Learning Networks

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Introduction

So, this turns out to be a book about 2004, a year that I began by calling “the turning point” and that I find in retrospect as I write this introduction eight years later was exactly that. There was another version of this eBook, it may even exist, it had nice introductions for each of the articles and a different introduction, but as I write it is lost, and so here is the 2012 version of my 2004 works, a slightly different grouping of papers, but the same content, the same changes.

2004 was for me the year the network theory of learning came together. It was a significant year for me as I spent a month in Australia and found it, not in the red centre at Uluru, as I had expected, but in the rock paintings at Kakadu and the 2,000 year-old cedars on the west coast of Tasmania. It was also the year educational blogging became mainstream and Open Content was capturing the imaginations of people.

This collection of papers and transcripts varies from the technical to the expository to the polemic. What we have here are not the broad strokes of a network theory of learning – these would require more time to articulate – but the details, the structures and systems that comprise such a system. From the Semantic Social Network, which lays out the different types of networks at play, to learning in communities, to content networks and resource repositories, to the idea of distributed digital rights, cascades and connectivity, the framework of the theory is put into place, bit by bit.

Moncton, May 18, 2012

An Introduction to RSS for Educational Designers

Introduction

RSS stands for ?Rich Site Summary? and is a type of XML document used to share news headlines and other types of web content. Originally designed by Netscape to create content ?channels? for its My Netscape pages, RSS has been adopted by news syndication services, weblogs, and other online information services.

Because it is one of the simplest uses of XML, RSS has become widely distributed. Content developers use RSS to create an XML description of their web site. The RSS file can include a logo, a site link, an input box, and multiple news items. Each news item consists of a URL, a title, and a summary.

Content developers make their RSS files available by placing them on their web server. In this way, RSS ?aggregators? are able to read the RSS files and therefore to collect data about the website. These aggregators place the site information into a larger database and use this database to allow for structured searches of a large number of content providers.

Because the data is in XML, and not a display language like HTML, RSS information can be flowed into a large number of devices. In addition to being used to create news summary web pages, RSS can be fed into stand-alone news browsers or headline viewers, PDAs, cell phones, email ticklers and even voice updates.

The strength of RSS is its simplicity. It is exceptionally easy to syndicate website content using RSS. It is also very easy to use RSS headline feeds, either by viewing a news summary web page or by downloading one of many free headline viewers. Though most RSS feeds list web based resources, several feeds link to audio files, video files and other multimedia.

Why RSS is Important for Educational Designers

RSS is the first working example of an XML data network. As such, and in this world of learning objects and metadata files, RSS is the first working example of what such a network will look like for educational designers. Just as news resources are indexed and distributed in the RSS network, so also educational resources can be indexed and distributed in a similar learning object network.

The model provided by RSS is very different from the model provided today by learning content management systems (LCMSs). In the world of the LCMS, everything is contained in one very large software application. Insofar as content is distributed at all, it is distributed in bundled content libraries. This means that educational institutions must make a major investment in software and expertise in order to access learning content.

RSS, by contrast, is not centralized. It is distributed. Content is not distributed in bundles, it is distributed one item at a time. There is no central store, repository or library of RSS content; it is all over the internet. To access and use RSS content in a viewer or in a web page, you do not need a large software application. A simple RSS reader will do the trick.

For this reason, the distribution of educational content over the internet will look a lot more like an RSS network than it will an enterprise content management system. Many more people will use a distributed learning object network not only because it's easier and cheaper, but because they can access much more content for much less money.

As a result, the concept of syndicated educational content can really come into play. While there will always be a need for reusable learning objects (RLOs), anything that can have an educational application ? including images, videos, journal articles, even news items ? can be distributed through a learning object syndication network.

The RSS Network Architecture

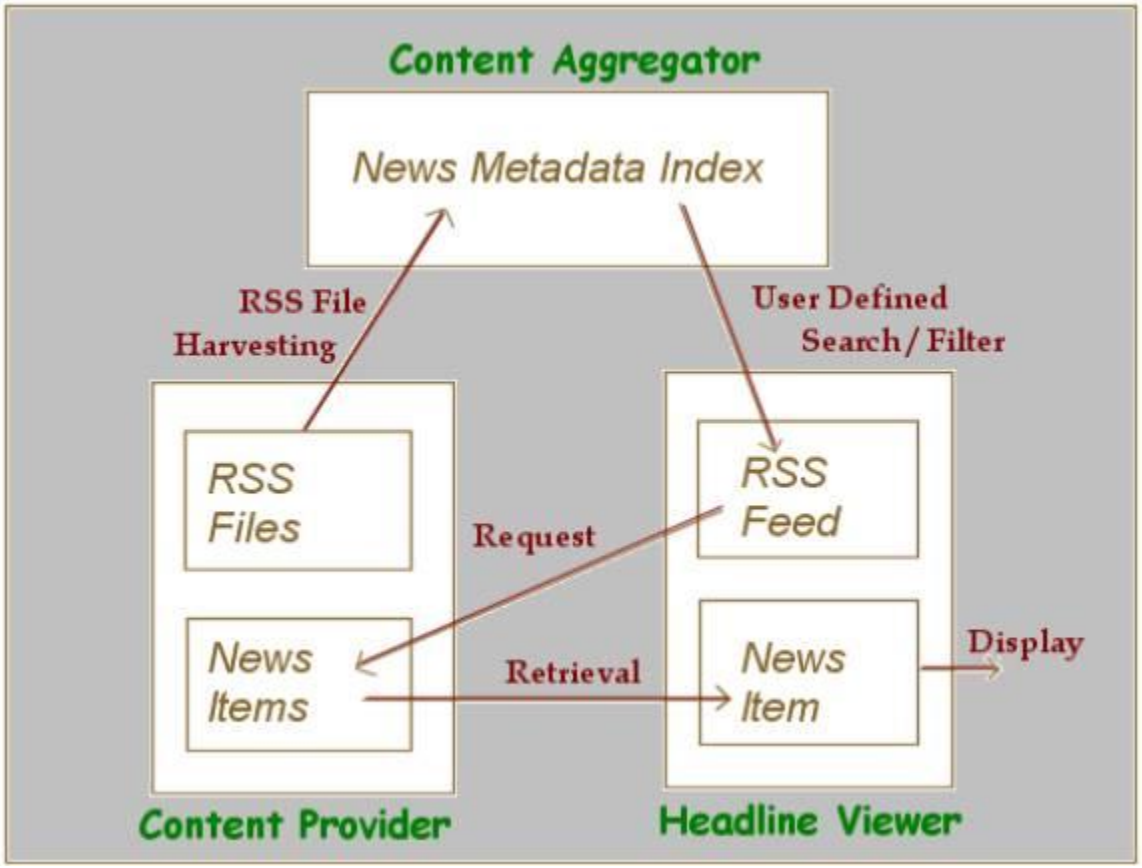
An RSS network consists of three major components:

