and was welcomed into the community. Students were hoping to get feedback on their work from faculty members through the social networking site. This is very different from other case-studies of Facebook groups, where students prefer a clear separation of their academic and social lives, and might be related to the particular style of study for drama students, the small size of the drama department, and the need for more feedback and interaction with professors and older students.

The use of MXit has an even stronger social objective, and users tend to be teenagers, which explains their strong reaction against introducing adults into their community. "Almost all respondents were horrified at the prospect of their parents joining MXit and said that they would never interact with them via this medium, clearly identifying MXit as a forum for youth only" (Bosch 2008).

Privacy

Ethical issues around data security and privacy were a concern, especially in educational projects that not only involve higher education students, but minors.

"These concerns revolve around the fact that the people using this facility were minor children and they were freely giving their cell phone numbers out to total strangers. MXit keeps track of participants by their cell phone numbers" (Butgereit 2007). In order to deal with these concerns, tutors needed to sign a code of conduct, which clarified that certain topics or language were not allowed, and prevented the exchange of personal information.

While strict separation makes sense when dealing with minors, and to prevent inappropriate content, it might have also enabled a more positive effect: the tutors were approached with more serious requests for advice and counselling on personal issues. The anonymity that is required in Math on MXit conversations might have increased users' levels of trust. The project followed a strict policy of not engaging on personal issues, but tried referring users to more appropriate venues for counselling. "The Dr Maths" project raises interesting points about the potential use of cell phones and/or applications like MXit to reach young people with educational or social messages, or in the provision of educational or social services such as counselling" (Bosch 2008).

Policy

A number of policies can negatively influence or impede experimentation with and implementation of Web 2.0 technologies. For example, university evaluation frameworks consider the different contributions a lecturer can make. At UWC, these are research and

publication, teaching and learner support, and social or community involvement. However, when it comes to promotions, most institutions place heavy emphasis on research publications. Lecturers with the choice to spend time working on another publication, or on experimenting with new technologies that might make teaching more effective, has a strong incentive to work on her research.

Some universities ban the use of social networking sites such as Facebook or web-based email from campus. For example, the University of Fort Hare allows access to social networking and web-to-phone SMS services during lunch times only. Others don't allow the use of mobile technology during classes. Where policies are not technically enforced (by blocking access), students are unlikely to respect it. "Most South African schools have policies that ban cell phone use by students in the classrooms, but this does not seem to proven [users] from using their phones at school and even in class" (Bosch 2008).

These policies, if enforced effectively, make experimentation even in small projects difficult and prevent innovation. Although universities are generally happy to unblock certain services and grant permission to staff who are pioneering experimental projects, students engaging in web 2.0-enabled informal learning often face bigger challenges in side-stepping such policy. An un-official approach to policy is to step around it by accessing certain sites outside of key business hours, or by ignoring it as long as it is not technically enforced.

Lack of awareness

So far, the number of academics that actively investigate the existing and potential use of Web 2.0 tools in their classes is small. Few academics use Web 2.0 services themselves (to network with friends, etc.) and are unaware of the possibilities they offer, or encourage their students to use them. Technology support groups and e-learning support groups are required to demonstrate and promote new tools, relate them to teaching and learning practices, and support their implementation.

Lack of ICT support within the institutions

The introduction of Web 2.0 tools in university courses requires support and training for lecturers and students. While most universities have ICT support divisions for the use of technology in education, these typically focus on "traditional" e-learning applications, including learning management systems.

Lack of ICT skills

Some respondents mentioned a lack of ICT skills as an obstacle to the uptake of Web 2.0 tools and practices, but anecdotal evidence suggests that this may be less of a problem for students than it is for lecturers. At least in some cases, students clearly have the ability to develop - either through self-study or peer-support - the skills that they need in order to use the applications in which they are interested. For example, sitting in during a course at the University of the Western Cape, researchers from the Rip-Mix-Learn project observed that the majority of students accessed their Facebook homepages at least once during the course. The same cohort of students reported technology problems as a barrier to using the course-mandated blogging system. Without better data, we cannot draw any conclusions regarding the extent to which usability of the technology (many Web 2.0 applications are carefully tested for usability, and offer slicker and more intuitive interfaces than traditional e-learning systems) and students' interest to master an application (and their lack of interest in educational applications) influence students' ability to use Web 2.0 tools, but both factors are likely to play a role.

Lecturers on the other hand lack some of the social drivers for familiarising themselves with these new tools, and given their teaching and research loads, may not invest in learning new

tools if their relevance and use is not immediately obvious. Typically, lecturers rely on their institutional e-learning support departments to identify suitable tools, and provide training and ongoing support. However, not all institutions have the capacity for extensive training and support or the ability to support newer Web 2.0 tools. While students will develop the needed skills to communicate with their friends, lecturers are not as likely to use Web 2.0 tools for social uses and will need to expend more effort into familiarising themselves with these technologies.

Copyright

The legal restrictions on use and re-use of copyright materials affect how Web 2.0 tools can be used. However, given the pilot and informal nature of most Web 2.0 activities in higher education in South Africa, and the cavalier approach to dealing with copyright materials that is common in South Africa, copyright has not been mentioned as a major barrier by those experimenting. However, in the context of more institutionalised projects and support, both a strong commitment to the use of free and open licenses (to clarify what can be done with the materials that are created) and consolidated efforts to exempt educational users from the increasingly restrictive copyright legislation are needed.

As mentioned above, the University of the Western Cape has passed a Free Content, Free/Open Courseware policy that encourages all publications to be licensed under creative commons licenses. The University of Cape Town's (UCT's) IP Research Unit, and Wits University's LINK Centre are part of an African research network on copyright issues, which aims to provide both better understanding of the negative effects of copyright on education, as well as design alternative solutions that are most appropriate in the African context.[64]

Student resistance

While generally students are ardent and enthusiastic users of Web 2.0 technologies, especially outside of education, some are reluctant to adopt more innovative technologies and practices in their studies. During the RML research at UWC, students indicated that they preferred to be told what they had to know by the lecturer, and found the technology they were supposed to use, too complicated and did not understand its educational value. The challenge to achieve buy-in from students can only be addressed by a combination of user-interface designers/ software developers who need to ensure that the technology used in education is at least as user-friendy as the tools that students are used to from social activities, and lectures who need to careflly design relevant use of these tools in teaching and learning.

Cost

Cost of computers and Internet access are frequently cited as obstacles to further uptake of technology and equally affect Web 2.0 practices. However, the cost of training, support and research to inform the integration of such new technologies into teaching is often underestimated. Lecturers and student need support, servers must be maintained by skilled technical staff, and awareness raising and the development of institutional policies require ongoing and long-term efforts. Building communities of practice among lecturers, who can share experience and support each other, takes time.

"[T]here is a huge mythology that circulates about the low barriers to entry that needs to be deconstructed as it is not helpful to institutional planners." (Neil Butcher, by email)

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64   The project's website is http://www.aca2k.org/, last accessed 7 August 2008.

Ways in which the use of the social web is affecting higher education

The impact of Web 2.0 technologies on teaching, learning and administration at South Africa's universities is yet to be determined. Today, it is upon the largely anecdotal reports from students, academics and those involved in pilot experimentation that we rely in order to gauge the extent and nature of the application of Web 2.0 technologies to educational objectives.

However, there is much that we can surmise regarding the potential that these tools afford, and one such example is the breakdown of institutional borders, as students and lecturers from different institutions use Web 2.0 technologies to collaborate and communicate. The social web also offers ample opportunities for actualising the advantages of peer assessment, which have long been identified in pedagogical research.

Learning to participate in the social web and use its numerous tools is likely to lead to the development of useful skills. Berg (cited by John-Steiner & Souberman, 1978) writes that "just as the tools of labour change historically, so the tools of thinking change historically. And just as new tools of labour give rise to new social structures, new tools of thinking give rise to new mental structures." The aptitudes developed through participation in the social web are likely to include communication and technical skills, as well as creative expression. From negotiating and expressing one's online identity, to learning to work in a team using collaborative online documents, the advantages for capacity building are evident.

Some respondents felt that students can more easily identify and initiate the use of Web 2.0 tools for social communication, and are able to translate it into learning and professional activities, whereas lecturers and institutions struggle with this. However, the blurred boundaries between social and educational (professional) use of technology does not always promote learning. While there are many benefits, the social aspects of many of these technologies can distract from the educational use. The powerful opportunities that many of these tools provide for networking and communication can distract from their use for more educational or professional goals, and can also prove time-consuming. "The social networking can also be extremely unhelpful and time-wasting, when people with whom I don't really want to communicate solicit correspondence" (Joy Olivier, by email).

The application of social software for learning is a recent phenomenon, but the quick uptake of ICT-enabled social networking by a range of users bodes well for the potential impact it can have on learning and teaching. Given the networking and collaboration possibilities these new technologies afford for overcoming some of the challenges facing our institutions, these are indeed exciting times to be teaching and learning.

Examples of use in academic and administrative support areas

Czerniewicz & Brown (2005) write that "although we know that ICTs offer unprecedented opportunities for additional and different kinds of communication, there is very little evidence of such use for teaching and learning purposes. This is despite the fact that learning itself requires dialogue, engagement and communication; and despite the fact that ICTs are used extensively for communicative purposes outside the educational context" (p.16).

The use of Web 2.0 in South Africa is largely developing on the fringes of institutional education programmes, through experimentation by individual university staff, small research and pilot projects, or student initiatives. This section provides a few snapshots of initiatives in higher education institutions that are making use of Web 2.0. In most cases, the examples were provided by the initiators of these efforts, and garnered through informal correspondence with them. In addition, as a result of the researcher's access and exposure to networks and projects in the Western Cape, many of the examples cited reflect activities in the region.

MXit - Cell-phone chat

Making use of the popularity of the cell-phone based chat solution MXit, researchers at the Council for Scientific and Industrial Research (CSIR) set up a maths tutoring pilot project that offered learners help with their Mathematics homework via MXit. Mathematics education in South Africa is consistently underperforming (Reddy 2006, reference in Butgereit 2007), and the researchers were hoping that by introducing technology - which students were already using for social purposes - their interest in Mathematics and ability to access support would increase. The project started using English, but soon added Afrikaans and was considering adding more languages. Following the trajectory of other Web 2.0 solutions, the project scaled quickly and through viral marketing. "Although this project originated at one school, 'word of mouth' advertising (also known as 'viral' advertising) where learners told their friends about the MXit contact ensured that the number of learners grew and the geographical location of the learners spread throughout the country" (Butgereit 2007). The anecdotal evidence presented by Butgereit (2007) shows strong acceptance of the service by users. Unfortunately the study makes no effort to identify the effect on students' marks.

Podcasting

UWC has developed a podcasting application that uses low-cost portable computers for recording and allows automatic publishing of the audio files into a UWC's new e-learning platform KEWL3. The enables lecturers to make audio recordings available to their students as podcasts, include them in blog posts, or synchronise audio with presentation slides using the Web 2.0 service Slideshare (http://www.slideshare.net).

Social networking

During a recent seminar organised by Centre for Educational Technology (CET), Tanja Bosch shared her anecdotal finding that students at the Michaelis School of Arts (University of Cape Town) were using a Facebook group to network with one other for both social and professional purposes[65]. For these drama students, Facebook offers a way to get feedback on their performances, which would otherwise only be discussed with classmates. Getting input from more experienced students was noted as an important feedback mechanism, and since interaction between different years of study is otherwise limited, the Facebook group was found to be a highly successful tool for connecting people across disciplines and years.

From Learning Management Systems to Web 2.0 Portals

The University of the Western Cape has developed the KEWL 3 eLearning platform as a bridge between the role of the "learning management system" and the more personalized, open, *meshable* world of Web 2.0. KEWL3 provides most of the tools that are usually associated with Web 2.0 in education, including blog, wiki, podcast, mashup capability, open API support, building communities, messaging, multimedia, etc. It has been designed to behave as anything from the traditional system to a completely independent personal learning environment (PLE) and can easily morph into any kind of web application with a few simple clicks, for example a content management portal (http://www.uwc.ac.za), a personal blog that can serve as a PLE (http://www.dkeats.com), a presentation sharing and live presentation social site (http://chameleon.uwc.ac.za) or a dedicated eLearning platform (http://eteaching.uwdc.ac.za). All of its features are available in an eLearning implementation. KEWL3 supports integration with content and services provided as part of the Web 2.0 global infrastructure. With an open API, and widgets to provide content, KEWL3 can also provide input for other systems. For example, if

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65   This information is compiled from my notes of a talk by Tania Bosch on use of Facebook at UCT. A paper is under development, but no working version or presentation slides are available yet.

you want to include a live presentation in a blog (any blog running any blogging application, not just the KEWL3 blog), you can cut and paste the live presentation widget into your blog.

KEWL3 is currently being phased in at UWC, upgrading the previous e-Learning system which had some but much more limited Web 2.0 capability. It is also being deployed in Namibia and several other African countries, with a major training programme on using KEWL3 in education to take place at UWC in October.

Wikis

The Rip-Mix-Learn project at the University of the Western Cape (http://free.uwc.ac.za/ripmixlearn) implemented and researched the use of different Web 2.0 technologies within higher education courses, focusing on two key topics: assessment (including peer assessment), and student-generated course content. Some of the courses used wikis for collaborative text development, whereby students were asked to complete assignments together, using the wiki to edit one another's' work, and the lecturer used the history function to track changes. The wikis were also used for communication, whereby students shared personal stories related to the course content via the wiki. Since the first pilots, a strong demand for additional wikis grew, as lecturers learned about the tool through word of mouth.

The Rip-Mix-LearnERs project (http://free.uwc.ac.za/ripmixlearners) is a spin-off from Rip-Mix-Learn and encourages students to build their own repository of learning materials, lecture recordings, and class notes and market them virally to their peers using a wiki. It was designed as a response to the difficulties – namely the slow pace -- encountered in a more "traditional" open courseware project that relied on lecturers to provide course materials and review their reformatting for online publication.

Wikis are also used to support cross-institutional collaborations. For example, University of Cape Town (UCT) and University of the Western Cape (UWC) recently collaborated on a short hands-on workshop about Open Educational Resources and stored all information about the course on a shared wiki (http://free.uwc.ac.za/sandbox), which was then edited with participants during the workshop.

Student portal Vuma

The South African Institute for Distance Education (SAIDE) has created VUMA (http://www.vuma.ac.za), an online portal for higher education students that is operated on behalf of the Federation of Tertiary Institutions of the Northern Metropolis (FOTIM). The site is intended to help with all aspects of student life, including but not limited to, educational objectives such as finding others to work with and accessing help with coursework. The site is a combination of a traditional portal – containing information on topics relevant to students, such as writing skills, health issues, time management – and a blended combination of Web 2.0 tools for use by students, student mentors and university staff. It combines blogs, wikis, RSS Feeds, discussion forums/mailing lists, resource-sharing tools & repositories.

