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Weblogs as Open Constructive Learning Environments.

Abstract:

This paper presents the authors experience using weblogs in a final year Communication Design class entitled Contemporary Issues in Design and Technology, at the Queensland University of Technology in the Faculty of Creative Industries. Students in this class actively contributed to a weblog for the duration of the semester, with this activity being integrated into both formative and summative assessment. The experience provided a range of insights into the weblog phenomenon. This paper will explains the purpose of the class, and why the weblog was selected as a suitable online environment for student activity. The experience resulted in a number of observations that have lead to the development of current approaches to using weblogs in learning and teaching. Finally the paper suggests that the focus on providing centralized web services to support activities like blogging, may not be ideal for the purposes of creating authentic learning experiences. It advocates that such learning experiences are best achieved within a 'healthy' Information Ecology (Nardi and O'Day), or learning blogosphere (Gibson), grounded in a constructivist pedagogy, and where there is recognition that information systems are not value neutral.

Introduction

> *"... a research blog is to traditional means of disseminating research as eBay is to yard sales: given equal effort, your odds of getting what you need are much better."* *(Paquet)*

> *"... few people write 'college essays' when they leave college. But many people blog outside of academia."(Lowe)*

There is always the risk of proselytizing the weblog, or any new technology, when introducing it for use in a class. There are characteristics of weblogs, which are not new and are relatively trivial, then there are other characteristics that have significantly reshaped understanding and experience of the web, for example the use of trackbacks[1] and RSS[2] feeds. A single weblog in isolation is relatively uninteresting. However, an ecology of densely interconnected weblogs highlights one of Johnson's principles of emergence, "more is different" (Johnson), and in this case, is far more interesting. The process of introducing any new media technology into a curriculum requires a careful negotiation and critique of the 'dazzling light' (Graham) and utopianism that accompanies new technologies, combined with a focus on the texture and detail of the specificities of practices, localities of adoption and use, and the dynamics of diffusion.

The initial inspiration for use of weblogs in the context of a written assignment came from: previous curriculum developments influenced by constructionist pedagogies; my experiences of blogging and reblogging[3]; the success of peer review of written work employed in previous classes; a view that assessment tasks should to be cognitively and contextually authentic; the desire to provide a writing environment which was collaborative and supported the exploration of remediation and intertextuality; the composition of multi vocal, networked hypertexts; and, finally to provide an experience of writing which was more closely aligned with the growing phenomena of the weblog, introducing students to this form of writing and publishing. However, it was the opening quote, from a post titled *Why write papers?* on *Sébastien Paquet's* research weblog, that finally confirmed my decision to shift from *paper* to the use of a weblog as the writing and publishing environment for the completion of written assessment in the class Contemporary Issues in Design and Technology. Before commencing a discussion about the specific class and assessment item I will briefly outline my background in education, highlighting the way in which technology has been employed within my teaching practice.

Background.

Todate my teaching practice has been influenced by social constructionism, which is an extension, or application, of Piaget's constructivism, by Seymour Papert. Papert's focus is on how knowledge is constructed through the act creating public "artifacts".

> *Constructionism--the N word as opposed to the V word--shares constructivism's*

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[1] Trackbacks are a function of weblogs that provides a method of notification between weblogs. For example when one weblog publishes a post that references a post on a different weblog the trackback interface is used to notify the weblog which has been cited. Trackbacks are also used to notify other web applications when new material has been posted to a weblog.

[2] RSS is an acronym for Real Simple Syndication. RSS provides a structured formate for syndicating content.

[3] Reblogging is a process of filtering and republishing content drawn from many RSS feeds.