1. A (large) number of content providers, each providing news articles, and each providing their own RSS files describing these news articles.

2. A (smaller) number of RSS aggregators that read these RSS files from multiple sources, collect them into an index, and provide customized ?feeds? of topic-specific news headlines from this index.

3. A (large) number of news viewing applications that, based on user input, connect to an RSS aggregator, access a news feed, and display it to the reader. On viewing the news feed, the reader can then select a news item (by clicking on the headline) and read the article directly from the content provider.

The RSS network architecture looks like this:



RSS Channels

A single RSS file is typically called an RSS channel. This is a lot like a television channel or a radio channel: it contains news items from a single source. For example, to the right is an HTML view of an RSS channel from the online magazine First Monday.

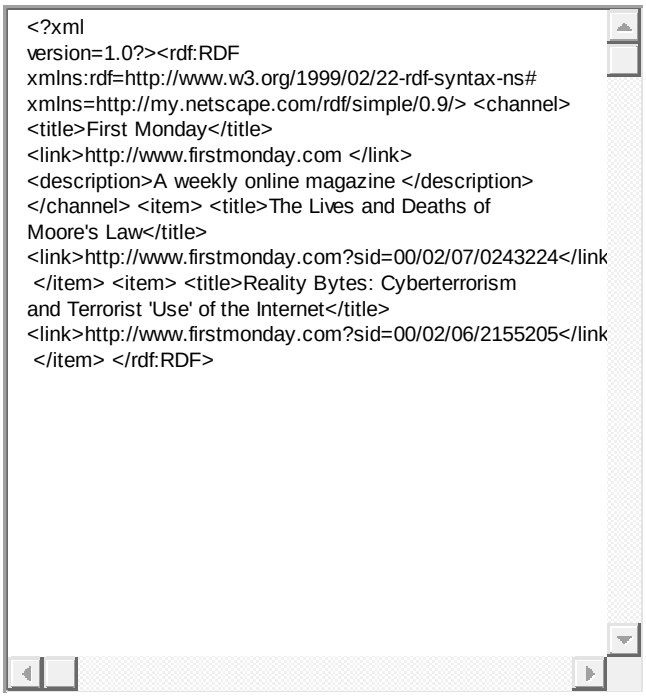
An RSS channel consists of two major sets of elements:

Channel Properties ? the name of the channel (in this case, First Monday), a home URL for the channel, and an image for the channel.

Item Properties ? the separate news items listed in the channel. In this case, there are ten news items

listed. Each item has a headline and a URL. In some cases, an item will also contain a short summary, a publication date, author information, and more.

In order to define a channel like the one on the right, the channel properties and the item properties are defined in an XML file (or to be more precise, an RSS file), as follows:



At the top of the text box is a declaration of the type of XML file being used.

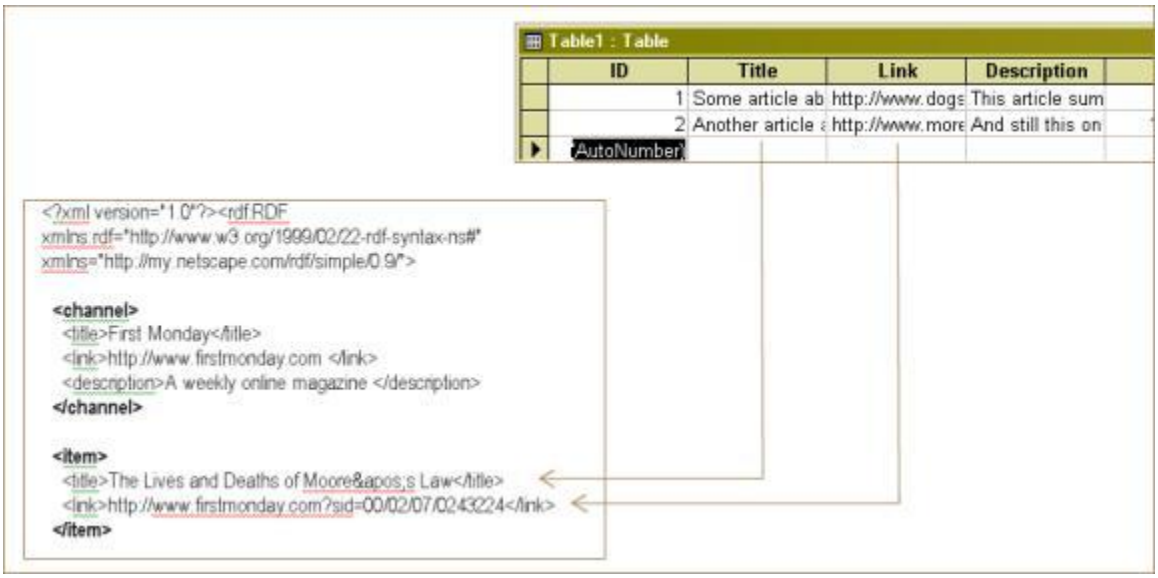
Next we see an XML field describing the RSS channel. Within this field is the channel name, link and description.

Finally, we see a list of the items available in the channel (I have only listed two items here). Each item is described with a title, and a URL.

Creating an RSS Channel

Because an RSS channel is an XML file, it can be created using a plain text editor ? the same sort of editor that you might use to create an HTML page. It is usually easier to start with a template (such as the RSS file displayed on the previous page) and to insert your own values for each tag.