The portal aims to enable students to provide support to one another, and academics and support staff are encouraged to improve the site's usefulness and relevance for students. Many academics in South Africa suffer from high teaching loads, in additional to publication requirements, and struggle to find the time for intensive one-on-one student support. Helping to create a site that enables students to provide peer-to-peer support can, in the medium term, increase the support that individual students receive while decreasing demands on lecturers' time.

In addition to the site's educational usability, a range of social networking tools are provided, which are intended to allow students to interact more informally than they would within an

institutional learning management system. VUMA has not been heavily advertised, but already attracts around 2,000 unique monthly visitors (and is currently growing at a 10% monthly rate)[66].

Rhodes University Portal

"At Rhodes University, computer science students have been involved in experiments around developing material in a variety of languages for a bridging course for students whose first language is not English. A Web interface allows students to access materials developed by volunteer students and to participate in online chat sessions in a variety of languages. The system comprises a chat room, an online glossary and a knowledge base or newsgroup" (PHEA 2008).

Individual use by students

Relatively little is known about other student-driven Web 2.0 projects taking place in South Africa. Czerniewicz & Brown (2005b, p.9) found that ICT "take-up does not appear to be driven by lecturer requirements within courses only, but also seems to occur as students use computers as part of their own learning activities." They ask the question, "What drives students to use ICTs independently for their own learning?"

One student who commented on her use of the social web as part of her studies pointed out the possibilities of Web 2.0 tools for collection, annotation and organisation of online resources (using the social bookmarking service del.icio.us and YouTube for media sharing); communication with other students and lecturers (again, using del.icio.us to share bookmarks, but also Facebook, Google chat, and Skype) and online collaboration (using Google documents for shared document editing). She reported that the new generation of tools helped her work more quickly and efficiently, by making it easier find share and keep track of resources. She also pointed out that it was less necessary to be on campus (or even in a specific city) and that she was now able to work from almost anywhere.

Supervision of Graduate Students

At University of Cape Town, lecturers are using wikis and blogs to facilitate supervision of graduate students. Students are asked to use a blog for note taking and tracking their activities, and store their notes from meetings with supervisors on a wiki. The main advantages noted include the timeliness of information on the blog, and the ease of collaboration through the joint editing functionality provided by the wiki.

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66   According to Neil Butcher by email.

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Web 2.0 in Higher Education in the United States of America

Alice Marwick, New York University

Executive Summary

The United States is a world leader in the use of Web 2.0 technology. Much of the research on social media use is conducted in the United States, many technologies were invented in the States, and American students are highly conversant with social media use. As a result, there are numerous examples of social media used for educational ends at colleges and universities throughout America, driven by current pedagogical theories of active, student-centred, constructivist learning models which correspond well to the affordances of Web 2.0.

However, the majority of educational Web 2.0 uses are done on an ad-hoc basis by motivated faculty, staff, and students, and these solutions are often not scalable. When universities do make official, concerted efforts, they typically treat Web 2.0 as a publishing platform for marketing material aimed at recruiting new students. In order to truly take advantage of the collaborative, interactive behaviours facilitated by social media technologies, calculated, coordinated efforts must be made at a university-wide level.

Definitions

For the purposes of this paper, "Web 2.0," also known as the "read/write web," is used as synonymous with "social media" to encompass a range of internet technologies which facilitate collaboration, information-sharing and social production among users, including blogs, wikis, social networking services, photo and video sharing sites and social bookmarking applications.[67] Web 2.0 is fundamentally about users collaboratively creating content, transforming from information *consumers* to information *producers.* While some of the uses described in this document are more correspondent with information distribution and dissemination, social media is a continuum of interactivity rather than a specific set of features.

National Context

This section includes information about the college student body in the United States, the social media landscape, and sketches out the overall landscape of higher education social media adoption.

Student Statistics

The United States has an enormous student population (17 million), which includes both 4 year colleges and universities and 2 year "junior" or "community" colleges. Whenever possible, numbers for both are included as the student populations of both types of institutions can vary widely.

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[67] This paper does not discuss the use of video games as educational technologies; for more on that subject, see James Gee's *What Video Games Have to Teach Us about Learning and Literature* (Palgrave Macmillan 2003) and Marc Prensky's *Digital Games Based Learning* (McGraw-Hill 2000).

Gender

The majority of students in higher education in the United States are female; 56% of undergraduates in October 2006 were women.[68]

Age Mix

According to the US Census Bureau, the majority of students are in the 20-24 age range. 24% of students are 25 or above.[69]

Age	Percentage
15-19	29.6%
20-24	46.1%
25-34	17%
35+	7.1%

Table 11: Age distribution of students

Percent of School Leavers Going into Higher Education

69% of United States high school graduates pursue higher education, including both 4 year colleges/universities and 2 year colleges ("junior colleges" or "community colleges"). [70]

Computer Ownership

EDUCAUSE reports that 67% of college students own computers. However, this varies significantly by institution; while 84% of students at private institutions have their own computer, only 56% of students at public institutions do. Similarly, 85% of undergraduate (Bachelor's) students own a computer, but only 21% of community and junior college (Associates) students do. [71]

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[68]   U.S. Census Bureau. (2008). School Enrollment – Social and Economic Characteristics of Students: October 2006. http://www.census.gov/Press-Release/www/releases/archives/education/011921.html or http://tinyurl.com/5p53kj

[69]   U.S. Census Bureau. (2007). Table 5: Type of College and Year Enrolled for College Students 15 Years Old and Over, by Age, Sex, Race, Attendance Status, Control of School, and Enrollment Status. *School Enrollment--Social and Economic Characteristics of Students: October 2006.* Housing and Household Economic Statistics Division, Education & Social Stratification Branch. http://www.census.gov/population/www/socdemo/school/cps2006.html

[70]   United States Department of Education, Institute of Education Sciences, National Center for Education Statistics, Student Effort and Education. (2007). Transition to College (Table 25-1). *Student Effort and Educational Progress.* http://nces.ed.gov/programs/coe/2007/section3/table.asp?tableID=702

[71]   Hawkins, B.L. and Rudy, J.A. (2007). *EDUCAUSE Core Data Service Fiscal Year 2006 Summary Report*, September. http://net.educause.edu/apps/coredata/reports/2006/

Foreign Students

According to the *Chronicle of Higher Education*, in 2006 582,984 foreign students studied in the United States.[72] Based on an estimated 17,916,000 students enrolled overall in 2006, this represents 3.2% of the overall student body.[73]

Social Media Statistics

Broadband Usage

Among active internet users, 90.5% of households have broadband and only 9.51% still use dialup.[74] Among overall American households, however, 57% have broadband internet.[75]

Social Networking Sites (SNS)

While MySpace is the biggest SNS in the United States, Facebook is more popular with college students. Recent studies have shown that MySpace's audience is more likely to be from a racial or ethnic minority group, of lower parental education, and a lower income household than Facebook, which skews Caucasian, older, and wealthier.[76]

MySpace

Although Facebook has recently eclipsed MySpace in media attention, it is still the number one social network in the United States with 71.92% of the market share in June 2008.[77] However, MySpace is still second to Facebook on college campuses; 59% of college students have MySpace accounts.[78]

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[72] McCormack, E. (2007). Number of Foreign Students Bounces Back to Near Record High. *Chronicle of Higher Education*, November 16. Vol. 54(12): A1. http://chronicle.com/weekly/v54/i12/12a00102.htm

[73] Chronicle of Higher Education. (2008). Projections of College Enrollment, Degrees Conferred, and High-School Graduates, 2007 to 2015. *The 2007-8 Almanac.* Vol. 54 (1):16.

[74] Website Optimization. (2008). US Broadband Penetration Breaks 90% among Active Internet Users - July 2008 Bandwidth Report. *Websiteoptimization.com*, August. http://www.websiteoptimization.com/bw/0807/

[75] Website Optimization. (2008). Broadband Penetration Grows to 57% in US Homes – April 2008 bandwidth report. *Websiteoptimization.com,* May. http://www.websiteoptimization.com/bw/0804/

[76] Hargittai, E. (2007). Whose space? Differences among users and non-users of social network sites. *Journal of Computer-Mediated Communication*, *13*(1), article 14. http://jcmc.indiana.edu/vol13/issue1/hargittai.html; Tancer, B. (2007). MySpace v. Facebook: Competing Addictions. *Time Magazine*, October 24. http://www.time.com/time/business/article/0,8599,1675244,00.html?iid=sphere-inline-sidebar or http://tinyurl.com/623cxm

[77] Hitwise (2008). Facebook sees 40 Percent Growth Year over Year. *Hitwise.com Press Center*, July 23. http://www.hitwise.com/press-center/hitwiseHS2004/us-facebook-grows-40-percent-23072008.php or http://tinyurl.com/5qn5lt

[78] Harvard University Institute of Politics (2008). Executive Summary. *The 14th Biannual Youth Survey on Politics and Public Service*, April*.* http://www.iop.harvard.edu/Research-Publications/Polling/Spring-2008-Survey/Executive-Summary or http://tinyurl.com/6ec6w7

Facebook

According to Facebook's own statistics, it has an "85% market share of 4-year US universities,"[79] which is backed up by an April 2008 Harvard University survey that found that 86% of college students had a Facebook profile.[80] 29% of Facebook's users are between 18-24.[81]

Other Sites

Other SNS like Bebo and MyYearbook have very little market penetration in the United States compared to Facebook and MySpace.

Online Video

College students consume online video far higher than the national average. While 57% of American internet users have watched video online, according to the Pew Internet Project,[82] 93% of college students have watched some form of online video. A study conducted by marketing firm Survey U found that YouTube is the clear industry leader with 90% of college students citing it as their favourite online video site; Google Video is at 38%, iTunes at 34%, and MySpace at 32%.[83]

The same survey found that college students engaged in other participatory behaviours; 91% received video links, 83% sent video links to others, 40% rated videos and 37% had uploaded videos.

Picture Sharing

Experience, Inc.'s 2006 Media Perception Survey found that 67% of college students had uploaded and shared photos.[84] The most popular photo sharing site among 18-24 year olds is PhotoBucket (40%); Flickr only has 5% market share.[85]

Blogs

Blog use is growing among Americans, and is especially high among younger people. 60% of Americans of all ages read blogs, according to an Interpublic Group study;[86] a 2007 study by the

[79]   Facebook (2008). Press Room: Statistics. *Facebook.com*.
         http://www.facebook.com/press/info.php?statistics

[80]   Harvard University Institute of Politics 2008.

[81]   Lipsman, A. (2007). Facebook Sees Flood Of New Traffic From Teenagers And Adults.
         ComScore Inc. Press Releases. http://www.comscore.com/press/release.asp?press=1519

[82]   Madden, M. (2007). Technology & Media Use: Online Video. *Pew Internet and American Life Project*, July 25. http://www.pewinternet.org/PPF/r/219/report_display.asp

[83]   Coates, D. (2007). College students dramatically surpass general population in the consumption of online video. *SurveyU,* September 11.
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         http://www.experience.com/corp/press_release?id=press_release_1152733240076&channel_id=about_us

[85]   Prescott, L. (2007). Photobucket Captures 41% of Photography Category Visits. *Hitwise Intelligence,* April 4. http://weblogs.hitwise.com/leeann-prescott/2007/04/photobucket_captures_41_of_pho_1.html or http://tinyurl.com/5kd94q

[86]   Morrissey, B. (2008). U.S. Lags in Social Media Creation, per Survey. *Adweek*, April 18.
         http://www.adweek.com/aw/content_display/news/digital/e3i1e3d5e92979d92c1f48811623b250fff?pn=2 or http://tinyurl.com/6cr4uu

Pew Internet and American Life project found that 70% of teenagers read blogs.[87] Similarly, 26% of US adults have ever published a blog and 10% of US adults regularly do, double the number from 2007, while 20% of US adults age 18-34 publish a blog, up from 10% in 2007.[88]

Web 2.0 Background

National Drivers for Social Web Use

Government

There are no nation-wide initiatives at the Congressional or Presidential level specific to the use of Web 2.0 in higher education. However, the Department of Education has an office of Educational Technology, which released *The National Educational Technology Plan* in 2005. This plan called for increased broadband access, incorporation of e-learning and a move to digital content. It remains to be seen if future versions of the plan will suggest the integration of social media into curricula at all levels.

However, many federal agencies are active in encouraging the educational use of social media technologies. For instance, the Library of Congress has integrated social media into its website, including blogs, RSS feeds, podcasts, and widgets, and provides digital resources to interested instructors.

Grants

The MacArthur Foundation's Digital Media and Learning initiative has provided $50 million in grant money "to researchers, educators, game developers, and others to explore how, and to what extent, digital technologies are changing the way young people learn, play, socialize, and participate in civic life."[89] These grants have been distributed to a variety of institutions and are sponsoring several long-term, wide-scale projects including the development of digital literacy curricula, ethnographic studies of young people's use of digital media, and the impact of digital media on civic institutions.

The Corporation for National and Community Service is funding the "Learn and Serve America Higher Education College Student Social Media Initiative," which provides "$2.3 million of grant funding to support the facilitation of better engagement of college students in service through social media."[90]

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[87] Lenhart, A., Madden, M., Rankin, A., and Smith, M.A. (2007). *Teens and Social Media*. Pew Internet and American Life Project, December 19. http://www.pewinternet.org/pdfs/PIP_Teens_Social_Media_Final.pdf

[88] Universal McCann. (2008). *Media In Mind* Annual Study*;* Universal McCann (2008). *Power to the People: Social Media Tracker Wave 3*, March. http://www.universalmccann.com/Assets/UM%20Wave%203%20Final_20080505110444.pdf or http://tinyurl.com/6jewhl

[89] McArthur Foundation. (2008). Domestic Grantmaking: Digital Media, Learning & Education. http://www.macfound.org/site/c.lkLXJ8MQKrH/b.946881/k.380D/Domestic_Grantmaking__Education.htm http://tinyurl.com/68kao9

[90] Corporation for National and Community Service. (2008). Notices of Funding Opportunities: Learn and Serve America Higher Education College Student Social Media Initiative FY 2008. *Learnandserve.gov.* http://www.learnandserve.gov/for_organizations/funding/nofa_detail.asp?tbl_nofa_id=56 or http://tinyurl.com/5dlruw

Non-Profit Organizations

The Coalition for Networked Information "is an organization dedicated to supporting the transformative promise of networked information technology for the advancement of scholarly communication and the enrichment of intellectual productivity." It is primarily composed of universities and educational institutions and publishes a series of working papers.[91]

Perhaps the most prolific organization in this space is EDUCAUSE, "a non-profit association whose mission is to advance higher education by promoting the intelligent use of information technology." They publish many working papers, reports, and surveys, and publish a useful journal of information technology and education; much of their recent work has focused on social media applications like Facebook, MySpace and Second Life.[92]

Finally, the National Institute for Technology and Liberal Education (NITLE) is a network of colleges and universities using technologies to advance undergraduate education. Current research looks at Web 2.0 storytelling, open-source learning management, and other social media related efforts.[93]

Prospective Developments in Social Web Use

While specific educational examples of Web 2.0 are given in the next section, a few large-scale efforts should be noticed. Currently, most US universities use some form of Course Management Software (CMS) like Blackboard and Angel. These technologies cannot be called "social," as they primarily involve delivering content to students; as Edward Maloney writes in *The Chronicle of Higher Education,* "most course-management systems were developed at a time when the Internet was seen primarily as a mechanism for information delivery."[94] They are built around courses, rather than students, and are static and used in isolation.