> *connotation of learning as "building knowledge structures" irrespective of the circumstances of the learning. It then adds the idea that this happens especially felicitously in a context where the learner is consciously engaged in constructing a public entity, whether it's a sand castle on the beach or a theory of the universe. (Papert)*

Constructionist pedagogy represents a shift in approach to education, from a behaviorist epistemology to a social constructivist epistemology (Fosnot), where the learning outcomes cannot be simply equated to the sum of the material 'transmitted' from the teacher to the student and the final quantitative grade. Such approaches are particularly significant in the context of our contemporary networked knowledge society (Castells) where: many see 'intelligence' and cognition as being contextual and distributed between human and non-human agents (Hayles); terms like 'googlation' (the unpronounceable collision of google and education) have become commonplace; and, a generation of researchers are turning to forms, such as weblogs, as a phenomena of study and a method of publishing and peer review, as seen in the opening quote.

Constructive environments and information ecologies.

This theory can be seen as informing the development of what are referred to as Constructive Environments (Turner). Constructive Environment is a term initially proposed by Jane Turner to describe a combination of practice, technology and interaction that scaffolds learning in mixed realities[4], with an aim to support the realisation of authentic learning experience. While working at QUT I have been involved in the design and use of two specific Constructive Environments'. The first was The Lost Cities Project[5] with Jane Turner, where an Encore Xpress enhanced MOO[6] was used in the context of a class in Immersion Design. The second project, referred to as the Faux Cave[7], was developed as a lightweight, low cost solution to support student productions in a class on Virtual Reality. As a result of these two experiences I have observed that Constructive Environments are very similar to Nadi and O'Day's Information Ecologies, which they define as follows.

> *We define information ecologies to be systems of people, practices, values, and technologies in a particular local environment. In information ecologies, the spotlight is not on technology, but on human activities that are served by technology. (Nardi and O'Day p47)*

Drawing on properties of ecologies Nardi and O'Day suggest that information ecologies are complex *systems* made up of a diverse range of elements (actors, agents, objects) and the relationships and exchanges between these elements that occur within a *local* environments. They highlight the specificities of the locality, a move that militates against abstraction, generalisation and normalisation, and one that I see as significant in the context of used of centralised systems. Healthy information

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[4] Mixed Realities is a term used to describe environments that support the interaction of communities of people within both physical and digital information spaces.
[5] For details on the Lost Cities Project see: http://education.qut.edu.au/~turnerj/portfolio/building_lost_cities.html and http://www.uber.tv/g!/tl.html
[6] MOO is an acronym for Multi-User Domain Object Orientated. A MOO is an application that allows multiple users to connect, and 'inhabit', to a shared world represented in text.. Encore Xpress is a web enhancement to the MOO, developed by Jan Rune Holmevik and Cynthia Haynes, which enables the text based worlds of the MOO to be augmented with other forms of media.
[7] The Faux Cave is a play on CAVE™. The Faux Cave is a low tech solution for producing large scale immersive works using off the shelf hardware and software, combined with three king sized bed sheets, data projectors and sound system. See http://ubik.uber.tv/old_projects/135.htm

ecologies also exhibit *diversity* where the relationships between different elements result in *coevolution*, which are synergetic with the textures of locality or context.

The employment of an ecological metaphor is particularly useful as it opens space for new perspectives, perspectives that are obscured by other metaphors like technology as tools, as system, or as communication channel. These perspectives resonate with Apple's suggestion that "there are a number of ways of dealing with some of the possible difficulties associated with the use of systems management procedures in education. […] The lenses of open systems and biological systems could provide excellent disclosure models for further examination." (Apple p120)