Typically, though, RSS files are created automatically. This is possible because an RSS file has a standard format. Thus, if you have a database of articles, then you can easily create an RSS channel from that database by extracting table data into XML data.



Another popular means of creating an RSS file is by means of scraping an HTML file. To scrape an HTML file is to extract link titles and URLs from an ordinary web page. This is done by analyzing the HTML tags and for the link title and URL. A script such as this in Perl

```
while($page_text =~ m/<a  href="(.*?)">(.*?)</a>/gis) {
$url = $1;
$title = $2;
}
```

will generate a list of the URLs and titles in almost any HTML page. Thus it is very easy to write a script that will generate an RSS file from any web page.

There are online services, such as Moreover, that specialize in HTML scraping. Moreover scans the web pages of major newspapers from around the world and generates RSS channels for them. Moreover also provides a series of specialized RSS feeds.

Weblogs

Weblogs, or as they are sometimes called, blogs, have a unique role in the world of RSS. A weblog is, in the first instance, a web page that is updated on a regular basis. Thus a weblog resembles a diary or a journal; entries are dated and each day the weblog web page contains something new.

What distinguishes a weblog from a personal web page, though, is that the weblog consists of a series of entries associated with links to other resources on the web. Thus the typical weblog consists of a list of sites, descriptions of those sites, and some discussion.

My daily newsletter, OLDaily, pictured at right, is a typical example of a weblog.

OLDaily has channel elements, such as the newsletter title and home page URL.

The difference is in the items. I am not listing my own articles. I am listing articles published by someone else. The description, however, is mine. I am providing my description and interpretation of someone else?s material.

Also worth noting is that I did not obtain my items from a single source. As you can see by looking at the items, I have listed different articles by different authors working for different publications.

So a channel need not be produced by a content producer. A channel can be created by anybody with something to say about the items being described.

The RSS for OLDaily, though, looks exactly like the RSS created for First Monday. If you were to look at the RSS for OLDaily, though, you would find several more tags, and specifically, tags to denote the author, publisher and publication date of the article, along with the URL and the title.

Aggregators

An RSS aggregator is a type of software that periodically reads sets of RSS files and indexes them for display or syndication. There are two major types of aggregator: centralized and personal.

A centralized aggregator is intended for use by a number of people. RSS files are read by the centralized aggregator and are then used to create a topic-specific web page or customized RSS feeds (as in the diagram above).

The Moreover aggregator, for example, culls RSS from a variety of sources (including HTML pages, which it scrapes). It then provides RSS feeds devoted to specific topics ? such as Microsoft, as illustrated - that can be used on web pages.

Another well known centralized aggregator is a web site called News Is Free. At latest report, the aggregator collects headlines from 3744 sources and allows readers to browse the headlines or to search for the latest news. The site also offers headline syndication and web services.

A personal aggregator is an application that runs on a user?s desktop. It can access a centralized aggregator (in which case it functions as a headline viewer) or, more frequently, it can access an RSS channel directly. This is called subscribing to the RSS channel.

Radio Userland, for example, accesses a list of channels from a centralized aggregator. The user selects a set of channels from this list and subscribes to them. Radio then updates item listings from the selected channels once an hour. Using the data supplied from the RSS files, it also facilitates the creation of a personalized weblog (which can in turn be published as another RSS channel).

Another popular personal aggregator is called Amphetadesk. Like Radio Userland, users can select from a list of channels supplied by a centralized aggregator. Amphetadesk users can also subscribe to a channel directly if the channel provider has provided a specialized subscription script.

Aaron Swartz has written a novel aggregator that converts RSS channels into email messages.

Metadata Harvesting Generally

RSS aggregators are members of a wider class of software called harvesters. The purpose of a harvester is to retrieve and parse metadata located on remote servers, providing the information in a usable form for various applications.

In educational design, metadata harvesting involves the aggregation of metadata records associated with education and training resources. Aggregation provides greater exposure of those resources to the wider community. Aggregation also promotes the reuse of resources and encourages the development of interoperable resources.

The most well-known metadata harvesting initiative in the education community is called the Open Archives Initiative (OAI). The purpose of the open archives initiative is to provide access to academic papers and other resources over the internet.

In the terminology employed by OAI, the content provider is called the data provider. The aggregator is called the service provider. And a harvester is a client application used by the service provider in order to access metadata from the data provider.

A number of initiatives have emerged based on the OAI harvesting protocols. The Public Knowledge Project, for example, is an initiative based at the University of British Columbia intended to develop an Open Journal System (OJS). The OJS assists with every stage of the refereed publishing process, from submissions through to online publication and indexing.

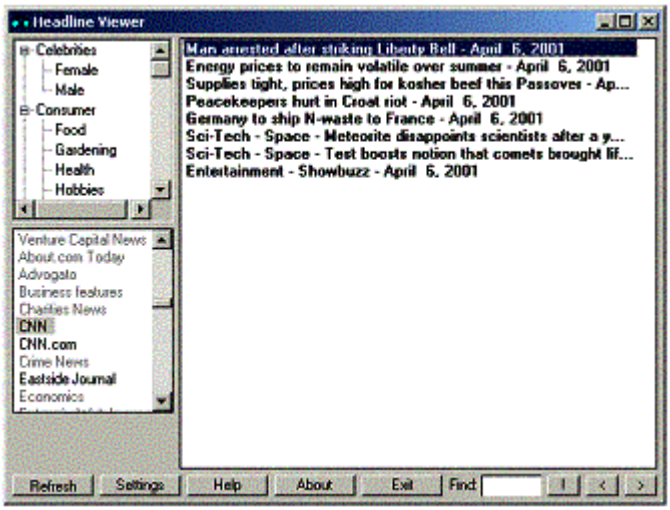
Another project is the Illinois OAI Protocol Metadata Harvesting Project. The public face of this project resembles a centralized aggregator in that it provides a search window for academic articles. It then displays the full metadata record for the selected article.