However, with the recent interest in Web 2.0 technologies in education, CMS system designers are beginning to respond to the changes represented by Facebook and other social media technologies.[95] For instance, Blackboard's newest version, Blackboard Beyond, integrates a social bookmarking application called Scholar and includes a Facebook application that notifies students when their class website has been modified.[96]

Similarly, an open-source CMS called Moodle, which includes a plethora of Web 2.0-related plug-ins, positions itself as an alternative to more restrictive CMS, with 47 thousand sites and more than 2.2 million courses created.[97] These trends point to increased acknowledgement and institutionalization of the importance of Web 2.0 in even conservative educational technology systems.

Finally, the "official" use of social web technologies by colleges and universities, as opposed to individual professors, is increasing. For example, Wellesley College's "iTunes You" features podcasts from around the university, including tours of the museum, lectures from popular

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[91] Coalition for Networked Information. (2008). *Cni.org.* http://www.cni.org/

[92] EDUCAUSE. (2008). *Educause.edu.* http://www.educause.edu/

[93] National Institute for Technology and Liberal Education (2008). *Nitle.org*. http://www.nitle.org/

[94] Maloney, E.J. (2007). What Web 2.0 Can Teach us about Learning. *The Chronicle of Higher Education*, January 5, 53(18): B26.

[95] Craig, E. M. (2007). Changing Paradigms: Managed Learning and Web 2.0. *Campus-Wide Information Systems*, 24(3): 152-161.

[96] Guess, Andy. (2008). Facebook, Meet Blackboard. *Inside Higher Ed*, May 14. http://www.insidehighered.com/news/2008/05/14/sync

[97] Moodle. (2008). Moodle Statistics. *Moodle.org*. http://moodle.org/stats/

professors, and alumna interviews;[98] the University of Pennsylvania uses Facebook for its first year orientation,[99] and the Massachusetts Institute of Technology (MIT) has a dedicated video channel of university-related content.[100] Although these efforts are focused on student recruiting and retention and use social media as a publishing platform rather than a truly interactive, social technology, they may signal changes to come as the use of Web 2.0 in the classroom becomes more common.

Drivers for the Use of the Social Web

Pedagogy

New pedagogical drivers come from innovative faculty, teaching communities, and students. The pedagogical foundation for using Web 2.0 in the classroom is related to both changes in students (content creators, digital media enthusiasts) and changes in learning theories. Learning conceptualized as a bottom-up, collaborative, participatory process, as in student-centred, constructivism and active learning theories, coincides with the fundamental principles of Web 2.0: community, creativity, participation, and reflexivity.

Participatory Culture and Knowledge Production

MIT professor Henry Jenkins argues that Web 2.0 is facilitating a new type of collective media production from the bottom up which he calls "participatory culture", facilitated by "the explosion of new media technologies that make it possible for average consumers to archive, annotate, appropriate, and re-circulate media content in powerful new ways."[101] Jenkins argues that as young people who were formerly solely media *consumers* become media *producers*, new types of skills and strengths are emerging, but so are new problems. A McArthur foundation report identifies these as:

- **The Participation Gap**: the unequal access to the opportunities, experiences, skills, and knowledge that will prepare youth for full participation in the world of tomorrow.

- **The Transparency Problem:** The challenges young people face in learning to see clearly the ways that media shape perceptions of the world.

- **The Ethics Challenge:** The breakdown of traditional forms of professional training and socialization that might prepare young people for their increasingly public roles as media makers and community participants.[102]

Participatory culture theory emphasizes that students "are no longer passive consumers but active producers of knowledge."[103] Therefore, the top-down models of learning characterized by older forms of pedagogy should be altered to incorporate and encourage this type of collaborative, creative activity, which is valuable in itself. The creation of new media from pieces

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[98] Wellesley College Information Services. (2008). Wellesley iTunes U. *Wellesley.edu*, April 15. http://www.wellesley.edu/Computing/Itunesu/

[99] University of Pennsylvania. (2008). *Pennster*. http://www.rescomp.upenn.edu/pennster/

[100] Massachusetts Institute of Technology. (2008). Video at MIT. *MIT.edu.* http://watch.mit.edu/

[101] Jenkins, H. & Clinton, K., Purushotma, R., Robison, A.J. & Weigel, M. (2007). Confronting the Challenges of Participatory Culture: Media Education for the 21st Century. *Building the Field of Digital Media and Learning Paper Series*, McArthur Foundation.

[102] Jenkins et. al. 2007, p. 3

[103] McLoughlin, C. & Lee, M.W. (2008). Future Learning Landscapes: Transforming Pedagogy through Social Software. *Innovate: The Journal of Online Education*. 4(5): June-July.

of other media products allows students to trace connections and relationships between seemingly disparate types of information.[104]

This point of view not only advocates that students be encouraged to use new media tools to create content, collectively solve problems, and "mash-up" or "remix" disparate works together, but that the social issues generated by these practices be directly addressed in education.

Promoting Digital Literacy and Critical Thinking

The concept of "digital literacy" was coined by Paul Gilster in 1997 and is defined as a "special kind of mindset that enables users to perform intuitively in digital environments, and to easily and effectively access the wide range of knowledge embedded in these environments."[105] We might think of digital literacy as a combination of critical thinking, media literacy, and computer literacy. Despite widespread claims that today's students are highly technologically savvy, often this doesn't translate to researching and evaluating online information.

Digital literacy encompasses several aspects. First, digital literacy can mean learning how to compose digital texts, or how to work with multimedia as a language of information presentation.[106] Web 2.0 applications allow students to practice creating and interacting with digital media in a learning-focused environment. For example, the student videos of class projects posted on YouTube mentioned earlier use humour and satire to convey information in a way that engages their key audience; students can look at how larger communities respond to the videos in order to judge the effectiveness of information presentation.

Another part of digital literacy is learning to evaluate online sources; understanding the relative reputability of sources like *The New York Times,* a blog post, and a Wikipedia entry is simplified if students have created a blog or posted an edit to a wiki. Similarly, understanding how digital photography can be altered or manipulated using Photoshop could be easily demonstrated through comparative analysis of images found on photo-sharing sites. A digital literacy class at the University of Minnesota had students search Google Images, Flickr, and Photobucket for differing media representations of social phenomena (like the homeless or the Iraq war).[107]

Finally, Web 2.0 tools can be used to promote general engagement and critical thinking.[108] Asking students to contextualize or understand their own experiences on Facebook or YouTube allows for a particular type of self-reflexivity. Lohnes writes, "a critical engagement with [students'] own practices results in a broadening of their view of the possible ways to engage technology."[109]

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[104]   Maloney, E. (2007). What Web 2.0 Can Teach Us About Learning. *The Chronicle of Higher Education*, January 5. http://chronicle.com/weekly/v53/i18/18b02601.htm

[105]   Avairam, Eshet-Alkalai (2006). Towards a Theory of Digital Literacy: Three Scenarios. *EURODL: European Journal of Open, Distance, and E*-Learning, 2006(1); Gilster, P. (1997). Digital *Literacy*. New York: Wiley Computer Publishing.

[106]   Doering, A., Beach, R. & O'Brien, D. (2007). Infusing Multimodal Tools and Digital Literacies into an English Education Program. *English Education*, 40(1):41-60.

[107]   Doering et. al. 55-56.

[108]   Davi, A., Frydenberg, M., & Gulati, G. J. (2007). Blogging Across the Disciplines: Integrating Technology to Enhance Liberal Learning. *MERLOT Journal of Online Learning and Teaching.* 3(3): 222-232.

[109]   Lohnes 2006, p. 9.

Theories of Learning

Active Learning

Active learning theory emphasizes decentralized learning – collaborative, networked interaction, rather than top-down knowledge dissemination.[110] It is centred around the student, who is in control of his or her own learning processes.[111] Active learning might emphasize real-world problem solving that included observation of a particular phenomenon, individual reflection, and small group work and collaboration. An ideal active learning environment alternates between rich experiences and thoughtful reflection on those experiences.

Web 2.0 works well with active learning as it facilitates collaboration and group work. Moreover, the nature of textual tools like blogs and wikis lend themselves well to reflexivity and reflection.

Social Learning

Social learning theory focuses on learning within a social context. People learn from each other through a variety of processes such as observational learning, imitation, and modelling.[112] The rich community-building aspects of Web 2.0 are attractive to social learning theorists as they allow individuals to participate in various levels of production, from peripheral participation to becoming a fully skilled member of a community.

Constructivist Learning

Constructivist teaching argues that instructors should build on knowledge that students already have to engage them in new concepts. Educator Audrey Gray writes that the key elements of a constructivist classroom include:

- Actively involved learners

- Interactive, student-centred activity

- A democratic learning environment

- A learning process where students are independent, self-directed, and accountable for their actions, and

- An educator who facilitates these elements.[113]

Like participatory culture theory, constructivist learning positions students as active *creators*. Web 2.0 applications can be utilized to emphasize problem-based learning, collaboration, interactivity, and support.

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[110]   McLoughlin & Lee, 2008.

[111]   Prensky, M. (2005). Engage Me or Enrage Me: What Today's Learners Demand. *Educause Review* 40(5): 60-65. http://www.educause.edu/ir/library/pdf/ERM0553.pdf.

[112]   Ormrod, J.E. (1999). *Human Learning* (3rd ed.). Upper Saddle River, NJ: Prentice-Hall.

[113]   Gray, A. (1997). 'The Road to Knowledge is Always Under Construction': A Life History Journey to Constructivist Teaching. *SSTA Research Centre Report #97-07*, Regina, SA: Saskatchewan School Boards Association Research Centre, http://www.ssta.sk.ca/research/instruction/97-07.htm

Social institutions

The popularity of Web 2.0 technologies has contributed to an expectation from college students that information, including readings, class schedules, library materials, information, and, often, professors, be always-on and always accessible.[114] These needs are not met by current CMS systems such as Angel and Blackboard, because they are seen as inflexible, isolated, and disconnected from the other digital tools students use to manage their lives, such as IM, Facebook, and Flickr.

The ubiquity of social media technologies in the daily communication practices of American college students shows the necessity of exploring their educational use. An EDUCAUSE report on Facebook stated, "Any technology that is able to captivate so many students for so much time not only carries implications for how those students view the world but also offers an opportunity for educators to understand the elements of social networking that students find so compelling and to incorporate those elements into teaching and learning."[115]

Sarah Lohnes, in her study of "Net Gen" students at liberal arts colleges, points out that student engagement with technology outside of the classroom affects how they use it inside the classroom, and vice versa.[116] She advocates an approach that respects "the practices that students engaged in outside the classroom, based on recognition that valuing such practices can provide a gateway to information that helps us understand how to make teaching and learning relevant to Net Gen learners."[117]

Policy drivers

There are few national policy drivers for Web 2.0 adoption in the United States, as discussed in Section 2.3. However, other government policies, such as anti-filesharing provisions in the current version of the Higher Education Act, will potentially affect choices to implement social media technologies. Locally, the internal information technology policies of colleges and universities are crucial to system-wide technology adoption; these policies are influenced by recruitment efforts, state drivers, and overall institutional philosophies of knowledge.

Recruitment and Student Needs

As previously mentioned, most college and university IT departments do not yet integrate Web 2.0, are typically committed to legacy CMS systems, and are often resistant to change. However, forward-thinking colleges and universities have adopted institutional technology policies that include social media.

For example, Xavier University reconceptualised their technology policy as part of an overall effort to recruit and retain students. Their Information Resources decision was dysfunctional and isolated, and did not serve the actual needs of the student population. For instance, 84% of their students began class research using a search engine, and only 1% used the library website.

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[114]   Frydenberg, M. (2008). Wikis as a Tool for Collaborative Class Management. 4(2):169-177.

[115]   EDUCAUSE (2006). 7 Things You Should Know About Facebook I. *EDUCAUSE.com.* http://www.educause.edu/ir/library/pdf/ELI7017.pdf.

[116]   Lohnes 2006, p. 4.

[117]   Lohnes, 2006, p. 5.

Similarly, more than 96% of students registered for classes online, but there was no online support for this technology.[118]

To change this system, Xavier re-organized their IR department to emphasize integration, web services, and support. Rather than relying on tech support specialists as a first point of contact, the department emphasized automatic transactions, self-help, and information discovery. This new strategy focused on "user-centric services for 21st century learners, NOT on content providers and organizational units."[119]

For example, to assist new students with the application and enrolment process, the "Road to Xavier" website integrated messaging, student profiles, and financial aid information into a dynamic, personalized page that replaced static content.[120] Similarly, student portal sites and library information was reconceptualised to respond to actual student practices rather than traditional ways of organizing information. These types of initiatives are currently rare, but are likely to continue if they demonstrate added value, such as student satisfaction, increased student retention, and so forth.

State Drivers

State-funded universities are often confronted with state-wide technology mandates, some of which may involve the adoption of social media. For instance, Michigan's 2008 IT Strategic Plan calls for state agencies to emphasize citizen-targeted services, experimenting with mashups, wikis, social networking and other Web 2.0 services.[121] Many of these initiatives may affect university technology policy on a systemic level.

The Open Access Movement

In 2008, Harvard University's Faculty of Arts and Sciences passed a resolution that mandates Harvard faculty to publish scholarly work online. This requires faculty to publish in "open-access" journals, which eliminate subscription requirements and fees to view scholarly work, making articles free for anyone with an internet connection to read and use. Alexander writes, "Educational content published in this way is open, contributing to a public field of knowledge. That content can be learning guides, journals of education, and opinion pieces about pedagogy."[122]

Although open access journals are not social media per se, university-wide regulations like Harvard's contribute to greater openness around knowledge production, which is often facilitated by Web 2.0 applications. Therefore, integration of Web 2.0 technologies may be needed to fulfil such mandates.

IP & Copyright Issues

The American media industry (primarily the Recording Industry Association of America and the Motion Picture Association of America) have heavily lobbied the United States Congress to pass anti-file-sharing laws specific to university campuses. In 2008, the Higher Education Act was

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[118]   Dodd, D. & Ruschman, D. (2007). Xavier University's Web 2.0 Strategy. *EDUCAUSE Annual Conference*, October 24. http://www.xavier.edu/educause/ruschman/web-strategy.pdf

[119]   Dodd & Ruschman 2007, p. 19.

[120]   Xavier University. (2008). *The Road to Xavier.* https://roadto.xavier.edu/

[121]   State of Michigan (2008). *IT Strategic Plan.* http://www.michigan.gov/itstrategicplan

[122]   Alexander 2008, p. 153.