While Nardi and O'Day's ecological lens does not focus on technology, it is often the selection of technology that influences the quality of the outcomes. This is especially the case where technological systems, particularly those systems which enframe student learning experiences, are employed by educators in ways that present these systems as value neutral. Numerous voices[8] have argued that technology, and the design of technological artifacts, is not value neutral. In the context of education, Apple's critique of "systems management" approach to the solution of educational problems shows that "since systems methodology communicates a sense of neutrality, it is ideally suited to establishing a consensus around it." (Apple) This process of consensus, Apple suggests, is best suited to progressing the interests of administration and management of an institution in establishing the questions that can be asked in and about education. Thus resulting in a homogenizing force that erodes the creative and participatory nature of education, and is at odds with the self determination of students and staff. (Cole) Despite the age of Apple's text on ideology and curriculum I am continually surprised at how frequently technologies become an assumed neutral, and unquestioned, backdrop within education. Recent media reports on conflicts between bloggers and institutions, for example reports on students being banned from webloging (McKenna), employees being sacked for blogging (Barkham) and companies establishing blogging guidelines and policy to control staff blogging. (Hornik), indicate that the introduction of weblogs into curriculum poses a number significant challenge to institutions. There is an inescapable gravity to centralise and control students and staff use of weblogs, which is grounded in a systems management perspective.

Contemporary Issues in Design and Technology.
When introducing the use of weblogs in the class Contemporary Issues in Design and Technology, it was the "systems management" mindset, mentioned above, that I wanted to avoid. Not only did the class rationale called for such an approach, it also pointed to the need for a Constructive Environment which exposed the operations and ontological design(ing) (Willis) of the 'interface', how it constructed the learner, prefiguring and enframing the space of possible expression, and how this design(ing) was constituted as a node, and agent, within wider networked information ecologies.

> *As inhabitants of cultures increasingly driven by technology, it is in all of our interests*
> *to be aware of processes and implications of technological change. This unit is*
> *designed to encourage students to reflect upon and analyse current interconnections*

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[8] Some of these voices include Bolter, Heim, Coyne, Heidegger, McLuhan, Hillis, Hayles, Levy, Fry, Fuller, Manovich and, Marx and Smith…

between technology, design and society, and to provide tools to perform these activities effectively. This unit is designed to encourage you, creators, designers, writers, speculators, imagineers, and dreamers, to reflect upon, analyse and deeply question these interconnections... You will be required to identify contemporary issues in this domain and present your understanding/analysis/critique through a written assignment and a multimedia construction. (Sade, Contemporary Issues in Design and Technology. Unit Outline.)

The class aimed to see students, by the end of the semester, develop: an intellectual framework for considering philosophical, social and cultural issues surrounding technology and design, through their historical development, modes of production, side effects, synergisms and second-order effects; an understanding of ontological design(ing) within this context; and, methods of analysis that can be employed to develop understandings of the interrelations between design and technology within their specific areas of practice in the Creative Industries.

"Co-authored weblog".

Despite my use of web based journals and other forms of electronic publishing in assessment, it was not until this class that a weblog became a required form for submission of a written assignment. The new assessment brief required students to work in small groups of between 3 to 5. Each group had to establish and maintain a weblog for the duration of the semester, which was referred to as a "co-authored weblog". The style of weblog was inspired by existing "co-authored weblogs", for example Grand Text Auto[9], Ludonaughts[10] and World Changing[11]. Each of these weblogs are written by a small group of authors who share an interest in a common subject.

Assumed knowledge

An important consideration in making this change was to ensure that all students in the class could engage with the task. Below is the list of assumptions made about students when planning for the class. These assumptions are based on the class prerequisites.

> *On commencing this class it is expected that you:*
> *1) are familiar with the QUT and Communication Design computing environments;*
> *2) have atleast a foundation level understanding of new media / multimedia technology and related principles and theories;*
> *3) bring to the unit a high level of knowledge, skill, proficiency in your major area of study within the Faculty of Creative Industries;*
> *4) technical knowledge of media production in your area of study;*
> *5) can design, produce and publish basic web sites; and*
> *6) are familiar with the university (academic) standards for the submission of written assessment. (Sade, Contemporary Issues in Design and Technology. Unit Outline.)*

Not all of the students enrolled in the unit were majoring in Communication Design. This meant that in the class there were students who where fluent with HTML, CSS, SQL, PHP etc, and others who had only constructed very simple HTML pages. After the first tutorials it became apparent that this spread of knowledge was wider than anticipated. There were a number of students who had no experience making web pages, or had completed this aspect of their studies up to 4 semesters earlier and had not

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[9] Grand Text Auto can be found at http://grandtextauto.gatech.edu/
[10] Ludonaughts can be found at http://www.ludonauts.com/
[11] World Changing can be found at http://www.worldchanging.com/

made any web pages since. Despite this, even students with no web experience were able to setup weblog within the duration of an hour tutorial.