The National SMETE Distributed Library (NSDL) is another organization looking at metadata harvesting. The model described by NSDL mirrors almost exactly the model used by the RSS community. The NSDL project is attempting to collect metadata not only from OAI compliant archives but also from a wider variety of metadata sources. This, reports the NSDL, does not cause a problem not in the collection process but does cause a problem in service delivery.

Headline Viewers

The purpose of a headline viewer is to provide a list of headlines obtained from an aggregator. When a user selects from this list of options (by clicking on a headline), the headline viewer retrieves the article from the source site and displays it for reading.

Many headline viewers exist. One of the earliest and best known is Carmen?s Headline Viewer. This program runs as a stand-alone application on the desktop and taps into major centralized repositories such as My Userland, XMLTree, News Is Free and Grok Soup.



The major difference between a headline viewer and a personal aggregator (described above) is in the display of the results. Carmen?s Headline Viewer, as can be seen from the screen shot at right, displays headlines sorted by topic. Thus the reader is not restricted to a small set of channel subscriptions; instead, they obtain topic-specific feeds.

Other headline viewers, such as Novobot, create web pages for viewing headlines. This has the advantage of being a familiar interface for most users. However, web pages listing many resources can take a while to load.

What RSS Does Not Provide

RSS is a powerful tool for content syndication. However, it lacks some important features needed to develop into a robust solution for the location and organization of educational content.

One of the major deficiencies (identified in the NSDL paper) is the lack of digital rights management for both original articles and metadata feeds. RSS assumes that all articles and metadata are published on the open web and are therefore freely available for viewing by anyone. This means that resources for which there is a fee cannot be accessed through the RSS network.

Another major problem, again identified in the NDSL report, is RSS?s inability to deal with mixed metadata. Over the years various types of RSS have developed (RSS 0.9, RSS 1.0, RSS 2.0) and the tools have adapted on a case by case basis. RSS aggregators, however, still cannot

access alternative forms of metadata, much less display resources from a wide array of both news and non-news sources.

A third problem for RSS is in the manner it handles weblogs. As described above, weblogs are commentaries on original resources. Yet they are displayed in the same format, and in the same place, as original articles. This can result in duplicate listings when the same resource is described in several weblogs. In addition, there is no means to display the comments from many weblogs side by side.

More Reading

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2004: The Turning Point

This article published as 2004: The Turning Point in Ubiquity *Volume 4, Issue 46 January 21, 2004.*

I am usually hesitant to write predictions of the future, not because I think it's risky (I have a great deal of confidence in what follows) but because it's hackneyed. Especially at this time of the year, everybody is making predictions, which makes just another projection about as run of the mill as an article can get.

But there is a collective veil sweeping, it seems, across the foresight of a wide variety of columnists. Perhaps they are lured by what they think the markets will do, or by corporate press releases. Perhaps it's all a semi-informed groupthink. But as I commented in OLDaily yesterday, it's as though the wonderment had been drained from their collective souls, replaced by some sort of machine-parts analysis.

In what follows I base my projections not on stock prices, sales trends or focus group analysis. I base it on what I think - on what I *feel*, in the classic sense of the Idoru - is driving the hearts of those who will make the final decisions on the future of the internet, those who use it.

Email redux

One way or another, the deluge of spam will be resolved in the near future. The most likely outcome is that the email protocol will be replaced with a more restrictive system in which the sender's address, if not identity, will be authenticated. Kill one spam message and all subsequent email from that sender will be blocked.

In the interim, much heat (and little light) will be generated surrounding anti-spam legislation. It will become apparent that the legislation passed has been, in essence, the legalization of spam. Based on this, it will not be surprising to see marketing agencies take to the courts to block the deployment of authenticated email, on the grounds that it makes their now legal mass mailings unprofitable.

A population in search of a community

The evolution of email will have as an unexpected consequence a resurgence in the widespread search for community on the internet. Historically, the most popular applications have always been those where people could share their thoughts in groups. Usenet dominated the early days of the net, email and mailing lists the nineties, web based discussion boards the last decade. Because community forums have been so corrupted by commercial content, people have found themselves cut off from their communities.

This phenomenon has emerged largely unremarked (I haven't seen a reference anywhere). But I have a sense that people, if they think about it, will discover that they haven't been reading their email so diligently nor visiting the online discussions so frequently. I have sensed a drop in the number and frequency of posts in the lists that I monitor. So where are these people going?

One answer, of course, is the blog. The rise of half a million personal journals in just a couple of years shows, if nothing else, a yearning to communicate. But blogging has already peaked, and over the next year we will see more signs of its regression. Despite blogrolls, comment forms, trackbacks and more (all of which are showing early signs of spam pollution), blogging is essentially an individual activity, not a participation in a group.

This mass of people will be cast adrift once again, searching for a way to form a group. There won't be a single magic bullet application that meets this need. But a suite of tools, ensuring bloggers not only the capacity to write, but also the chance to be heard, will begin to evolve through the new year. Part of this will have to do with the email redux, which will allow readers to select their sources. The other part will have to do with effective personalization.

Blogging without writing

One tenth of one percent of the people write publicly. Well, OK, I can't validate this figure, but it has been a rule of thumb for me for about a decade. If you have a thousand readers on your website, one person will post regularly to the discussion board. If you have a thousand mailing list subscribers, one person will post the bulk of the messages. If you have a thousand internet users, one person will create (and maintain) a blog (people may observe that two percent of internet users currently blog, but I see this as an indication of the scale of the coming shrinkage of the blog community).

Most people, therefore, will not write, thus robbing the internet community of a valuable resource. The views and opinions of these people constitute font of information. We have only been able to capture that information indirectly: we track the number of hits on a web page, we track individual browsers with cookies and web bugs. Tools like the Google bar and Alexa try to capture and report personal internet usage.

Right now, spyware has a bad reputation, and deservedly so, as the results disappear into some corporate vault, only to later haunt you in the form of vaguely targeted spam. But if the results didn't disappear? What if you could control these results, wearing different profiles for different browsing routines, clicking on an evaluation as you read, adding a comment or annotation if you felt like it, capturing and collecting your own personal library as you went along? Not a blog, because a blog is about writing, but a way of communicating what you think is important.