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passed in both the House and the Senate with a resolution to require federally-funded universities to implement anti-piracy technology. The HEA asks universities and colleges to develop "plans to effectively combat the unauthorized distribution of copyrighted material, including through the use of a variety of technology-based deterrents," and implement commercial alternatives to peer-to-peer (p2p) file sharing whenever possible.[123]

Since P2P technologies can be used for a host of technologies besides sharing copyrighted media, this act has the potential to disrupt larger social media implementation (such as video distribution over Bittorrent). Further attention is needed to determine how this act will affect university technology policies.

Issues / Responses

While many technologists, students, administrators and educators believe in the value of Web 2.0 in higher education, there are a few conflicts that should be mentioned as they remain significant obstacles to large-scale implementation in many educational contexts. The primary obstacle is adoption or even rejection by faculty, students, and staff; each group confronts entrenched institutional barriers to widespread use of social media.

Faculty Adoption

A recent study suggests that while American faculty members are aware of the benefits of social media in educational contexts, far fewer currently use these technologies (14% of those surveyed used blogs, 24% wikis, 8% social networks and 6% social bookmarks).[124] The authors conclude that classroom Web 2.0 use is ultimately dependent on faculty behaviour and attitude, which is influenced by superiors, peers, and students, and the ability to access social media that are easy to use, useful, and compatible with current technologies. This suggests the importance of fostering institutional cultures that are Web 2.0-friendly; understanding the benefits of these technologies is not enough to encourage use. Faculty will need clear incentives to adopt new technologies, particularly when they are unfamiliar, difficult to use, or complicated.

Threats to Traditional Models of Learning and Teaching

Although new models of pedagogy discussed in Section 4.1 are compatible with social media, these are not widely adopted philosophies. Indeed, Web 2.0 includes an implicit criticism of the traditional model of knowledge production practiced and supported by most universities.[125] This may be threatening to faculty members who do not adhere to bottom-up learning models and prefer to maintain pedagogical authority in the classroom.

Assessment

American universities typically require professors to assign numeric grades based on concrete grade rubrics, a method that does not always work with participatory, interactive assignments. The 2007 Horizon Project reported that "both at the student and the professional level, assessment is lagging behind creative work. Learning that takes place in interdisciplinary,

[123]   Olsen, S. (2008). Mixed Reviews for Illegal File-Sharing on Campus. *C|Net News.com*, August 1. http://news.cnet.com/8301-1023_3-10005089-93.html

[124]   Ajjan, H. & Hartshorne, R. (2008). Investigating faculty decisions to adopt Web 2.0 technologies: Theory and empirical tests. *The Internet and Higher Education*, in press. doi:10.1016/j.iheduc.2008.05.002

[125]   Freire, J. (2008). Universities and Web 2.0: Institutional challenges. eLearning Papers 1(8), April. http://www.elearningeuropa.info/files/media/media15530.pdf

context-rich environments such as games and simulations is still difficult to evaluate."[126] Professors may shy away from such situations because they worry about student pushback over grades, or believe that they cannot evaluate such work from an objective paradigm.

Faculty Evaluation

In the United States, tenure-track faculty members are typically evaluated on the basis of books and articles published in closed, peer-reviewed journals. Interdisciplinary, collaborative work or traditional research published in open-access journals is not rewarded in tenure evaluations. Furthermore, peer-produced knowledge like Wikipedia is calling into question the idea of the traditional expert. The Horizon Report notes that "New forms of peer review are emerging, but existing academic practices of specialization and long-honoured notions of academic status are persistent barriers to the adoption of new approaches… given the pace of change, the academy will grow more out of step with how scholarship is actually conducted until constraints imposed by traditional tenure and promotion processes are ceased."[127]

Student Adoption

Students will not automatically adopt social media technologies. First, despite the image of the modern American university student as technically savvy and advanced, many students are not familiar with lesser known Web 2.0 applications such as social bookmarking or mashups. Second, students may view Facebook and YouTube as "their" domains and resent faculty and educational intrusion into what they conceptualize as a private space. Third, like any unfamiliar educational technology, social media can provoke anxiety and uncertainty from students concerned with grades and classroom achievement.

Student Anxiety

The nature of social media as public means that students can interact (receive comments, suggestions, critiques, etc.) from people outside the classroom. While this can be a positive pedagogical tool, there is a difference between a professional blogger writing about a subject he or she understands well, and a student engaged in learning asked to respond to an article or write about something they are not familiar with.[128] This has potential for students to receive negative or critical comments from others. Even if this rarely happens, there is a chilling effect where a student may feel nervous about writing for their classmates or an imaginary public.

IT Adoption

Because of the distributed, bottom-up philosophy behind Web 2.0 applications, they often posit IT departments as unnecessary, out of date, or irrelevant. This can create conflicts between forward-thinking faculty and IT personnel who do not wish to cede control of their current information systems.

For example, many universities have invested large amounts into comprehensive CMS legacy systems such as Blackboard and Angel. Without a clear incentive, there is little motivation to switch to Web 2.0 alternatives. First, there is no social media "single solution" that can be rolled out and supported in a similar way to CMS. Second, since faculty, student, and support staff are familiar with current systems, there would be high switching costs to transfer to new

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[126]   EDUCAUSE Learning Initiative and the New Media Consortium. (2007). *The Horizon Report: 2007 Edition.*

[127]   EDUCAUSE 2007, p. 4.

[128]   Hurlburt 2008, p. 185.

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technologies (training, documentation, etc.). Third, the bureaucratic nature of large university systems may inculcate an overall aversion to innovation and entrepreneurship which can be antithetical to wide-scale adoption of new technologies.[129]

Social Issues

Frivolity

Facebook, YouTube and podcasts are viewed by many as entertainment technologies with few or no educational applications. They may even be seen as distractions from the "real work" of learning.[130] For example, podcasting is often associated with iPods and pop music, which are seen as contributing factors to "educational apathy."[131] Todd Gitlin, a Columbia University professor, said in an interview with the *Chronicle of Higher Education* that professors who have gained attention for posting lectures on video-sharing sites are contributing "to the trivialization of the education process and a certain narcissism."[132] This conflict between old-fashioned learning techniques on one hand, and new-fangled, light-weight social technologies on the other, may discourage creative incorporation of the latter into the classroom and indeed, paint educators who do so as trivial.

Privacy and Safety

In the last few years, there have been several high-profile American cases in which college students were expelled or punished based on information shared on Facebook.[133] Even more sensational are the accounts of "online predators" who purportedly use SNS to contact minors for sexual contact. Although the latter activities represent a minority of users, the popular image of SNS has suffered accordingly.[134] As a result, many young people are discouraged by parents and teachers from using SNS at all; for example, incoming law students are frequently told to erase all social networking profiles so as not to alienate future employers.

More practically, there are issues with instructor-student relationships. Many social media tools encourage interactions which breach boundaries of traditional student-teacher relationships, such as sharing personal information, writing informal communiqués, and the like.[135] This familiarity can create discomfort both for students (who perceive educators as invading "their" spaces) and educators (who wish to maintain a professional distance from students).

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[129]   Friere 2008, p. 1.

[130]   Salaway, Caruso, and Nelson. "Social Network Sites."

[131]   Fose, L. & Mehl, M. (2007). Plugging into Students' Digital DNA: Five Myths Prohibiting Proper Podcasting Pedagogy in the New Classroom Domain. *MERLOT Journal of Online Learning and Teaching* 3(3), September.

[132]   Foster, A.L. (2008). Linked In With Todd Gitlin. *The Chronicle of Higher Education*, August 8, 54(48):A10. http://chronicle.com/free/v54/i48/48a01001.htm

[133]   Stutzman, F. (2006). How University Administrators Should Approach the Facebook: Ten Rules. *Unit Structures*, January 23. http://chimprawk.blogspot.com/2006/01/how-university-administrators-should.html or http://tinyurl.com/2wr7sp

[134]   Marwick, A. (2008). To Catch a Predator? The MySpace Moral Panic. *First Monday* 13(6), June. http://www.uic.edu/htbin/cgiwrap/bin/ojs/index.php/fm/article/view/2152/1966

[135]   Lipka, S. (2007). For Professors, 'Friending' Can Be Fraught. *Chronicle of Higher Education* 54(15): A1.

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Examples of Use in Academic and Administrative Support Areas

There are extensive examples of innovative teaching uses of Web 2.0 in the United States. However, this description does not reveal the whole picture. Often, the exemplars presented in educational journals, studies, and blogs are the most successful ones; the failures are rarely written about or indeed referred to at all. Furthermore, these are usually presented from the perspective of the educator, who may have a different view of "success" than a student.

A Note on Interactivity

Tim O'Reilly provides a continuum of interactivity along which Web 2.0 applications (or uses of Web 2.0 applications) can be placed. On one end are uses which do not depend on internet connectivity, and which could exist very well without the internet (for example, the electronic version of a Spanish-English dictionary). On the other end are applications which could not exist without both the internet and network connectivity (such as Facebook).[136]

It is possible for academics to use Web 2.0 technologies in ways that mimic their real-world social applications, but do not harness the real power of interactivity supposedly intrinsic to social media. Sarah Hulburt, a professor at Whitman College, gives the example of class blogs which exist solely for students to submit assignments. She writes, "While traditional assignment structures do transfer to blog structures fairly clearly, they do not automatically transform themselves into interactive assignments as a result... the assigned blog can very easily be no more than a complicated way to submit an individual essay."[137] If a faculty member wishes to garner the benefits of interactivity, he or she must design assignments that take advantage of the interactive features of Web 2.0.

Broadly speaking, academic use of Web 2.0 technologies can be broken into two types: faculty members using Web 2.0 to create or disseminate class material, and student creation of content, either independently, with an instructor, or through the auspices of a class assignment. While the former use is probably more prevalent in the United States than the latter, the true potential of Web 2.0 is found in classes and assignments which take advantage of student's talents in order to inspire collaboration and content creation.

Academics

Teaching New Media

Classes taught about computer science, new media, digital literacy, digital production and the like are often excellent examples of forward-thinking educational practices as they lend themselves very well to the integration of theory and praxis. Three examples illustrate different subjects that used a variety of Web 2.0 applications to further the goals of the class.

BJ Fogg, Stanford, Creating Facebook Applications

Dr. Fogg taught a class in the Computer Science department about creating Facebook applications. The class had both a private and a public Facebook group, a blog, a wiki, and an extensive website where students posted their projects and received feedback from tech

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[136] O'Reilly, T. (2006). Levels of the Game: The Hierarchy of Web 2.0 Applications, July 17. http://radar.oreilly.com/archives/2006/07/levels-of-the-game-the-hierarc.html or http://tinyurl.com/5vgrak

[137] Hurlburt, S. (2008). Defining Tools for a New Learning Space: Writing and Reading Class Blogs. *MERLOT Journal of Online Teaching and Learning*, 4(2):183.

bloggers, Silicon Valley entrepreneurs and software developers.[138] The class was very successful; one student wrote "The students in the room were the most entrepreneurial ones that I met at Stanford. The experience is so rich that you can feel it only by being there." Two applications built as class projects exceeded 1 *million* installs. BJ Fogg wrote, "As a teacher and researcher, I find that dealing head-on with Facebook is the right approach. The students resonate with projects related to Facebook. They respond well to any assignments I give via a Facebook channel. And when they post work on Facebook, the students' friend outside the class often comment. So I'm seeing lots of benefits."[139]

David Silver, University of San Francisco, Digital Literacy Seminar

Dr. Silver taught an honours seminar in Spring 2008 with the following description, taken from the syllabus:

"In Digital Literacy we will explain what literacy means – and can mean – in a digital age, our age. We will read, write, and reflect. We will design, create, and construct. We will participate, contribute, and collaborate…. Upon course completion, [students] will learn:

1. How to navigate, evaluate, cite, and contribute to existing knowledge;

2. How to construct and manage a creative, collaborative, and responsible digital identity; and

3. How to collaborate (preferably effectively and creatively) with others."[140]

The class was conducted as a small discussion seminar with extensive readings from books, journals, blogs, and other websites and included a lecture series.[141] Students were required to read the speakers' blogs; wrote their own journals; took digital pictures and uploaded them to Flickr; attended movies; and took field trips. One student wrote on her own blog, "I've had a wonderful time doing this blog and this class. I'm happy that I've created something that I like and find interesting…This class was never about telling us what to do - it was about encouraging us to do *something*, to use these technologies in ways that work for us."[142]

Keith Hampton, Annenberg School for Communication, University of Pennsylvania, New Media and Community Life

Dr. Hampton organized the class using a blog, posting readings and assignments on the class blog and requiring each student to keep a blog where reaction papers were posted and to comment on other students' blogs. He created assignments that integrated Web 2.0 technologies in different ways; for example, students read different essays on privacy and then were asked to evaluate the privacy policy of Facebook, Google, or MySpace. Other assignments reflected on the scope and reach of technologies in physical space: in one, students had to

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138   The Stanford Persuasive Technology Lab (2007). *The Stanford Facebook Class.* http://credibilityserver.stanford.edu/captology/facebook/

139   Salaway, G., Caruso, J. B. & Nelson, M.R. (2008). "Social Network Sites." The ECAR Study of Undergraduate Students and Information Technology, (Research Study, Vol. 8). Boulder, CO: EDUCAUSE Center for Applied Research. http://www.educause.edu/ecar.

140   Silver. D. (2008). Digital Literacy: Spring 08. *Silver in SF.* http://silverinsf.blogspot.com/2008/01/digital-literacy-spring-2008.html

141   The lecture series is archived on the web at http://www.usfca.edu/its/cit/video/davies_forum.html.

142   McChesney-Young, A. (2008).Tag Cloud. *Shiny Things*, May 7. http://amberinprogress.blogspot.com/2008/05/tag-cloud.html

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count and photograph all the CCTV (surveillance) cameras in a city quadrant, and in another, they observed people using technology at coffee shops.[143]

Analysis

All three classes were able to seamlessly integrate technologies since technologies themselves were the subject of the class. However, this is not the case for every class; it might be more difficult to integrate Facebook applications into English Literature or mathematics classes. This does not mean that it is not possible, but that it may require more innovative learning and teaching techniques. Luckily, there are excellent examples of professors in all disciplines using various other social media tools to support learning and teaching.

Classroom Blogs

Blogs (sometimes called "personal publishing") are among the most popular tools for teaching. As seen in the previous examples, blogs allow students to reflect on their reading, to learn to write for a public audience, to interact with strangers about their intellectual interests and to collaborate with classmates and interested members of the community. Moreover, they are simple and cheap (usually free) to set up, easy to learn and simple to maintain. Because blogs encourage reflexiveness, they are appropriate for all types of classrooms. Huffaker writes, "Any discipline can use blogs to approach a style of *meta-learning*, where concepts or contexts are discussed and articulated in both a personalized and group exchange, and ideas are built on previous educational content."[144]

Writing Practice

Using blogs for writing assignments and exercises has the advantages of immediacy and interactions with both local and worldwide audiences. Barbara Ganley at Middlebury College taught a class on Contemporary Ireland through Fiction and Film, using a class blog to publish student analyses. She invited experts to read and comment on the blog, "contextualizing their learning in the real world."[145] As non-class-related individuals found and commented on the blog, the students' experiences were enhanced knowing that their assignments had affected individuals out in the world. Steven Downes writes for *EDUCAUSE*, "The process of reading online, engaging a community, and reflecting it online is a process of bringing life into learning."[146] Bryan Alexander discusses how writing for a global audience requires students to reflexively question their own personal identities and how they wish to represent themselves and understand the audience.[147] Blogging allows students to critically reflect on the learning process and their role in it.