It was also surprising how few students were blogging, or reading weblogs, at the time approximatly 15% of the class had any engagement with weblogs. A survey conducted this year, in a second year class in Interaction Design, showed that 50% of students had weblogs, however the majority of these students had been required to set up a weblog for other classes. It must be noted that a much larger number of students were actively engaged with other forms of social software.

Choosing a Weblog solution.

Instead of enforcing the use of a specific weblog solution, or even a weblog for that matter, the assignment brief stipulated that the chosen solution must:

> *a) support multiple authors, and clearly identify each authors contributions including a
> date and time stamp for each contribution;*
> *b) provide an RSS feed in one of the following formats RSSv0.9x,RSS1.0,RSS2.0,
> ATOM; and,*
> *c) provide the ability for readers to post comments. (Sade, Contemporary Issues in
> Design and Technology. Unit Outline.)*

This left students free to select their own weblog solution, or any other form of social software that met the above requirements. In 2004 all students used weblogs with the most popular choices amongst the cohort were WordPress[12], LiveJournal[13], Moveable Type[14] and Blogger[15]. This year students in classes have started to use other solutions including open source forums, wikis[16] and even custom made web applications. There were a number of students who looked towards the teaching staff for advice on this selection. At the time two weblog solutions were identified as suitable for use, these were Moveable Type, and WordPress, and one open source wiki was also recommended.

Submissions.

The assessment item involved a staged series of submissions over the duration of the semester. Each submission was part of the formative (unmarked) assessment, with the final mark being determined at the end of the semester.

The first submission involved each group of students: 1) setting up their weblog; 2) deciding on the subject that they were going to address and how the group would approach the subject through the form; 3) completion of initial background research into styles and genres, and the identification of any similar publications that were currently addressing similar issues; and 4) completing an initial search of the literature on the subject and the development of a list of key sources.

The second stage was the contribution of posts to the weblog over the duration of the semester. There

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[12] http://wordpress.org/
[13] http://www.livejournal.com/
[14] http://www.sixapart.com/movabletype/
[15] http://www.blogger.com/
[16] A Wiki is a web application that allows for the collective editing of hypertext documents.

was no fixed schedule the students were required to adhere to, however the marking criteria valued sustained regular contribution and participation in the weblog through both posts and comments. By the end of the semester each group member was required to have submitted at least 5 posts of 500 words each. These post were to be written in a scholarly manner and adhere to academic standards for writing and referencing. Beyond these posts students had to be visible as active participants in on the weblog over the duration of the semester.

> *Each group member must also be seen as actively contributing to the weblog and engage in critical discussion on the weblog. This means that you are required to: comment on each others posts; submit shorter posts that are related to the issue being addressed; submit posts that contain reference or resource materials that you have found during your research; and in general be visible as an active contributor to the web log. (Sade, Contemporary Issues in Design and Technology. Unit Outline.)*

The final requirement was that each student had to peer review two other weblogs and post their reviews. Once each group had established their weblog, the URLs of each weblog were published, along with an OPML[17] file containing the URLs of RSS feeds for each weblog. It is this connection between weblogs that was required to facilitate the emergence of the class blogoshpere.