The early indications are already out there, and in the next twelve months we should be watching for some form of non-blog blogging to emerge.

Personalization finally works

Very few people select a wardrobe composed entirely of clothing made by one company, but that's the model personalization has attempted emulate in the past. It's as though Armani had defined personalization as the act of showing you only clothes in your size. More useful than it was, certainly, but the providers of personalization have been left scratching their heads wondering why people didn't flock to their wares.

Personalization is about choice, and so not surprisingly efforts to personalize within an environment of restricted choice have not been successful. Even technologies are forward looking as RSS have followed thus far the brand-first approach to feed reading. You subscribe to Wired News, or CNet, or Instapundit, and put up with a certain amount of annoying off-topic content to get the stuff you want. But all that's about to change with the advent of topic based (or geography based, or affinity based) mixed feeds.

2004 could be the year personalization of the web finally succeeds (it will definitely make a mark, but it could be a few years before it reaches the mainstream). By combining the information provided by non-blog blogging with tailored feeds drawing resources from hundreds or thousands of sources, readers will be able to be presented exactly what they want. Into this same environment will be piped whatever replaces email, so that all a person's essential web reading (and very little non-essential web reading) will be available through a single application.

This isn't, of course, personalization the way it was pushed in the late 90s, where the idea was that advertisers would be able to push exactly the content you wanted - or they wanted (this was never clear). It's something very different, and commercialization will be a greater challenge - but offer, when it finally succeeds, much greater payoff.

Learning objects at last

Much has been made, in some circles at least, of the potential of learning objects. Vast sums of money have been spent on learning management systems that emulate the functionality of those great (and now extinct) e-commerce systems of the nineties. The next result has been e-learning largely regarded as irrelevant and boring, and while it may be true that students in an authoritarian environment may be forced to learn this way, there is no great enthusiasm, at least, not after the initial pleasure of escaping even more boring lectures has worn off.

For all that, learning objects will come to the for in 2004 or shortly thereafter, but not as cogs in a centrally packaged learning design. Learning objects - or, as some will start calling them, learning resources - will begin to reach their potential outside the mainstream. When people who use informal learning - as much as 90 percent of learning, according to some estimates - the demand, and therefore the production, of learning objects will increase dramatically.

Much to the displeasure of those who invested in such content technologies, the vast majority of learning resources will be free, and the internet will be an increasingly viable alternative to a traditional education. Good thing, because funding patterns for traditional education will not change: tuitions will rise, classes will be cut, and the minute independent certification becomes widespread (could be 2004, but probably later) the educational system will enter a full scale crisis from which it will not recover.

New hype: simulations

Smart people have realized by now that the future of commercial content lies in higher end production that cannot be emulated by a 16 year old with a computer and an attitude. This is why the music industry has turned to music videos as its salvation, the commercial audio track being almost a thing of the past, and this is why the people who consult for the industry have been embracing simulations in a big way.

What's more, simulations have legs. They provide a compelling alternative to traditional content delivery because they engage the learner. A simulation is not just some scripted presentation of instructional material, it is a representation of that material in a manner that places the learner within a context in which the learning would be used. Simulations, therefore, will be hyped like crazy for the next couple of years - just long enough to the aforementioned 16 year old to get his hands on sophisticated simulation authoring tools and, with his enthusiasm, imagination and lack of restraint, put the content publishers to shame.

Attacking Open Content

The defining issue of 2004 will be open content, and more importantly, the launch of the most aggressive attacks yet on the emergence of open content. The real threat facing the content industry (and this includes music, video, text, software and education) is not content piracy, it is the availability of high quality free content being distributed in competition with the commercial product.

The best evidence of this is in the news media, mostly because newspapers offer the most technically low-end product. Even newspapers that are *not* being pirated on the web (and that's most of them) are suffering from the impact of online competition. MIT's Open CourseWare project instantly vaporized dozens of business plans. Wikipedia has more readers - and, these days, more clout - than Britannica. Linux is being seen more widely as an alternative to Windows. Open access journals are forcing publishers to retrench. The list goes on.

The attack on open content is intended to drive it from the marketplace. Part of this is legislative - with a widening copyright and patent regime, some open content is simply being declared illegal (which is why we see corporate support for even the most absurd patents). Part of this is promotional - a system-wide advertising campaign aimed at executives is stressing the risks of

open content, both in terms of legality and reliability. And part of this is strategic - corporate alliances are forming to create closed content markets on the desktop, for example.

This is a last desperate gasp before the bottom falls out of the content industry completely. Wise investors are already noting the acquisitions of publishers and music labels. Content is well on its way to being a value-add, something that you might attach to a product, but not something that *is* the product. Apple uses music to sell iPods, not iPods to sell music.

IP Communications, finally

Finally, a little out of left field, comes another revolution sweeping the web: IP communications. This may sound odd, as the internet just *is* IP (Internet Protocol) communication, but in fact we have been using alternative systems - such as the telephone, television, and even the post office - much more frequently. That's all about to change.

The biggest fuss will be made about voice over IP (VOIP), but this is just one aspect of the consolidation of communications technologies. Television - especially live television, such as sports coverage - is on the verge of being replaced (and just in time, too, as systems like TiVo kill the advertising market). 2004 is the hype year for this technology - 2005 is the year consumers rebel, as they realize they are bing charged analog prices for digital technologies, and that cheaper (or free) alternatives are available.

The dark horse in all of this is the resurgence of videoconferencing. The old, unreliable (and expensive) systems will be phased out over the next few years in favour of IP videoconferencing. Combine this with large flat screen displays (still too expensive to justify the hype they will get, but looming large in the corporate market) and you have a much more compelling experience than you can imagine.

2004, in Retrospect

2004 will be looked on as the year in which everything changed, but nothing changed. We will cross some significant barriers in 2004, but the changes that emerge from this turbulent, uncertain year will take several more years to mature. When we look back, we will see that 2004 was a lot like, say, 1996 - the new infrastructure will be in place, but the massive discovery will not yet have taken hold, and the sceptics more often than not will appear to be holding the ground. Don't be fooled by this.