Critical Thinking of New Media

Dr. Doug Davis of Haverford College taught his freshman writing seminar using LiveJournal, IM chat logs and Facebook. The LiveJournal blogs were used not only as a way for the students to practice writing, but also to reflect critically on the nature of online writing. Davis noted that his

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[143]   Hampton, K. (2006). *Com 410: New Media and Community Life.* http://www.mysocialnetwork.net/blog/410/

[144]   Huffaker, D. (2004). The Educated Blogger: Using Weblogs to Promote Literacy in the Classroom. *First Monday*, June. http://www.firstmonday.org/issues/issue9_6/huffaker/

[145]   Lohnes S. (2006). What Do Net Gen Students Have to Teach Us? *Transformations,* December 14, p. 7

[146]   Downes, S. (2004). Educational Blogging. *EDUCAUSE* September/October, p. 26.

[147]   Alexander, B. (2008). Web 2.0 and Emergent Multiliteracies. *Theory into Practice* 47(2), p. 156.

students were able to parse IM transcripts in sophisticated ways which allowed them to reflect on "the kind of writing that we all did online."[148] Students often have difficulty identifying their own text messaging and emailing as "writing"; furthermore, they often lack the knowledge to identify credible sources from non-credible ones (for example, understanding that Wikipedia is group-generated).

Fostering Discussion

Blogs allow students to quickly and easily comment on each other's thoughts, work, and opinions. Alexander Halavais at the State University of New York at Buffalo created a blog for a 180-person law class; giving credit for postings spurred lively discussion, to the point where students asked him to continue the blog after the class ended.[149] This type of comment-based discussion and linking to other student class blogs allows students to get to know each other, promotes a dynamic learning environment and creates peer-group relationships that can enhance classroom interactions.[150]

Classroom Wikis

Wikis are valuable classroom tools as they allow for collective knowledge production, versioning capability, interlinked information and immediate publishing. Wikis are widely used in education, by businesses, and organizations; educational uses range from organizing sources for literature reviews, taking notes for classes, summarizing readings, sharing project findings, annotate texts, creating exploratory experiences, and general class communication.[151] I am using Mark Phillipson's taxonomy of educational wikis to identify two major uses of wikis in the classroom.[152]

The Presentation Wiki: Course Management and Information Sharing

The simplest form of class wiki is one that presents the syllabus, class readings, and assignments; these are usually not particularly interactive as often the only person who can edit them is the professor, and the "wiki" functionality is only utilized for self publishing. Mark Frydenberg's study of wikis for more collaborative class management points out that using a wiki instead of a CMS like Blackboard or Moodle both involves "students in the process of creating and sharing class content" and allows them practice interacting with a real-world tool.[153] For example, students can create study sheets for examinations, post notes from different lectures, manage group projects, and contribute material to the class. This requires the instructor to be comfortable "partnering" with students in learning.

Brown University has an extensive system of wikis which are used for classes, by student organizations, and for cross-disciplinary projects.[154] One example is the class wiki for "The

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[148]   Lohnes 2006, p. 6.

[149]   Downes 2004, p. 18.

[150]   Huffaker 2004.

[151]   Frydenberg 2008, p. 170; Mindel, J. L., & Verma, S. (2006). Wikis for Teaching and Learning. *Communications of AIS , 18* (1), 2-38.

[152]   Phillipson, M. (2007). Wikis in the Classroom: A Taxonomy. In *Wiki Writing: Collaborative Learning in the College Classroom*, Robert E. Cummings and Matt Barton, Editors. Ann Arbor: University of Michigan Press. http://www.wildwiki.net/mediawiki/index.php?title=%E2%80%9CWikis_in_the_Classroom:_A_Tax ononomy or http://tinyurl.com/635xeh

[153]   Frydenberg, M. (2008). Wikis as a Tool for Collaborative Class Management. 4(2):169.

[154]   Brown University (2007). Dashboard. *Brown University Wiki.* https://wiki.brown.edu/confluence/dashboard.action

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Beginning of Judaism," where students contribute to three collectively-written essays on main class themes and contribute shorter entries on people, places, and concepts in the readings.[155]

The Resource Wiki: Collective Knowledge Production

Other class wikis have the goal of serving as knowledge resources for other educators, classes, and learners, created collectively by instructors and students and perhaps even added to by others after the class ends. Mark Phillipson, an English professor at Bowdoin University, writes, "While acting as a register of class activity, a knowledge base (if properly archived and maintained) can extend beyond one class--and even one emphasis. In this way, a resource wiki can give students the sense of contributing to a large and unfolding project, joining preceding peers in a given course or department or topic of study; it can also allow instructors to continually drive study of fresh material."[156]

For example, Phillipson used a wiki to create of "The Romantic Audience Project," which explores the transmission and dissemination of Romantic poetry.[157] The wiki covers Romantic authors and particular poems, providing hyperlinked explanations of unfamiliar terms, analyses of wording and stanzas, and relationships between these concepts. In Phillipson's study of the project, he identifies the main benefits to students as helping to create a collective class identity; facilitating group work (something students often request); allowing for multiple types of information submission including short entries and graphics; and letting quieter students participate fully in discussions.[158] Doug Achterman, writing in *Teacher and Librarian* magazine, identifies other advantages: wikis are easy to use, allow both individual and group work, facilitate creating non-linear documents, and built-in mechanisms for reflexivity and discussion.[159]

Social Bookmarking Tools

Social bookmarking tools like del.icio.us, digg.com, and reddit.com allow students and professors to identify, share, and comment on internet resources for course development, group projects, disciplinary knowledge or assignment help. For instance, Connotea is targeted towards researchers, clinicians and scientists, allowing people in different institutions to contribute to a collective resource. Alexander calls this *social filtering,* when "users contribute content to the work of others, leading to multiple-authored works, whose authorship grows over time."[160]

The educational benefits of social bookmarking are numerous. Abbit writes, "It is this unique connection of social interaction with a focus on sharing and collaboration towards a common goal among users with a shared interest that makes the social content strategy very appealing in an educational environment." [161] Social bookmarks can be used as *outboard memory*, to

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[155]   Mader, S. (2007). Course JS 53: The Beginning of Judaism. *Brown University Wiki.* https://wiki.brown.edu/confluence/display/Spring07JS0053S01/Home

[156]   Phillipson 2007.

[157]   Phillipson, M. & the students of English 242. (2005). *The Romantic Audience Project.* http://ssad.bowdoin.edu:8668/space/snipsnap-index

[158]   Phillipson, Mark & Hamilton, D. (2004), The Romantic Audience Project: A Wiki Experiment. *Romantic Circles*: Romantic Pedagogies Commons, December. http://www.rc.umd.edu/pedagogies/commons/innovations/rap/index.htm

[159]   Achterman, D. (2006). Beyond Wikipedia. *Teacher Librarian* 34(2):19-22.

[160]   Alexander 2008, p. 153.

[161]   Abbit, J. (2007). Exploring the Educational Possibilities for a User-Driven Social Content System in an Undergraduate Course. *MERLOT: Journal of Online Learning and Teaching*. 3(4).

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remember websites that otherwise would be forgotten among the "information overload" of modern research.[162]

At the College of William and Mary, government professor Ted Perlmutter had students find, share, and comment on readings about the politics of immigration, providing interesting, timely, and relevant class material, and a platform for meta-discussion.[163] Indications show that social bookmarking is an effective tool for such purposes. A pilot study at Miami University developed a social bookmarking tool to expose students to a broad variety of issues surrounding technology use in education. 88.6% of the students in the pilot project stated that the activity helped them to learn, 83.7% said that the tool helped them to find resources they could use in the future, and 93.2% "indicated that they found resources or information that they may not have otherwise found."[164]

Rather than using public systems, some institutions develop proprietary social bookmarking applications. The library at the University of Pennsylvania built the Penntags system, which allows all members of the Penn community to save resources that might be useful for their colleagues, such as journal articles, items in the Penn library system, and web sites.[165]

Disadvantages

Some disadvantages of deli.cio.us and similar tools is that they tend to be developed for a somewhat sophisticated audience, so students may not be familiar with their use. Furthermore, although the collectively developed "folksonomy" allows for unique tags like "Bio304" or "Professor Smith", it also makes organization more complicated than a traditional reading list or research guide. Finally, there are fewer home-grown social bookmarking systems, so faculty may have to use public, commercial tools, making it more difficult to distinguish class contributions from those of the public.

Multimedia (Audio / Video)

There are a wide variety of audio and visual applications related to Web 2.0, including podcasting (creating downloadable audio files, typically lectures, readings, and talk shows), online video sharing on sites like Google Video and YouTube, and photo-sharing on sites like Flickr and Photobucket. Interestingly, these tools seem to be used less by faculty and more by university administrators for public relations purposes (see next section). Perhaps this is due to the fact that wikis and blogs depend more on traditional classroom activities, like writing and evaluating content; multimedia content is also more difficult to create and assess. However, there are examples of innovative faculty members using multimedia Web 2.0 sites for a variety of educational purposes.

Photo Sharing

Classes devoted to art or design are leading the pack in utilizing such tools. A team of students in a Parsons class about everyday design studied bike messengers; part of the final class project was taking and displaying digital pictures of their technology use, bike customization, outfits, and practices. Markam Keith Adams, a photography professor at Rowan University, requires his students to use Flickr, MySpace or Facebook to post their assignments; they use the same tools to critique other students' work. Adams writes, "social networks [present] a

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[162]   Alexander 2008, p. 156.

[163]   Bryant, T. (2006). Social Software in Academia. *EDUCAUSE QUARTERLY* 2: 61-64.

[164]   Abbit 2007.

[165]   University of Pennsylvania (2005). *PennTags*. http://tags.library.upenn.edu/

unique opportunity for art faculty to incorporate existing technology that students are very familiar with and expand the boundaries of the traditional critique to a venue that students are more comfortable talking and writing in."[166]

Video

The most popular use of video sharing sites is to record and disseminate class lectures. Many universities post these on official sites like "iTunes U" (see next section), but many others independently post on popular sites like YouTube. These lectures are provided for students in the class who may miss a session, as well as distance learners and non-traditional learners or people outside the university system. For example, MIT's Open Courseware initiative provides videos of lectures, group projects, and demonstrations in addition to lecture notes and assignments. The project's goal is to "advance knowledge and educate students in science, technology, and other areas of scholarship to best serve the world."[167]

As a result of their public-ness, some of these lectures become internet sensations, such as Michael Wesch from Kansas University's Digital Ethnography project, whose video on Web 2.0, "The Machine Is Using Us" video has had more than six million views.[168] The video was created by Wesch and his students for a class on digital ethnography, and explains the transition from Web 1.0 to Web 2.0. It is an effective teaching tool and has publicized Wesch's research initiatives; he recently gave a lecture to the Library of Congress about YouTube content (the lecture is, of course, available on YouTube).

YouTube is an excellent source of example videos for classes, as it includes many public domain videos, commercials, media clips, presentations, instructional videos, and so forth. Professors at New York University's Department of Media, Culture and Communication use YouTube clips to teaching media history, showing examples of older television shows that are referenced in articles but that students may not have seen.[169]

There are many examples on video-sharing sites of videos created as class assignments. Many of these are quite funny, such as a video created for an Intro to Security Risk Analysis class at Penn State,[170] which utilizes parody, satire, humour, and references to current media. While video creation can be challenging, and requires expensive equipment and access to software that students may not be familiar with, it also allows students to play with the vocabulary of media, learn about presenting material in an engaging manner, and utilize different skill sets.

Podcasting

Podcasting is recorded audio material made available in .mp3 format, often through Apple's iTunes store. Students can set up their iPods to automatically download daily or weekly podcasts, so professors can use the system to deliver lecture or supplementary class content. A study by California Polytechnic State University found that students enjoyed podcasting for

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[166]   Adams, M.K. (2008). Exploiting Social Networks to Teach the Art of Critique. *The International Journal of the Arts in Society*, 2(5): 67-72.

[167]   Massachusetts Institute of Technology (2008a). *MIT Open Courseware.* http://ocw.mit.edu.

[168]   Wesch, M. (2008). Digital Ethnography at Kansas State University YouTube Channel. *YouTube.com*, http://www.youtube.com/user/mwesch

[169]   One concern with YouTube is that it often includes content that would not be considered suitable in an educational context; in response to this problem, the site TeacherTube has been created for educational videos only. However, these are often aimed at a secondary education audience and are not necessarily appropriate for university-level learners. See http://www.teachertube.com/

[170]   Toastfuzz. (2008). Identity Theft PSU Class Project. *YouTube.com,* April 24. http://www.youtube.com/watch?v=74k44ncmUEs

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several reasons. First, supplementary material (such as explanations of an assignment) could be provided via podcast, saving time during class sessions. Second, students appreciated the ability to listen to podcasts multiple times in order to clarify concepts or assignments. Third, students found that podcasts combated the "information overload" effect of students "tuning out" certain portions of class lectures. And finally, students became more comfortable and relaxed with class materials, decreasing anxiety.[171]

Social Networking Sites

Social Networking Sites (SNS) like Facebook and MySpace are among the most popular Web 2.0 applications found on college campuses; American students tend to be "Facebook addicts" and much of the social life of the university goes on through these mediated systems. (Facebook was designed by students at Harvard University for college students, and was originally restricted to individuals affiliated with a university; thus, its popularity on college campuses is unsurprising; many of the following examples refer to Facebook specifically.) The Horizon Report writes that "students are tremendously interested in social networking sites because of the community, the content, and the activities they can do there. They can share information about themselves, find out what their peers think about topics of interest to them, share music and playlists, and exchange messages with their friends."[172] It is this intense interest, rather than the features of the networks themselves, that is inspiring most educators to integrate SNS into their pedagogical practices.

The most mundane ways to use Facebook is as a sort of notification or announcement system. Professors are often surprised to find that their students rarely check email, using it only to stay in contact with bosses, parents, and instructors, while they typically check Facebook on a daily basis. As a result, class announcements are more likely to be seen if posted on Facebook.[173]

However, the strengths of SNS are not harnessed by such approaches; it is the maintenance of campus social ties, or the peer-to-peer aspect of SNS, that makes it uniquely positioned for active, participatory learning. Student-to-student interactions and exchanges can help students understand class topics, share assignments, organize study groups, and generally engage with the university. A study at Michigan State University found that almost half (49%) of students had used Facebook to organize a study group or class meeting, 53% to talk about class work and 34% reported using Facebook to collaborate on class assignments. Most students (69%) had used Facebook simply to ask another student about schoolwork or class procedures.[174] In addition to using SNS for pragmatic, class-related purposes, re-telling and sharing information can help students to remember and process information learned in class.[175] SNS may be more suited to this type of "informal" learning than as an additional publishing tool for syllabi and assignments.