Reading…

Over the duration of the semester I kept up to date with each group's progress by using an RSS read/aggregator, at the time the software used was NetNewsWire[18]. Half way through the semester I switched to using the server side solution, Reblog produced by Eyebeam[19]. This process of reading was also introduced to the students as a method for both engaging with their peers work, and with the larger conversations occurring outside the context of the class. An OPML file was provided for students, along with suggestions on aggregation solutions. Bloglines[20] was one of the preferred solutions of students who engaged in aggregated reading in the unit, however less then 50% of the class engaged in this form of reading..

While initially the use of comments was seen as a method for staff to provide feedback, it turned out that comments were most suitable for interaction between students. Within the first few weeks of the semester it became clear that the shear volume of 80 plus students blogging was too much for a single staff member to keep up with in a constructive manner. While I was currently subscribed to, and scanned through, far more weblogs as part of my daily reblogging, student weblogs required far more time as I had to engage critically with the work that was being published. The only advantage was that the use of an RSS aggregator meant I could do this in a more concentrated and concerted way, however it was difficult to engage in conversations with each student in comments on their blogs in any way that was meaningful. Interaction between teaching staff and students, via the comments on a weblog, would be best achieved in the context of smaller cohorts, or where the teaching staff are taking on roles such as mentoring, supervision, or working with peers.

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[17] OPML stands for Outline Processor Markup Language.
[18] NetNewsWire is an RSS reader/aggregator for OSX made by Ranchero Software
[19] Reblog is server side RSS reader/aggregator made by Eyebeam research, which also provides plugins for common weblog solutions, thus supporting the "reblogging" of items. http://www.reblog.org/
[20] http://www.bloglines.com

Ongoing feedback and interactions with students, both in person, and via email, formed the body of "formative assessment" whilst the summative full stop was due at the end of the semester. As noted above the volume of posts made it difficult to use comments as a channel for feedback. Instead formative feedback occurred in tutorial time where the weblog provided a focus for discussion. The final assessment criteria were very similar to those that had been used in previous semester for written assignments, addressing the relevance of the topic, quality of research and literature review, knowledge of the subject, ability to develop a line of argument, evidence of analytical, critical and synthetic thought, quality of written communication, use and exploration of the form, personal construction of meaning, with the addition of criteria that addressed the groups ability to collaborate in the production of the "co-authored weblog".

Observations and Outcomes

The experience of using the weblog in the context of a written assessment item has lead to several observations. Most significant was that over the semester it was observed that the connection of the group weblogs into a mini blogosphere[21], resulted in the emergence of small social networks leading to effective interactions between peers. Students commented that the regular cycle of writing, publishing, reading each others work and the resulting discussion/comments reduced their anxiety about writing publically. The class blogosphere was not as active as anticipated, which is an aspect that will require more support, especially in related to methods of engaging with numerous weblogs.

For many students it was the first time that they had been introduced to the world of weblogs and RSS. This introduction expanded students information retrieval, and evaluation skills. This also resulted in two emergent issues. Firstly the reliance on web-based sources meant that students required more guidance on evaluation of source materials, and also lead to an increase in references to secondary and tertiary sources. Secondly, there was an observed increase in the 'recycling of memes', where memes or unit ideas were recycled from other weblogs without exercising any analysis or critique, or reference to information 'outside' the portion of the 'web' the student was reading. As a result of these observations this year the class included tutorials on information retrieval and evaluation.

The use of the weblog also saw writing styles shift, with language becaming more casual and referencing less rigorous. This has been related to the fact that many students upon commencing the class viewed weblogs as principally used for personal diaries. This was accompanied by a reduction in the adherence to referencing standards, which in part has been related to the fact that bibliographic software like Endnote is not easily integrated into the weblog writing environment.   Students who maintained academic referencing standards typically composed their posts in software like Microsoft Word then copied these into the weblog.

Also of interest was the fact that there was not direct causal relationship observed between previous experience with weblogs, or technical literacy, and the final grades and learning outcomes. However,

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[21] Blogosphere is a term used to refer to the ecology of interconnected weblogs, and other web publications that provide similar interfaces.

group weblogs that were more active and connected were observed to have resulted in better student learning outcomes.