Moncton, December 30, 2003

Online Conference Discussions

Increasingly conference organizers are thinking of adding an online discussion to the in-person proceedings. This is a good thing to do and strongly encouraged, since it adds a dimension not possible to achieve with a strictly in-person event. This paper was written in response to a request for advice by the organizers of one such online event, and while it is by no means the last word on the subject, it constitutes a good overview of how you can approach such a project.

The first and foremost thing I would advise concerns the interface. My experience is that forums like this tend to adopt overly complicated interfaces. I would suggest keeping the interface as clean and as simple as possible, something that keeps searching for the discussion to a minimum. Drupal[1] is very popular and widely used, and as you will see, the price is right. Many people have experience with this interface, and it is intuitive to those who are new. Significantly, there are no major barriers to participation, though control can be enabled by requiring a login to participate. Please do not use a proprietary conferencing system, since you are paying money you don't have to and since many such systems require the use of specific operating systems and browsers.

Use of a system like this adds capacities that will be necessary for your discussion. Specifically, you will want to add an RSS feed and email notification of new topics or responses. This allows people to stay up to date without having to remember to visit the web site each day. This also allows people to follow the discussion even though they aren't formally a part of it.

The audience: there may be some resistance to this - but it is important to remember that most discussions, most fora, have an audience consisting of people who are interested but who don't have time or inclination to take part. It should be possible to read the posts without logging in. If the discussion is sufficiently interesting, it will attract a wide readership.

To attract a large base of participants and audience members, it is necessary to advertise. A series of notices should be planned, leading up to the opening of the discussion. Probably these would be coordinated with the general conference notifications, but it should be kept in mind that discussions will attract a different audience than the conference itself. Notices should therefore be sent to major e-mal lists (WWWDEV, WWWEDU, DEOS, ITForum, TRDEV, and others). They should also be sent to major bloggers in the field.

The discussion itself should be longer than the conference, and leading up to it. Online discussions typically progress at a slower pace than in-person conferences, because people are distracted by other things and take longer to post replies. A good discussion period (based on my experience with things like

[1] http://drupal.org/

Net*Working[2] is about two weeks. Longer, and people lose focus. Shorter, and people are unable to get into the flow. The discussion should lead to the presentations at the conference, and while the conference is on, participants in the discussion should get updates. More on this below.

Discussion should be focused into topics; I have yet to see a viable online event discussion that wasn't led in some way. Good models are provided by ITForum[3] and IFETS[4] (though I don't like their website set-up). Typically, a discussion paper is posted on the site and comments are invited surrounding that paper. The paper's author should be available on a daily basis to add to the discussion, posting responses and sometimes seeding with more commentary. The papers should be invited and vetted; if you have saved money on the discussion list software then this can be used to induce higher profile authors to contribute their work (though many, especially government employees, will require the option to contribute for free).

Though it is not typically necessary to moderate the discussions, a conference moderator should be available just in case. The typical role of the conference moderator will be to provide technical assistance (if the moderator is not technologically astute, have a tech person write those items - the moderator does not need to be a single person, simply a single persona), to introduce the next paper/speaker and place the discussion into context, and perform general housekeeping chores.

One thing IFETS does that is very nice is to have the author summarize the discussion at various intervals. For one thing, this encourages discussion, since people want to be included in the summary. Additionally, it makes it easier for browsers to get the gist of the discussion without having to read all the posts. In addition, the discussion summaries are often more interesting than the original paper, since they are the result of many voices. It should be noted that a discussion, and hence the summary, may drift from the original objective of the paper. While completely off-topic discussion should be discouraged, it is important to allow the participants to wander. Often an important issue is teased out through the discussion of an apparently unrelated paper.

It is also worth noting that discussion of a particular paper need not be restricted to the discussion forum. As the papers are distributed (since you are using RSS), bloggers may comment on their own blogs. It is worth aggregating these and associating them with the discussion. Drupal has a built in aggregator to help with this. The RSS trackback feature (which might not be implemented in Drupal yet) is also a good tool for harvesting comments. For the Merlot conference last August, I wrote a conference-specific harvester.[5] There are many ways to import external discussion to the site, and they are important for allowing people to participate from their own space and using their own tools.

The selection of the papers is important. First, the papers selected must be the sort that can be discussed. Product show-and-tell papers don't really raise many discussion points, nor do narrowly focused surveys or studies (obviously, if the product or survey is controversial, an exception applies).

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[2] http://www.downes.ca/nw2002/netdaily_home.htm
[3] http://it.coe.uga.edu/itforum/index.html
[4] http://ifets.ieee.org/discussions/discuss.html
[5] http://www.downes.ca/merlot.htm

Papers devoted to the study of issues, proposals, and theory are more suited to discussion. The intent of the paper should be to inform as well as agitate - it is to be remembered that conference participants may not be familiar with the background of the matter under discussion. Hence, a good literature survey (with links, not references, since many readers do not have collections of journal articles easily at hand) is essential.

It is also worth remembering that the web is a visual medium. Papers should include diagrams and charts to ease comprehension. Dave Pollard's How to Save the World[6] blog is one of the best examples I can show of a good online writing format. Also see Jay Cross's Internet Time[7] blog (don't put so much on a single page as he does though; it will crash reader browsers).

An open and fluid graphical design is important. Though text is an important component, readers should not be presented with a solid wall of grey. Additionally, the papers should be of reasonable length (though for a formal conference presentation up to 2000 words could be contemplated), the paragraphs short and manageable, and plenty of white space provided to ease reading. Longer papers should have sections for easy identification. It is essential to allow readers to easily cut and paste blocks of text into their responses, so papers should be presented in HTML, not PDF or some other proprietary format.

Since the discussion is associated with the conference, it seems reasonable that conference papers would be selected for discussion. It may therefore be necessary to work with the author ahead of time to prepare the papers for discussion, since the typical conference submission is unsuitable for easy reading on the web. If you can, and if necessary, provide the author with graphical and design support. It may be necessary to remind the author that the online paper is different from the conference presentation, and that readers will need cues, aids, links and diagrams.