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[171] Fose, L. and Mehl, M. (2007). Plugging into Student's Digital DNA: Five Myths Prohibiting Proper Podcasting Pedagogy in the New Classroom Domain. *MERLOT Journal of Online Teaching and Learning* 3(3):277-280.

[172] EDUCAUSE Learning Initiative and the New Media Consortium, 12.

[173] Salaway, Caruso, and Nelson. "Social Network Sites."

[174] Salaway, Caruso and Nelson. "Social Network Sites."

[175] Selwyn, N. (2007). 'Screw Blackboard… do it on Facebook!: an investigation of students' educational use of Facebook. Paper presented to the *Poke 1.0: Facebook Social Research Symposium*, University of London, November 15.

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Administrators

As mentioned previously, Web 2.0 technologies are often used by universities and colleges for public relations purposes. There is the potential for social media to recruit students by framing the institution as young, hip, and in-touch, or simply by providing in-depth information. However, these channels typically function solely as one-to-many information dissemination or publishing methods, providing larger potential audiences for university lectures, publicity materials, and student organizations. This type of top-down, controlled communication is distinct from the collaborative, participatory content produced by social media. For example, one would get a different impression of a university by browsing its Facebook profiles and student groups than it would from the official .edu site. There is little literature on administrative use of social media with the exception of libraries, who in many cases are at the forefront of technology adoption.

Admissions

Applying and getting accepted to college can be a very stressful experience for high school students. Admissions blogs provide a direct connection to the university, potentially humanizing a somewhat alienating process. Matt McGann, the associate director of admissions at MIT, told *The Guardian* that MIT's experience with blogs had been positive: "We've been able to show MIT as it really is, to give students insight into what life is like on campus. We've also been able to better counsel students about the admission process."[176] Admissions blogs are primarily informational; Harvard Law School's admissions blog gives advice to prospective students, interviews graduates, and updates potential students on their decision status.[177]

Administrators

Blogs can be a cost-effective public relations tactic to combat the image of college administrators as remote or uninterested in the concerns of students,. For instance, Dan Bernardo, the Dean of the Washington State University College of Agricultural, Human, and Natural Resource Sciences, writes that "Rather than adopting the rather mundane approach of having the static and typically uninformative administrator's page, I am attempting to join the 21st century and maintain my own blog. I hope to use this medium as another means of keeping the lines of communication open to our employees and the stakeholders of our college."[178] However, most of these blogs seem to be only marginally interesting, existing primarily as marketing tools rather than providing any additional value to students or faculty members.

Libraries

Many college libraries are utilizing new technologies to engage students with research. The New York University library system has a blog for each separate library, announcing new technologies, recommending books, and publishing photos of events.[179] NYU has recently

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[176]   Adenekan, S. (2007). MySpace: The final Frontier. *The Guardian UK*, April 27. http://www.guardian.co.uk/education/2007/apr/27/highereducation.accesstouniversity or http://tinyurl.com/5zxtqv

[177]   Stock, T. (2008). *Toby's Blog: The Official JD Admissions Blog at Harvard Law School*. http://blogs.law.harvard.edu/admissions/

[178]   Bernardo, D. (2008). *Dean Dan Bernardo's Blog.* http://cahnrs.wsu.edu/dan-blog/index.html

[179]   New York University Libraries. (2007). Bobst Library Blogs. *New York University Libraries.* http://library.nyu.edu/blogs

introduced the "Ask a Question" service, where students can text message (SMS) or IM reference or homework-related questions to an NYU librarian.[180]

A much better example of innovative use of Web 2.0 technologies is the library of small Harper College, in Illinois. Harper librarians used YouTube to publish a funny and educational tour of the library,[181] and created "vidcasts" (video podcasts) to explain particular library features, viewable online.[182] The library has a del.icio.us account where librarians share useful resources,[183] and a Flickr account where librarians posted home-made READ posters featuring members of the university community.[184]

Social Networking Sites

Orientation

Fred Stutzman, a researcher at the University of North Carolina at Chapel Hill, has conducted research on how incoming first-year students use Facebook. He found that 85-95% of new students signed up for the site and most of them use it frequently. He concluded, "Facebook is truly a killer app for incoming [students]—as they prepare to start a new life in a new place, surrounded by a new social network, the Facebook presents a highly interactive way to explore this new space."[185] As a result, many universities are using pre-existing SNS to orient new students to university life and facilitate social connections, helping students to identify potential friends and learn the names of their new classmates.

For example, the University of Pennsylvania launched Pennster, a home-grown social networking tool that gives "incoming first-year students the opportunity to meet each other and begin forming friendships before arriving on campus" by allowing students to browse the profiles of other incoming first-years and connect with each other (the group is private and closed to non-first years). The homepage for Pennster also encourages incoming first-year students to join the official Facebook group for their class (the "Official UPenn Class of 2010 Group"). This group contains links to useful URLs, orientation information, groups for each dormitory and links to other incoming students. This seems to be quite successful, as the group has several thousand members. U Penn's strategy to utilize an already in-use SNS rather than create a new one from scratch helps incoming students transition into their new social networks.

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[180]   New York University Libraries. (2008). Ask a Librarian. *New York University Libraries*, April. http://library.nyu.edu/ask/

[181]   Harper College Library. (2007). Tour the Library. *YouTube.com.* http://www.youtube.com/watch?v=JHljR4LYmOA

[182]   Harper College Library. (2008). Harper Library Tutorial Vodcasts. *Harper College Library.* http://www.harperdoit.net/Library/

[183]   Harper College Library. (2008). *Harper College Library: Our Mission is Your Success.* http://harperlibrary.wordpress.com/

[184]   Webjunction Illinois. (2008). Library Spotlight: Harper College Library. http://il.webjunction.org/171/articles/content/451393; The "READ" program for public libraries features celebrities like Michael Jordan talking about their favorite book and encouraging children to read.

[185]   Stutzman, F. (2006). Adopting the Facebook: A Comparative Analysis, 2. http://www.ibiblio.org/fred/pubs/stutzman_wp5.pdf

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Promotion

Many colleges and universities have official MySpace profiles.[186] These tend to be smaller, more local colleges trying to attract students by using social tools. For example, Allegheny College created its own MySpace page to encourage connections and interactions,[187] as did Oklahoma City University.[188] Students can "friend" these profiles to claim affiliation with the school, but other than that they have little educational value and function solely as advertising.

Facebook Applications

Much like educators, administrators recognize the value of harnessing SNS enthusiasm for college-related purposes. A software company called Inigral is working on a Facebook application called "Schools," which integrates Facebook functionality with private data provided by a university's registrar. This allows students to publish and view their schedules and their friends' schedules, identifying people who share their classes and viewing information for their sections. Students can also list their organizations, dorms, majors, and student organizations.[189]

However, this information is mostly used for social interactions rather than "official" announcements. As founder Michael Staton explains, "Through testing an earlier version of our tool, Courses, we learned that students are not very interested in assignments and documents; they are much more interested in sharing and viewing information that helps them start or maintain a relationship with a classmate or friend, and a lot of that information is about school. We set aside our earlier project, Courses, and rebuilt it as Schools, which emphasizes features that support relationship building and information sharing in the academic context." [190]

Multimedia

iTunes

Web 2.0 multimedia can function as advertisements for schools. One of the most popular applications is Apple's iTunes U, which allows universities to publish audio and video content through the Apple Store integrated into iTunes.[191] Apple has strongly promoted the service to university administrators, claiming that it is easy to use and utilizes technology that students are already familiar with (Arizona State University technology administrator Dr. Adrian Sannier is quoted in Apple's publicity materials: "When we saw how many of our students already had MP3 players, and that the majority were iPods, it was a simple choice for us"). Hundreds of American colleges use iTunes U; however, it locks in the student body to a proprietary technology format, which is problematic if it is a requirement for students to keep up with podcasts or vidcasts for class.

Wellesley College in Wellesley, MA promotes their iTunes U through alumna newsletters and online publicity materials. Lectures by well-known professors and campus visitors, along with

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[186] For a fairly comprehensive list, see http://www.myspace.com/collegesanduniversities.

[187] Allegheny College. (2008). Allegheny College MySpace Profile. *Myspace.com.* www.myspace.com/alleghenycollege

[188] Oklahoma City University (2008). Oklahoma City University MySpace Profile. *MySpace.com.* http://www.myspace.com/oklahomacityuniversity

[189] It is interesting to note that much of this functionality existed in earlier versions of Facebook that were only open to students, and has been abandoned as the SNS was opened up to other user groups.

[190] Salway, Caruso and Nelson. "Social Network Sites."

[191] Apple, Inc. (2008). ITunes U and Mobile Learning. http://www.apple.com/education/itunesu_mobilelearning/itunesu.html

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guided tours of the university museum and grounds, are available directly from the itunes.wellesley.edu site, as well as through the iTunes store.[192]

YouTube

YouTube also provides space for colleges and universities to publish videos. Carnegie Mellon University (CMU) has a YouTube channel that includes tours, lectures, and campus visits by luminaries like Barack Obama and Bill Gates, as well as links to student videos.[193] This appears to be primarily a promotional channel managed by official university personnel; although the university invites current CMU students to submit videos, it is not particularly interactive. The Carnegie Mellon Robotics Institute also has a YouTube channel that features videos of current projects that seem to be integrated into the larger robotics community.[194]

Conclusion

American colleges and university systems are home to many of the leading innovative uses of Web 2.0. However, most of these are not implemented in any sort of systematic way and, indeed, may be incompatible with the large-scale information technologies present on campuses. Furthermore, current systems of assessment and faculty evaluation may actively discourse the sort of creative experimentation that characterizes cutting-edge use of Web 2.0.

However, American students are heavy users of popular social media technologies, and the behaviours that they support (community, interaction, co-presence, co-production of knowledge, creativity) will affect the way that these students see the world, view themselves as individuals, and relate to classroom material. This energy should be harnessed by educators to encourage active learning and comfort with computers and new media. Furthermore, critical thinking about online sources, or digital literacy, is a necessary skill for work and life in modern America. In order to fully educate young Americans for the 21st century media landscape, colleges and universities must overcome institutional inertia and begin to evaluate how the university curriculum can best utilize such modern tools.

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[194] Carnegie Mellon Robotics Institute. (2008). Carnegie Mellon Robotics Institute YouTube Channel. *YouTube.com.* http://www.youtube.com/user/cmurobotics

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Web 2.0 in Higher Education in the United Kingdom:

Observations on the growth of Web 2.0 and social Web technologies from a JISC-funded national adviser

Brian Kelly, UKOLN, University of Bath

Acknowledgements

Approach Taken in This Report

The approach taken is to document the author's personal experiences and reflections on the growth of use of Web 2.0 across the UK's higher education sector.

The report provides **descriptive** information on use of social Web technologies within the UK's higher education community.

The report provides **strategic** information which attempts to describe the rationale for use of the various types of social Web technologies covered and reflect on the organisational implications of further deployment of such technologies.

The report provides an **analysis** of the use of social Web technologies by providing documented evidence from feedback which has been obtained on use of the social Web technologies and by collating comments and discussions from those actively involved in provision and use of such technologies.

Initial Institutional Awareness of "Web 2.0"

2004

Early indications of an awareness at senior levels of a move from the Web providing a one-way publication mechanism for institutions can be identified in March 2004 when the author gave a talk on "*What Can Internet Technologies Offer?*" [1] at the UCISA Management Conference. This was an invited presentation which was delivered to over 300 participants at the annual UCISA event, aimed at senior managers in IT Service departments. Looking back at the slides it is interesting to note references to blogs, wikis and social networking services.

Further dissemination work was carried out during 2004, which led to a one-day event on "Beyond Email: Strategies for Collaborative Working and Learning in the 21st Century" [2]. This event provided an opportunity for IT Service staff to debate policy issues on the provision and support of technologies including blogs, wiki and instant messages services.

2005

Despite the high profile national events which were organised in 2004, 2005 saw little significant activities - perhaps this was a reflection of the slow take-up which can occur after an initial flurry of activity by early adopters, as characterised by the Garner hype curve.

One noteworthy exception was the talk on "*Using Networked Technologies To Support Conferences*" [3] given at the EUNIS 2005 conference. This paper described the potential of collaborative Web technologies to be used at conferences and other events held in venues which provided WiFi access. The paper described various early experiments in use of technologies to encourage online discussions and debate at events as well as the potential of technologies such as Skype to allow remote participants to take part. The paper acknowledged the potential associated dangers and argued that an Acceptable Use Policy should be developed when WiFi networks are provided at events.

Web 2.0 Becomes Mainstream

2006

Web 2.0 made its impact on the UK HE's Web and development communities during 2006. The high level of interest can be gauged by the popularity of a talk on "*Web Futures: Implications For HE*" held at King's College London in January 2006 [4]. Over 130 people from 13 institutions attended this presentation which covered many of the topics which had initially been raised in talks given in 2004 and 2005. This talk marked the start of a series of talks given at various events throughout the country which highlighted the potential benefits of what was now being referred to as 'Web 2.0'.

In addition to raising awareness of Web 2.0 technologies and approaches, work also began in 2006 on identifying barriers to the effective use of Web 2.0 and in exploiting approaches to addressing such barriers. A joint UKOLN/CETIS UCISA 1-day workshop on "Initiatives & Innovation: Managing Disruptive Technologies" [5] providing an opportunity for participants to discuss the management challenges posed by Web 2.0, including the management challenges, technical challenges, user and cultural issues. A record of these discussions is available [6].

By the time UKOLN held its annual Institutional Web Management Workshop (IWMW 2006) at the University of Bath on 14-16th June 2006 [7] the Web management and Web development communities within UK HEIs were very much aware that Web 2.0 could have a role to play to support teaching and learning, research and support activities within the institutions. The institutions were now having to address the issues of identifying and overcoming barriers in order to embed Web 2.0 services within mainstream institutional activities.

Early Institutional Adopters

University of Wales, Newport

The University of Wales, Newport were one of the first UK HEIs to develop an institutional strategy for Web 2.0. Michael Webb, IT and Media Services Head, University of Wales, Newport gave a talk on "*Developing a Web 2.0 Strategy*" at the IWMW 2006 - and note that not only his slides but also a video of his talk are available in the IWMW 2006 Web site [8]. His talk described the strategic decisions which led to the establishment of the My Learning Essentials portal. The challenges was to respond to the institution's top strategic aim of "*provid[ing] the highest quality student experience possible as the highest priority for the University of Wales, Newport*" in the context of the institution's IT strategy. It was recognised that:

> "Web 2.0 technologies could play an important role in supporting the University's main strategic aim (i.e. contribute to the overall student experience, not just improve teaching)."

This led to two important updates to the institutions IT strategy:

- A decision to "support existing (or emerging) Web 2.0 technologies such as Blogs, Wikis etc."

- A decision to "become an adaptive, agile service, and quickly support new technologies."