Whilst the assessment task setting out the purpose of the weblog, this became subverted with several students using it as a site to post and share materials related to other classes and assessment items, pose questions about their education, the construction of the curriculum, material covered and not covered, and to discuss and critique their experiences at university. This unintended outcome points to the potential for the form to support student's active participation in their education.

Characteristics of constructive environments.

Following this experience, and the experience gained from the previous constructionist projects Lost Cities and the Faux Cave, several key characteristics of 'constructive environments' have been developed to guide: future selection and design of suitable technological system for use in teaching and learning; the design of the 'soft networks' of interactions, relationships and scaffolding; and support the design of assessment tasks that are both cognitively and contextually authentic (Squires). It should be noted that the following characteristics do not represent a crystallized formula, but represent the current manifestation of an ongoing practice

> *Agency*. Preference should be given to solutions that provide high levels of agency to staff and students addressing questions of control, access, ownership, choice and potential for creation of personally meaningful representations.
>
> *Low threshold.* Preference should be given to solutions that allow students from a wide range of backgrounds, with different levels of technical literacy/fluency, to engage in the act of production, construction and sharing of representations.
>
> *Encouraging, fostering, technical fluency.* Extending the above characteristic, preference should be given to solutions that encourage, foster and promote technological fluency. (Resnick)
>
> *Accessible*. Selected solutions should support the lowest common denominator (computer hardware, net connection etc) that is affordable and accessible to the whole cohort.
>
> *Open*. Preference should be given to solutions that provided support for end user (student and staff) creative modification of the layout and design, data structures, and code bases. Solutions that are open to unintended use, or designed for subversion (Squires).
>
> *Critical*. Both the selected technological infrastructure and the contextual of use should provide openings for students to be critique the interface and the relationship between modes of representation, the constructed "artifacts" and the subject.
>
> *Rich, complex, systems or ecologies*, as opposed to 'contrived' situations and system, supporting, encouraging, or promoting, interrelationships, dynamics, flows, exchanges and diversity.
>
> *Social and participatory*. Preference should be given to solutions that provide afforances for the formation, or emergence, of social or peer networks and groups of shared interests.
>
> *Speculative.* Constructive Environments should allow for students to create speculative representations, supportive of reflexive engagement and providing potential for exploration of multiple perspectives and mode of expression / representation made possible by the form.

Support for Gardeners.

This experience combined with previous experiences, has highlighted the importance of a particular

type of personalities within Constructive Environments, one that Nardi and O'Day identify as *garderners*. Gardeners are viewed as playing important roles in the maintenance of a sustainable information ecology, and are described as liking to help other people solve problems as well as explore the potential of the technological tools and processes themselves. *Gardener* also act as an interface between two discourses "bridging the specifics of the domain, with its unique problems and challenges, and the capabilities of the tools used in the domain." (Nardi and O'Day p141) From my experience gardeners are often found among both the staff and student bodies, and in many cases their work goes unrecognized.

Current developments

This semester has seen an increased number of classes in Communication Design use weblogs within learning and teaching activities. In part these activities have been informed by the experiences of using weblogs in Contemporary Issues in Design and Technology in 2004, however there has been no central, or coordinated introduction of such technology into classes, instead weblogs have been employed in different ways to meet specific teaching and learning objectives. Below I will discuss two approaches currently employed.

Peer groups and the blogroll. In a final year design studio unit, coordinated by Debra Polson, students establish individual weblogs where they are required to publish progress on a design project over the course of the semester. In the first tutorial students formed into peer groups of 4 – 5, these weblogs were then connected together via the *blogroll*[22] on each students weblog. The class requires students to become actively involved in their peer group and provide review and critique of each others design work. This combination of peer groups and use of the weblog is aimed to encourage peer interaction, and to provide a constructive environment to support peer interaction beyond the confines of the timetable, and class room.