During the online discussion, introduce each paper in sequence, one every three days or so (one a day is too short; remember that you are dealing with time differences and that it will take 24 hours to get even the first round of responses). This allows you about five papers for your discussion, so you can pick and choose from the conference submissions (in an important sense, the online conference requires more rigorous selection than the conference itself). Note that discussion of one paper will not end when the new paper is posted (though the formal discussion ends at that point, and the summarization activity ends at that point), so place the more important papers first in the sequence.

When the conference itself takes place, it is most valuable to integrate the online discussion with the conference activities. Visitors to the conference should have easy web access to the online discussion, and the online discussion should be promoted. Even if the creation of new discussion topics was restricted prior to the conference, this should be opened up. As each paper is presented in person, open up a new discussion with access to the paper in HTML format. At the end of the in-person presentation, advertise the existence of the discussion and provide the web address to the online conference home page (where, if you are using Drupal, readers will be able easily to find the paper discussion).

[6] http://blogs.salon.com/0002007/
[7] http://www.internettime.com/blog/index.html

A nice touch would be to make online discussion transcripts available to in-person conference attendees. Distributing these printed versions of the online discussions will enable access to people who do not have a computer and may inform the in-person discussion that takes place. It also reminds people of what they missed by not participating in the online discussion (always plan for next time).

If possible, online participants should be able to view the paper presentations in progress and discuss them as they occur. Hence, support for a streaming video (or at the very least, audio) presentation is recommended. Three major platform options exist here: Windows media, Real Media, or Apple. You can find a good overview of options and requirements at this streaming media research page[8].

Live online discussion is also an interesting thing to add (though your speakers may become uncomfortable). Several conferences have experimented with placing a separate video screen in the conference room to allow typed comments via a chat service, instant messenger. If you do this, make sure the text is large enough to be read by audience members. The speaker, as well, should be able to view the comments. This can be done very cheaply - set up an ICQ account[9], have a computer logged into the account attached to a digital video projector and showing at the side of the room, and allow participants to submit messages either directly through ICQ or on the web through ICQ's web interface. Don't use IRC; most participants won't have a client installed.

After the conference, it is important to preserve the online component, since this will be the best location for access by later researchers. Plan for archiving in advance. The content submission features of Drupal can be turned off and the discussion simply presented as web pages. Links to the streaming media archives can be provided. The ICQ transcript should be captured (ICQ has a text capture and save feature) and added. Each discussion paper in the conference - whether it was part of the online pre-conference discussion or not - can be presented not as a single blob of text, but as a set of resources: audio, video, chat transcript, discussion transcript, and the paper itself. If an official conference publication is produced, include not only the original paper but also the discussion summary provided by te author.

Right now, the online version of a conference is usually an afterthought, something derivative, and typically attended by a small cadre of early adopters. In the future, however, the online component will be most peoples' primary access to conferences. It can be (and should be) free for online participants. Conferences that employ an online component will tend to be much more widely publicized, and will reach a much wider audience. Actual attendance at such conferences will be more in demand, since the overall experience will be of higher quality. And the preservation of discussion and conference archives ensures the lasting impact of the work beyond the individual memories of the participants.

[8] http://www.nwfusion.com/research/streaming.html
[9] http://www.icq.com/

More Advice

E-Discussion Toolkit[10] Good overview resource outlining the major steps involved in hosting an online discussion. Each step is described, with additional resources offered. Navigation is at the top of the page, so you'll have to scroll back up to find the next page.

The Moderators Homepage[11] "This page is a growing set of resources for moderators and moderators-to-be of online discussion in both academic and non-academic settings. Where possible I have linked to the full text of articles, and provided abstracts on this page. As this is part of my dissertation research, I would very much appreciate your suggestions for additions to these listings. The topics of "computer conferencing" and on-line teaching are closely allied, so I am including references in those fields, too."

Online Collaboration and Exchange Consistently good commentary and references to tools and advice by Robin Good.

I*f You Build It, They Will Come*[12]. "In compiling this article both authors reviewed material addressing current practices in assessing student participation in the online classroom. Careful attention was given to information related to the construction of threaded discussions as well as insight into the concerns that a facilitator may have when determining the value of threaded discussions within his/her online course."

Creating a Connected Community? Teachers' Use of an Electronic Discussion Group[13] Looks at the use of online discussion forums in professional environments and in particular at the development and use of the a Special Needs Coordinators (SENCo) Forum in the U.K. Discusses the use of the forum as an information exchange, the forum as a "virtual respite" and using the forum to create a sense of community. That said, the study accurately captures the a weakness of many discussion groups designed for education.

The Threads of Conversation[14] People who moderate online discussions and chats would do well to look at this article. Its key insight is that web discussions are what it calls 'hyper-threaded' - multiple threads emerge, get tangled, and rise and fall and rise again through time.

Moncton, January 31, 2004

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[10] http://www.worldbank.org/devforum/toolkit.html
[11] http://www.emoderators.com/moderators.shtml
[12] http://www.elearnmag.org/subpage/sub_page.cfm?section=4&list_item=3&page=1
[13] http://www.tcrecord.org/Content.asp?ContentID=10502
[14] http://www.darwinmag.com/read/swiftkick/column.html?ArticleID=139

Beyond Learning Objects

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In a presentation I gave at an eduSource[15] meeting in Toronto last sprint, in a now infamous example, I gingerly picked up a piece of tissue paper and proclaimed, "This is a learning object."

The purists object, of course. We are told that a learning object must be, at a minimum, a digital resource. Today we are also told that it must contain a pedagogical intent. Sandy Mills, for example, tells us that a learning object is something that is "an object or set of resources that can be used for facilitating intended learning outcomes."[16] The idea here is that a learning object contains the instruction, that the "instructional value" is "intrinsic" to the resource.

In my presentation[17] at CADE 2003 I presented an alternative interpretation: that what makes something a learning object is not what it is, but rather, how it is used. What makes the tissue paper a learning object is that it was used as a resource to support learning (and, in the case of this particular tissue, reused, much to the amusement of the assembled).