Since this institutional Web 2.0 strategy was implemented Newport have deployed a blogging service for its students [9] and, more recently, established a social networking environment for the student community [10].

University of Warwick

The University of Warwick student blog service [11] was launched in October 2004. The service, which was the first institutional blogging service provided by a UK HEI was featured in an article in the Guardian newspaper in May 2005 [12].

The idea behind the service was "self-publishing for all". In the Guardian article John Dale, head of IT services at the University of Warwick, explained that "*the hope is that once students start blogging it could build a community, foster collaboration and perhaps help with the personal development planning that students and tutors have to work on*".

The current (1 Aug 2008) statistics for the Warwick blogs service suggest that the University achieved its community-building goal with 5,235 blogs, 10,8461 posts and 192,195 comments – the ratio of about 19 comments per entry seem to indicate that the blog service functions as an active community for discussions, although with an average of about 2 posts per blog it would seem that many of the blogs are not being used.

University of Edinburgh

The University of Edinburgh organised a Star-gazing conference on "*Social technologies: from pioneers to mainstream use?*" which was held at the University of Edinburgh in November 2006 [13].

This event attracted over 100 participants from across the University who heard about some of the innovative Web 2.0 projects which were taking place within the University and then how students were making use of Web 2.0 and social Web technologies. The event also addressed the various challenges, including the legal risks and the dangers of relying of third party services.

Notes of the issues which were raised at the event are available on the event wiki [14]. These are summarised below:

- Social technologies are making teachers re-think their role.

- Online learning is becoming more participative than receptive, more collaborative than content based. Mobile technologies are increasingly important.

- Students use social networking tools all the time, sharing surprisingly personal information.

- Not all students use social collaboration software.

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- If legal aspects are considered at the start of any project, the law can be made to work with you. The law is there to facilitate, not to penalise. Creative Commons provides a legal framework, and the Acceptable Use Policy needs to be appropriate.

- The risks of doing nothing are higher than the risk of doing something. Universities typically take too long to adopt new technologies. Institutional inertia can be a significant barrier to adoption of Web 2.0 technologies.

- Institutional concerns such as quality control, appropriate content, data protection, policing, administration, controlling containing, partitioning are all against the spirit of Web 2.0. Web 2.0 is all about filtering and feeding by users of large quantities of user-generated data.

- Is it still appropriate for the University to provide services (eg email, diary) using the traditional approach of selection, support, maintenance, by central services?

- For students, commercial tools are sometimes better than University-provided tools (eg the university email system gives them very little storage space, and they can't keep the same email once they've left the university). Should the university use commercial tools, with a University branding (Google offers this…), ie decouple provision from branding?

- A change in culture is needed. Acceptable Use Policies need to be reviewed. More sophisticated models are needed for standards, accessibility, open source. The process for developing AUPs needed to be reviewed, to ensure there are mechanisms to enable users to contribute to the discussion process.

- HE as a whole is ahead of other sectors, eg museums, and reports from other HEIs may be misleading since only innovation is reported. The University of Edinburgh is large and therefore contains pockets of innovation; smaller HEIs don't have pockets of innovations. The University needs to tease out the expertise; together with the mistakes - eg if a website is turned into a porn webcam overnight, reflect on the experience. The stargazing group should emphasize that things go wrong but we can learn from the mistakes to build robust resilient services, rather than say I told you so. We need to encourage the innovators to share including their mistakes.

- Do websites need quality content, or should they provide a quality experience? What would be the difference? Would provision of a blog for each student improve their experience? Would this affect their emotional attachment to the University?

- Numerical models can be expressed using XML, rather than hard-coded as Fortran or other programming language. Models expressed as XML can then be shared using Web 2.0 tools such as Connotea.

- In future it may not be either possible or desirable to nominate a single tool as the institution's VLE. It is more likely that a mix of tools will be available, each chosen for its own qualities rather than because it's part of a larger tool.

One point which is worth highlighting is:

> The risks of doing nothing are higher than the risk of doing something. Universities typically take too long to adopt new technologies. Institutional inertia can be a significant barrier to adoption of Web 2.0 technologies.

Sector Wide Interest

The pioneering institutions which were beginning to explore the enterprise-wide use of various Web 2.0 technologies began to generate interest more widely across the sector, especially within the departments with responsibilities for the provision and support of technologies across the institution, including IT Service department and e-learning support units.

Exploiting The Potential Of Wikis Workshop, 2006

Such interests led to UKOLN hosting a one-day workshop on "*Exploiting The Potential Of Wikis*" which was held in Birmingham on 3rd November 2006 [15]. The workshop provided an opportunity for discussions on the user requirements for wikis followed by discussions on the strategies for addressing the requirements. A wiki was used to keep notes from the discussion groups [16].

One of the discussion groups [17] produced a table outlining the pros and cons of different approaches to the provision of institutional wiki services.

Approaches	Pros	Cons
1. A **large-scale enterprise** Wiki service for use within your institution	- cf. Phil's ease of editing - everyone having shared experience - no re-learning - stability maintained - editorial control - authentication	- choosing: could be too soon - the choice is critical - retraining postgraduate people (but transferring should be easy) - insular
2. A distributed and decentralised approach, in which departments, ad hoc groups, individuals, etc. may **choose their own** preferred Wiki tools, which could be installed locally or use of free or licensed externally-hosted services.	- each discipline can choose its own tool (eg chemistry molecules) - departments don't like being told what to do so they can have ownership - cross faculty: could be either pro or con - have two different wikis to learn - consistency for students	- support and **maintenance**: multiplied by the variety of systems - but also other software implications (eg Java etc) **security** - cross faculty: could be either pro or con - have two different wikis to learn *in*consistency for students
3. Use of Wiki functionality **provided in other enterprise tools**, such as VLEs, Blogs, etc.	**familiar** with the environment - authentication: don't need extra password - closed environment space for student activities, including assessment - easy to integrate with existing systems	- pale imitation - they could charge more

	- can be developed organically based on feedback - 'one stop shop' - need to make things easy	
4. **In-house development** of a Wiki service.	- get what you want? - if you know what you want, then OK! - institutional buy-in: the people within use "their" product - collaboration between establishments - complex model of reward for those directly involved	- **expensive** - long time to develop - need **proper** analysis of requirements - "a decision has been made" - "I don't want to know" - the one person who know all about it leaves the institution!
5. **Doing nothing**, either because effort is limited and prioritisation is given to other areas or a view that Wikis are of marginal relevance to the institution.	- subversive: individual will adopt something - do I need one? - Is it just a trend? - will students use it? - do they care	- possible embarrassment? - institution being behind the times - not providing a service

Table 12: Report from Discussion Group B3 on "Wiki Strategies to Support the Needs of Disparate Groups the Institution"

This table provides valuable evidence of the issues which those involved in the provision of wiki services were considering in November 2006.

Exploiting The Potential Of Blogs and Social Networks Workshop, 2007

The wiki event was followed a year later with a similar one-day workshop on *Exploiting The Potential Of Blogs and Social Networks*" which was held in Birmingham on 26th November 2007 [18].

Again the event provided an opportunity for participants to hear about approaches being taken by early adopters of blogs and social networking services which then informed the subsequent discussions.

Notes taken from two of the discussion groups are given in Annex 1. These notes illustrate the issues and concerns which were being considered in late 2007.

Institutional Exploitation Of Social Networks

IWMW 2007

By 2007 we were beginning to see an increasing number of institutions making use of Social Web services.

Edge Hill University was one of the first HEIs to exploit social networking services such as Facebook and to have a high profile in describing the activities and how the institution was

making use of these services in order to both promote a new higher educational institution and to be seen to be pro-actively engaging with new and existing students.

Alison Wildish, then head of the Web Services team at Edge Hill University gave a plenary talk on "*Let the Students do the Talking...*" at UKOLN's IWMW 2007 event at the University of York in July 2007 [19]. The talk was the highlight of the event, judging from the feedback the event organisers received. A year later the IWMW organisers received this unsolicited email which demonstrated how the approaches by one of the sector's early adopters was becoming accepted more widely across the sector:

> After the IWMW 2007 in York, I returned to Canterbury buzzing with ideas triggered by the whole conference, but in particular by Alison Wildish's talk about Edge Hill University. I was able to build on her experiences and the conference's status to prepare several presentations and case studies for the development of an online student portal.

At the same IWMW 2007 Peter Reader, then head of marketing at the University of Bath, gave a talk on "*Marketing Man takes off his Tie: Customers, Communities and Communication*" [20]. Peter's talk complemented Alison's with both talks demonstrating that institutional marketing and communications departments were willing to engage with use of third party social networking services in order to reach out to potential new students and existing students.

Institutional Uses of Facebook, YouTube and Twitter

On 7th November 2007 Facebook announced that organisations could create pages on Facebook, which had previously been restricted to individuals. Two days later a blog post [21] gave details of institutional presence on Facebook by the early adopters in the UK HE sector. These were, in alphabetical order, Aston, Cardiff, Kent and the University of Central Lancashire (UCLan).

On 16th June 2008 another survey of UK HEIs organisational pages on Facebook was carried out [22]. Due to the large numbers of universities on Facebook it wasn't possible to provide complete details. Instead details of UK HEIs with the largest number of 'fans' were listed. The Open University Facebook page is the top of all University pages, with 7,539 fans (with the University of Michigan way behind in second place with 5,313 fans. The other most popular UK Universities are Aston University (2,976 fans), Royal Holloway (1,765), Aberystwyth University (1,655 fans), University of Central Lancashire (1,475 fans), Keele University (1,420 fans), Cardiff University (1,357 fans) and the University of Surrey (1,166 fans).

Facebook, it seems, is becoming a mainstream service for use by institutions.

The Open University's Portfolio of Web 2.0 Services

As described on the Open University's **use** page [23] the Open University (OU) is making use of a number of externally-hosted Web 2.0 services. The OU was one of the first UK universities to make its podcasts available for free on **iTunes U**, and was also one of the first to have a dedicated institutional page on **YouTube**. The OU is also an early adopter of institutional use of the Twitter micro-blogging application.

As described above, the OU's **Facebook** page not only has the largest number of fans of any university, but they have developed a number of Facebook applications:

> *Course Profiles* allows OU students to show others what courses they have studied (and hope to study in the future). Based on this info the application enables the student to create relationships with other OU students, leave course

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reviews, access free course-related content, and suggests possible future courses based on others who have studied similar things to the student.

My OU Story allows OU students to publish their thoughts as they progress through a course. The students can assign an emotional status to each story and then see how their mood has changed throughout their academic journey. The students can see other people's stories and leave them messages; providing a means of meeting new people, offering support and sharing stories.

Further information about the Open University's use of Web 2.0 services is available on the UK Web Focus blog [24].

Provision of Institutional Social Web Services

In-house Services

The Elgg software provides an alternative approach to the provision of social networking environment. This open source software has been developed to provide a social networking environment for use primarily in an e-learning content. The software can be installed locally to provide a locally managed environment. In addition an externally-hosted use of the Elgg software has been provided by the Eduspaces.net service, although the ownership and long term stability of this service was under question following the announcement of the closure of the service in December 2007.

Two of the best known examples of use of the Elgg software to provide an in-house social networking environment can be found at the University of Brighton and the University of Leeds. The Community@Brighton (http://community.brighton.ac.uk/) service was shortlisted for the JISC Outstanding ICT Initiative of the Year Award in 2007.

Externally-Hosted Services

Externally-hosted social networking software provides an alternative approach to the installation of software in-house. The Ning social networking software is being used at the University of Bradford and the University of Wales, Newport.

As described in a talk given at the IWMW 2008 event [25] the University of Bradford launched their DevelopMe service in June 2007. In 2008 its role will be extended to support the University's Clearing campaign and to support arrived students who will be arriving at the start of the 2008-09 academic year.

The Newspace Ning service at the University of Wales, Newport was developed to fulfil a requirement to "*create a social place for students coming to the University to meet online before they join the University, and to be able to contact the student mentors*" [26]. Faced with the alternatives of developing a service in-house, exploiting an existing service such as Facebook or making use of "*one of the new wave of 'create your own' social network sites, like Ning*" it was felt that:

> After about 10 minutes playing with Ning it was pretty apparent that it would do the job, and we could get the site up and running, customised etc, in a very short amount time. In particular, it was great for showing people's photos and profiles, we could add our own profile questions (what course, interested etc), users could create their own groups, own events and so on, so take ownership.

Further considerations were given to issues such as the terms and conditions governing use of the Ning service, the lack of single-sign-on to the service, the costs of use of the service and the

implications of the advertisements it uses. However none of these issues was felt to provide a significant barrier to the institution,

Amplified Conferences

The Term

The term 'amplified conference' was coined by Lorcan Dempsey to describe "*how more conferences are amplifying their effect through a variety of network tools and collateral communications*" [27]. Amplified conferences may be regarded as an application of Web 2.0 technologies within a particular context – and a context which is very relevant to higher education.

An early example of how use of WiFi networks can enrich a conference was described by Paul Shabajee in an article entitled "*'Hot' or Not? Welcome to real-time peer review*" published in the Times Higher Education Supplement in August 2003 [28]. As the article describes:

> The keynote speaker was clear. He informed his audience during May's World Wide Web conference in Budapest that none other than Tim Berners-Lee, the father of the web, had first referred to embedded menus as hot links. A few minutes later, while the speaker was still in full flow, delegates around the hall learnt that this was not the case, at least as Berners-Lee himself remembers it. He had joined the electronic discussion that was accompanying the lecture and in a brief message read by those in the hall who had joined the internet relay chat channel, he stated: "I didn't call them 'hot'. I just called them links."

The article goes on to mentioned some of the potential pitfalls in making use of mobile devices at conferences including the distraction which use of noisy devices make cause and the risks of exclusion, as well as the concerns that such devices may be used simply to read email.

UKOLN's Experiences

UKOLN's first event which made pro-active use of the venue's WiFi network was IWMW 2005. This event was noteworthy as discussions on the IRC channel alerted the small numbers of participants who had brought along and were using a laptop to the breaking news of the London terrorist bombing which took place on 7/7. However this could not really be described as an amplified event, as the networked technologies were only being used by participants at the event.

UKOLN's amplified event in which plenary talks were accessible beyond the conference venue was IWMW 2006. This event provided an opportunity for experimentation with an in-house streaming service and use of the Access Grid. The following year live streaming of the plenary talks was provided by staff at the University of York and recordings of most of the talks were subsequently made available on Google Video. The video streams of the plenary talks were complemented by a real time chat facility which enabled the local and remote participants to discuss the plenary talks. On both occasions an Acceptable Use Policy (AUP) was provided which covered use of networked applications at the events [29] [30].

Although the numbers viewing the streaming video of the speakers at IWMW 2006 and IWMW 2007 was low (a maximum of fewer than 20 remote participants viewing the video stream at each event) the provision of a live video feed provided an opportunity to gain an understanding of how the speakers would feel about being broadcast to a live audience. We ensured that the speakers were notified that a live video service would be available at the event and asked for permission for their talk to be broadcast. We also informed the speakers that we intended to

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subsequently make a recording of their talk freely available on the Web. We did, however, make it clear that if the speakers had the right to request that their talk would not be uploaded to a public Web site. We found that the speakers were willing to be broadcast live and none of the speakers raised any objections to a recording of the talks being made available after the event.