Being a final year class students are also encouraged to consider how they will present their work after graduation. As such many of the cohort have setup their weblogs outside the University web domain, some using existing weblog hosting services, while others have registered their own domain names in preparation for graduation. This practice is viewed as being significant as it provides a pathway from University to professional practice, one that requires students to actively think about, and work towards, the development and presentation of their portfolio of work in a public and professional context.

Using a weblog to coordinate group work. In two classes I am running this semester students are required to work in small groups on a multimedia production. To support this activity each group is required to establish a web site, following the same guidelines as listed above. This site will primarily be used to support their collaboration, and as an archive / record of the design process as it unfolded over the duration of the semester. This will hopefully enable groups to more successfully collaborate, and coordinate their project, and support the rapid sharing and critiquing of design ideas between group

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[22] The blogroll is a term used to refer to a list of links to other weblogs. Blogger display these on their weblogs. The blogroll is a public expression of a network of peers, or connections.

members, and teaching staff. In this class several groups have elected to use solutions other then weblogs, including wikis and forums, however each solutions meets the functional requirements outlined above.

Proliferation and diffusion. Which blog am I posting to today?

This proliferation in the use of weblogs within teaching and learning provides a glimpse of a future where students, over the course of their study, will be required to maintain a presence in many online environments, accessed via a diversifying range of technologies[23]. Potentially leading to fragmented, schizophrenic and interrupt driven (Svensson) learning experiences. While this may not a problem for a seasoned blogger, or an organized student, it poses potential challenges for students who are not as fluent with online tools. Such fragmentation may also present a problem for students who want to maintain a higher level of control over the publishing and representation of their work, especially where outcomes of assessment are suitable for inclusion in a design portfolio.

The diffusion of a technology such a weblogs raises the inevitable question, should the University provide central weblog solutions for use by staff and students? If so what form should these solutions take and how is access and participation controlled, regulated? When approaching such questions it is critical to keep in mind that the provision of any centralised writing, publishing environments, or other information systems, enframe student learning experiences, establishing a virtuality that includes intended and unintended use. Specific attention should be paid to how any adopted solution supports, represents and reproduces existing economic, political, ideological, and intellectual frameworks that order and establish opportunity and power. (Apple p107)

Weblogs, and similar applications, are designed, or afford, subversive use. When such applications are used within the context of education there is the ever-present potential for abrasive encounters to occur between the "systems managers" and the end users, be they staff or students. In a more pragmatic sense central solutions tend to reduce staff and students ability to explore the creative potential of writing and publishing environments. The continual dynamic of exploration of functionality by staff and students, is counter balanced by a continual 'locking down' of functionality, by administrators who prefer to provided rigid, or fixed "template" solutions, and discourage all creative modification of the data structures, and code bases.

Such encounters problematise the use of information and communication technology within the educational institution along the axis of agency. The differential between the levels of agency afforded by the systems sanctioned for use by the University and those afforded by external low threshold applications motives this dynamic exchange and becomes more potent when weblogs, and other forms of social software, are the subject of study and research, and are increasingly used by students and staff. In this situation, students and staff will inevitable critique and reflect upon the relationships that shape their everyday experiences within the educational institution. As a result the very presence of phenomena like weblogs, and the blogosphere, outside the walls of the University pose an ever present

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[23] Here I am referring to the inevitable provision of access to information via handheld devices and smart phones etc, as well as traditional computers.

challenge to the authenticity of any centralised and standardised internal solution, especially if such a solution does not provide the same level of affordances, and agency as those used externally.

Speculative alternative

> *Publishers (bloggers) spend a lot of time hacking the tools to both "dice" and "splice" their content streams. I'm beginning to think that feeds (and content tagging) should be the starting point, not an offshoot. Until now, our tools have produced web pages then feeds. I'm thinking we need tools that create feeds and then let us combine them into web pages. (Check)*

The page metaphor has been bent beyond recognition, at least until the virtual transforms the material of paper. The quote above highlights a significant shift in conceptualizing webpages, and provides a point of departure for speculation on the nature of a suitable infrastructure to support the emergence of healthy information ecologies. Such a speculative infrastructure would consist of a framework for supporting a sustain-able distributed heterogeneous network of web applications. At the core of such an infrastructure would be a suite of tools to support the aggregation and republishing of RSS streams, combined with tools to support the creation, editing and manipulation of RSS streams. Such an infrastructure would leverage the elegance of the blogosphere with its relatively simple, standard and robust interface between applications, specifically the combination of standard weblog API, pings, trackbacks, and RSS.

By way of example, a student would maintain a single weblog over the duration of their studies, using whatever weblog solution they were most comfortable with, and which meets a basic level of functional requirements. Students would also use RSS aggregator to subscribe to the RSS streams coming from teaching staff, and peers. These two aspects could be integrated as seen in the combination of Eyebeam's Reblog with a common weblogs. Likewise staff would operate in a similar manner, publishing curriculum materials as an RSS stream, and maintaining contact with students via subscription to their RSS streams. In this situation the central class website, serves to publish the legally required information about the class of study, and most importantly acts as an aggregator, a small scale Technorati[24] or Bloglines, providing a nexus for the class blogosphere.

Space does not permit a detailed discussion of dimensions of such a speculative approach, however. it should be noted that there is a significant opportunity presented by the apparent lack of tools to support the creative manipulation of RSS streams. It is here that I suggest that energy time and resources be focused.

Challenges, Focus for future work.

It is clear that the use of weblogs, and other emerging new media and communications technologies, within educational settings will lead to a number of significant challenges, but also present potent opportunities. These challenges and opportunities are the result of the way low threshold, open source, social software afford new modes of emergence, participation, engagement and agency. Energy

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[24] http://technorati.com

expended on central online learning environments modeled after traditional closed Content Management Systems (CMS) will not always support the development of cognitive and contextually authentic experiences, where the success is related to issues of agency, control, choice, peer interaction, diversity and emergence. The use of 'social software' applications, like weblogs, holds the potential to increase the level of agency of individual staff and student, and provide new avenues for the formation of communities of learners, researchers, and peers outside the structures of control that are encoded in centralised CMS solutions.

This foray into the world of using weblogs in education, combined with the above speculations, has exposed a series of new challenges, or opportunities, which will form the focus for future developments.

Firstly, the relationships between physical environments, architectures, where education takes place, and overlaid virtual environments, which are increasingly being employed within education, need to be better understood, and aligned. Graham highlights this in his research manifesto by suggesting that "the subtle and complex relationships between urban places and the shaping, experience and diffusion of new media present a critical research focus that is too often lost, because researchers tend to focus on either place or on the mediated communication." (Graham p18)

Secondly, the refiguring and transformation of ontology and epistemology through the virtuality of networks and new technologies challenges both our approaches to curriculum design, and how we employ technology within the curriculum. Attention needs to be paid to the way in which we design cognitive and contextually authentic learning experiences in a world where intelligence and cognition are being conceptualised as contextual and distributed between human and non-human agents.

Finally, the opening of curriculum to the dynamics of participatory engagement of staff and students undermines the consumption and service based models and economies that currently frame education. Weblogs, and other forms of social software, point to a future where collective participatory environments will reshape the nature of staff and student agency within the University. The challenges, opportunities and implications of such changes present an open field for future work and investigation.

In conclusion, the adoption of new media technologies within education needs to be undertaken in a mindful manner, cognizant of the ontological and epistemological implications. Such developments must provide educational experiences that allow both staff and students to successfully: critique, and negotiate structures of power and control as exercised through design and technology; situate themselves with broader ecological networks and structures; and, envision, envisage, design and actualise genuinely sustain-able futures.

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