Integrating Use Generated Content

We have seen how an organisation can seek to amplify discussions at an event through the provision of video streams of talks and the provision of a 'back channel to support discussions. But in addition to these approaches which can be taken by organisers of an event we are also seeing user-generated content being provided to support events. The obvious example of this is the sharing of photographs on services such as Flickr. The increasing usage of such services reflects the growing numbers of people who use digital cameras (or other devices which take digital photographs such as mobile phones). It is interesting to observe the steady growth in the numbers of photographs stored on Flickr for the IWMW event from 2005-2008. The following tables gives the number of photographs with the tag 'iwmw2005', 'iwmw2006', 'iwmw2007' and 'iwmw2008'.

Year	2005	2006	2007	2008
No. of Photos	10	326	430	766

Table 13: Numbers of Photographs on Flickr with an "iwmw200n" tag

We are not yet, however, seeing any usage of user generated videos or audio recordings being taken. However with the increasing numbers of consumer products being sold which provide the capabilities to record sound and video and upload the data to networked services we may start to see an increase in the volume of user-generated multimedia content taken at events.

Storing resources in a well-known and popular centralised service such as Flickr has benefits in making it relatively easy to find relevant resources. However there will be other occasions in which distributed services may be used to enhance the amplification of events. One clear example of this are blog posts related to an event, in which regular bloggers will make use of their own blog to communicate their thoughts on an event. As well as conventional blogs the use of micro-blogging tools such as Twitter will result in a fragmentation of discussions about events.

Many such services, however, allow users to assign tags to their posts or their resources. We are seeing services being developed which allow content which allows content to be searched for or aggregated based on common tags. The Technorati service enables users to search for content using a particular tag whilst Twitter posts can be aggregated by services such as Hashtags and Twemes.

In order for user-generated content related to events to be easily found and aggregated there will be a need for the content to be tagged consistently. We are now starting to see event organisers providing recommendations for tags for events. As shown in Table 1, UKOLN has recommended tags of the form 'iwmw*yyyy*' since 2005. For annual events a short form of the event followed by a year string provide an obvious form for recommended tags. However, as described in a blog post on the eFoundations blog [31] there is not necessarily universal agreement on the relative merits of brevity in tags versus scalability in the naming scheme.

Sustainable Approaches

There will be a need to establish the business case for providing amplified events, ensuring the services are usable and used and to manage the risks.

The business case is interesting. Who should pay for the costs of providing a video streaming service for an event? Should the costs be taken from the participants who attend the event? Or should remote viewers who wish to access the video stream have to pay? Or perhaps event organisers should be looking for commercial sponsorship to cover the costs (although in light of the current economic turbulence, now is probably not a good time to suggest this). I wonder, though, whether the costs be covered by the host institution. Once the AV equipment has been installed, can the support costs be included in the rental of the facilities - just as we are now starting to expect access to WiFi network being provided as standard.

Once the business case has been sorted, there will be a need to ensure that the service is easy to use. Nowadays users shouldn't need to concern themselves with details of the technologies, as use of Flash seems to provide the interface to streaming services (although there may be issues about versions of Flash). However I suspect there will be a need to provide a back channel, to enable the remote participants to discuss the talks. There will also be a need for the remote participants to join in discussions with the local audience, especially if a WiFi network is available. There will be a need, therefore, to ensure that the back channel is not tightly coupled to the video streaming service.

Finally there will be a need to address the risks. This will include addressing issues such as privacy, copyright and data protection. In addition there will be a need to consider the quality of service and reliability of the streaming service, especially if the costs in providing the service have been made transparent.

Justifications For Amplified Events

The early uses of amplified conferences have been at events which have an IT focus and appeal to the early adopters and enthusiasts. There is a question as to whether the approaches are likely to be adopted outside this small context, whether the approaches are scalable and sustainable and how criticisms and perhaps the inevitable backlash should be addressed.

There are a number of reasons why we might find that amplified conferences become more popular outside the Web 2.0 and Blogging communities. The green dimension is starting to cause institutions and individuals to question the merits of travelling to events. With the growth in provision of WiFi networks at many venues and the potential for use of 3G telephone networks for data transfer we may start to see an expectation that the benefits of conferences are not restricted to those who are physically present.

We may also see pressure from students themselves. Students are now arriving with laptops and other mobile devices and may wish to make use of them in lectures, initially for note-taking, but with access to networked services available from such devices we may see such use being driven by the student community.

Such uses may, of course, also enhance the accessibility of lectures. We may find that there are legal or ethical reasons to encourage use of amplified lectures: for example, the student who is in a wheelchair or who finds it difficult to travel could benefit if the lectures were being recorded or broadcast. And such benefits need not apply only to users with disabilities – at the Accessibility Summit II organised by JISC TechDis and UKOLN and held in York in November 2006 one of the participants failed to attend due to train cancellations in travelling from Southampton. However as the participant had a Skype account she was able to travel to her office and use Skype to participate remotely in the meeting.

Addressing The Challenges

Privacy Issues

In November 2007 Andy Powell on the eFoundations blog announced [32] the availability of a multimedia presentation based on photographs taken at the JISC CETIS 2007 conference:

> A short 'video' blog of day one of the JISC CETIS conference, using the photos I took during the opening plenaries in the morning and the MUVE session after lunch, peppered with words and phrases that I noted popping up...

The post, however, went on to add that:

> Video link removed temporarily. A delegate asked me not to make their photo available on the Web and I have no sure way of knowing yet whether their image was in one or more of the audience shots that I used in the video. I've therefore taken it down again. Apologies to all concerned.

This incident highlighted one of the dangers of the exploitation of Web 2.0 technologies at events: user concerns over privacy and confidentiality. On this occasion Andy Powell was able to delete the resource and recreate an alternative one. But what if deleting the resource required the write-off of significant time and effort taken in creating the resource?

The simple answer may be to suggest that participants should give their permission. But then we need to ask how the permission should be granted, what happens if people wish to change their mind and how the use of technologies such as photographing, videoing, recording and broadcasting at events should be handled.

The approach which UKOLN has sought to take at its IWMW event has been to seek permission from the speakers well in advance of their talk, and to ensure that they are not forced into agreement. At the event itself the session chair is expected to publicly state that permission for recording the talk has been given. And after the event the speaker is able to request that a recording of their talk in not made publicly available.

At the IWMW event a poster was attached to the speaker's lectern which contained a Creative Commons licence so that the rights clearance for the talk was apparent on the video of the talk (a poster stating that permission to record the talk was not granted was also available).

Rudeness and Distraction

Are use of laptops at events distracting to other participants? Is their use rude? As described in a blog post by Martin Weller [33] "*My colleague Doug Clow was live-blogging the sessions he was in [but] was told by three different people in separate sessions to stop as his typing was off-putting.*"

A discussion on this issue took place on the UK Web Focus blog in response to a post on "*How Rude! Use Of WiFi Networks At Conferences*" [34]. The post included feedback on use of networked applications at the IWMW 2005 event which is illustrated in the accompanying image..

the folowing is a quick demo of using progrssive enhancement to generate charts on the fly from tabular data, using data "borrowed" from How Rude! Use Of WiFi Networks At Conferences.

Q1: I found use of the networked applications enriched the event
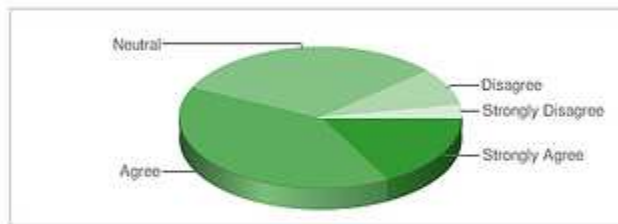
Q2: I found use of the networked applications distracting or disruptive to the event
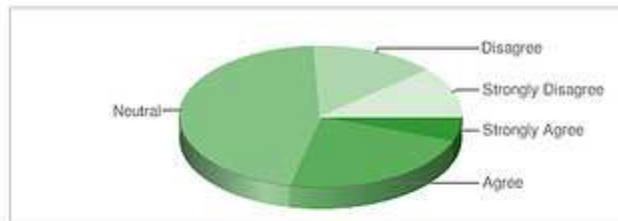
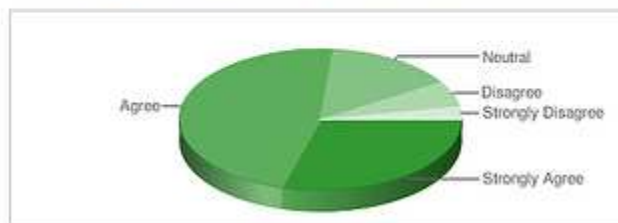Q3: I would encourage use of networked applications at future events

Figure 3:Attitudes to use of networked computers at conferences

There are clearly potential tensions between users who will have expectations of their entitlement to make use of their mobile devices at events and those (including possibly speakers) who feel that such usage is rude and potentially disruptive and distracting. There will be a need to be aware of such tensions and to seek ways in which such issues can be best addressed.

Accessibility and Social Inclusion

Stuff to be added on how the social web can embrace a widening participation agenda and provide a diversity of experiences for the learner. Such diversity can include addressing accessibility issues. This can also include student-owned devices.

Concerns that Web 2.0 services have flashy interfaces which break Web accessibility guidelines, and may act as barriers to people with disabilities.

Although may break WCAG guidelines, social Web technologies can also support a diversity of user experiences, rather than imposing a single view, which is the norm with traditional VLEs .

Can also allow learning to take place in the work place cf Stuart Smith's delivery of learning to trainee hairdressers using mobile phone technologies.

From this point of view the emphasis is not on use of e-learning resources which are universally accessibly to all but supporting a diversity of resources and a diversity of access mechanisms which enable the aims of the service (e.g. the learning objectives) to be accessible and usable for the user's preferred environment,

Preservation and Web 2.0

The use of externally hosted Web 2.0 services may give rise to concerns regarding the preservation of the resources created within the social Web environments, comments and annotations on such resources and, user information and, indeed, the long term sustainability of the services themselves.

These are all legitimate concerns and institutions - and indeed individuals - should ensure that they are aware of such issues in their risk assessment and risk management approaches covering use of such services.

However it should also be remembered that institutional services – and indeed JISC-funded services – are not necessarily themselves sustainable in the long term. An example of that can be seen in the recent demise of the AHDS service following changes in policy by the AHRB, one of the co-funders of the service.

One approach which can be taken to exploiting the benefits of social Web services which can help to minimise the risks of data loss is to ensure that the underlying data is being held in a managed environment, with the social Web service providing access to the resources and discussions about the resources. An example of this may be using the Slideshare repository of MS PowerPoint slides, which can enhance access to the slides, allow the resources to be embedded elsewhere and provide an environment to discuss the resource, while providing links to the master copy which could be managed within an institutional repository service.

Cite Chris Rusbridge's blog post: "Digital Preservation" term considered harmful? http://digitalcuration.blogspot.com/2008/07/digital-preservation-term-considered.html or http://tinyurl.com/6juhfm

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Annex 1

The following notes are taken from the report for discussion group 4 on Providing Managed Services at the UKOLN Workshop on "*Exploiting The Potential Of Blogs and Social Networks*" [18]

Discussion Group 4 on Providing Managed Services

1 Possible Concerns Of The Institution (1)

What concerns may the institution have when considering developing or deploying in-house blogs and social networking services?

- Academic literacy
- Need staff involvement
- Are rules and regulations fit for purpose - should we worry? Walk through some cases and see if rules fit. If not change them. Use examples.
- Why would students use in house social networking - when they have their own.
- Might be more successful for academic than for social networking
- How learning skills are developed.

2 Possible Concerns Of The Institution (2)

What concerns may the institution have when considering making use of externally-hosted blogs and social networking services?

- External sites - out of university control
- Speed at which sites eg Bebo are taken down
- Compliance, AUP
- Dignity at work policy – Cardiff
- Transient. Ephemeral. No record. Audit - eg QA, feedback loops.
- Use SMS?
- SMS train tickets!

3 Addressing The Concerns

How should such concerns be best addressed?

- Review AUP and rules
- Get advice from compliance unit?

Discussion Group 5 on Providing Managed Services

The following notes are taken from the report for discussion group 5 on Providing Managed Services [19]:

What concerns may the institution have concerning use of blogs and social networking services (excluding technical considerations)?

Possible Concerns Of The Institution

1 Compliance

- What is defamatory? When do you remove/ask to remove stuff? If material hosted outside the institution, how bad does it have to be?

- Acceptable Use Policy (AUP) not relevant to alumni or prospective students

- Copyright - many staff are not fully aware of issues surrounding copyright law (e.g. they think permission to use means they have copyright). Can no longer say, "the subject librarian will sort that out".

- Data Protection - Outsourcing to the states - data protection, cannot transfer to states. Can, if you have proper contract or permission of individual.

- Accessibility - How accessible is the third party technology that's being promoted? How accessible is the Web 2.0 software an institution adopts?

2 Controlling information

How secretive should we be? If it's really bad, people will talk about it down the pub etc, so it can't be controlled.

3 Resources

- How to do web 2.0 with existing resources?

- How many sites running own blogging service? Run by corporate systems. Now how do you use it? People using it for research.

- Departments not wishing to pay for additional services (or those that they think they can get for free)

- Pace of change

Using Web 2.0 / Cultural Barriers

- Is it professional to use Instant Messaging at work?

- Resistance by management who don't want to have to police everything - we don't police email.

- Who sets up the institutional Facebook presence / Second Life presence?

- Web 2.0 is something everyone knows something about. Five years ago it would be Information Technology decision - now it's public and can be a Public Relations exercise/challenge.

Addressing the Concerns (How?)

How should such concerns be best addressed?

Compliance:

Enforce regulations

Working with the Student's Union

Institutional cooperation and steer

Guidance on outsourcing etc. from JISC, UCISA etc.

1. If an institution feels strongly they'd have to ask their legal advisors.

Student moderators.

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2. Education, training and raising awareness

3. There's a lot of stuff we can't control, e.g. for alumni.

4. Risk management

Accessibility

3. Some IT staff are now in the corporate / pr

4. If outsourcing most web 2.0 stuff is free (Facebook etc.) Support is the resource.

Using Web 2.0 / culture

Education and collaboration with Student union and departments, also between marketing and IT and top management

Addressing the Concerns (Who?)

Which organisations, groups or individuals should be responsible for addressing such concerns?

- Is it IT services responsibility?

- When IT is pervasive we need to treat things differently.

- Proctors may ask IT for advice. We suggest head of department, but if locally hosted service IT has to help.

- How do you get in contact with Students Union.

- Marketing dept looks after brand, working in partnership with IT.

- We wouldn't expect IT to make decisions with brand damage, IT will help technically. IT would look after security.

- Rubber stamping at high level