Another way to approach the same idea, and the direction taken in this article, is to assert that developers of online learning should go beyond learning objects in the assembly of learning resources. No matter how narrowly one defines the concept of the â□˜learning object', it remains nonetheless true that things that are not learning objects may play a very similar and necessary role in online learning.

The map of the wall of a classroom, for example, is not in any way intrinsically a learning object. With rare exceptions, it is not designed for the purpose of teaching, merely for the depiction in visual form of natural phenomena and political boundaries. The map on the wall, however, becomes a teaching aid when the teacher uses it to support learning in some fashion.

The maps on the wall in my school illustrated the usefulness of online content, depicting as they did ‘French West Africa’, ‘Trans-Jordan’ and ‘Tanu Tuva’. These political entities, long since history by the time I began my studies, could not be updated on paper. The school had similar problems with flags, the names of cities and political leaders.

[15] http://www.edusource.ca
[16] http://www.alivetek.com/learningobjects/site_paper.htm
[17] http://www.downes.ca/files/widercontext.ppt

In previous articles in this series I have talked of syndicating learning resources, and it should be evident that the sort of resource that most benefits from syndication is that which changes on a frequent basis. Assuming that a law course, for example, had some use for the text of current legislation, syndication of this content into a course would be advantageous, even though it is not considered to be a learning object or, indeed, learning content of any sort.

A brief reflection will reveal a wide range of digital content that could, if accessible inside an online course or learning environment, would greatly ease the instructional process: the handbook of chemistry and physics, global weather and environmental information, sports statistics (for math class), legislation, briefs and white papers, geographical and geopolitical information - the list is endless.

We can go beyond learning objects in other ways as well. When designing the PEGGAsus project[18] for engineering and geology professionals in Alberta, I outlined the idea of presenting learners with a 'learning desktop' that would list new educational opportunities. In discussion with APEGGA[19], the organization sponsoring the initiative, I was told that the potential students would like also to see classes, seminars, lectures and conferences listed in the same environment.

Not even digital, these learning opportunities fall well beyond the traditional definition of the learning object. Yet they fulfill for these students the same function as an online course or short multimedia presentation. So the PEGGAsus project, in addition to listing online learning opportunities, listed in the same environment and in the same format these real-world events. In one sense, we threw the definition of learning objects out the window when we designed PEGGAsus; in another sense, these events became learning objects, at least, to our way of thinking.

When you get past the idea that learning objects must be digital resources of a particular format, a world of opportunity opens itself. Why, for example, should the following not be treated as learning objects: a classroom seminar, a booking for a helicopter flight simulation, a study trip to Malawi, a microscope, an interview with an expert in the field, access to an online discussion list, the loan of a trombone…

One wonders why, when people think of online learning, people think that it must consist entirely of a person working in front of a keyboard and monitor (one also wonders why, when thinking of learning, people think it must be something that takes place in a classroom). Educational opportunities - and learning 'objects' - abound in every community. By tapping into the use of metadata to connect potential students with potential 'teachable moments' the range of learning could be greatly extended.

[18] http://www.pegasus.ca
[19] http://www.apegga.ca

The mechanisms for realizing such a system now exist, though it will take some time to implement. The first is the registration, in metadata format, of all possible educational activities and resources. This means extending our conception of learning object metadata, and adopting a wider, more flexible metadata language such as the one I describe in my technical paper, Resource Profiles.[20] It also requires the development of systems that access this metadata, organize it, and present the resource information in contextually appropriate moments in the student's learning environment. And it requires the implementation of web services that will enable the student to conduct a transaction - such as the reservation of a tool or enrollment in a class - with the resource provider.

Taking full advantage of the resources available probably also requires a different approach to education in general. Even in the classroom, but especially online, learning is thought of as something that must be planned, organised, and assembled ahead of time. True, the best teachers react to changing situations and events, but this is almost impossible in contemporary distance or online learning.

The point of entry in learning today is at the topic â□“ a class or a lesson is developed around a specific learning objective determined in advance by the educational institution. But the pre-selection of a topic may not have anything to do with a student's current needs, and more, make take no advantage of new and valuable resources that have become available. It may be more appropriate, in order to best take advantage of the new availability of learning resources, to redefine this point of entry, and to base it on a task, a current even, a job function, or a project - in other words, something directly relevant to the student at the moment.

Moncton, February 13, 2004

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[20] http://www.downes.ca/files/resource_profiles.htm

The Semantic Social Network

Two types of technologies are about to merge. The technologies are content syndication, used by blogging websites around the world, and social networking, employed by sites such as Friendster[21] and Orkut[22]. They will merge to create a new type of internet, a network within a network, and in so doing reshape the internet as we know it.

The purpose of this article is two-fold. On the one hand, it is to describe the emerging Semantic Social Network (SSN) and to sketch the nature of the new internet we are about to experience. And on the other, it is to promote the development of the SSN by describing to developers the sorts of systems required and to suggest how the SSN can be used.

1. Starting Points

To begin, allow me to briefly outline where we are today by describing the two types of technologies that are about to merge.

RSS - or Rich Site Summary (or Really Simple Syndication) - is a metadata format used to describe online content. An RSS file, sometimes known as a 'feed', is an XML file summarizing a website's contents. The RSS file consists of two major sections: a 'channel' element, that describes the website as a whole, and a series of 'item' elements that describe individual resources.

There are various sorts of RSS formats, and even an emerging format that does the same thing, called 'Atom', but these are for the most part interoperable. It doesn't really matter which sort of RSS (or Atom) you use. These feeds are collected - or 'harvested' - by RSS file readers or aggregators. At first, it was only possible to read one feed at a time, but new services have emerged that combine lists of items from several feeds, creating topic based or geography based feeds.

A great deal could be said of RSS, but the essential points for this discussion can be summarized in a few words: RSS feeds describe content using XML, and they are gathered and reorganized by aggregators, creating content syndication, a means of sharing content quickly and efficiently.

Social Networks - the social network has a history almost as long as RSS, having been piloted with sites such as FireFly in the late 1990s. Aspects of social networks have long been present in dating services such as Match[23] and Casual Kiss[24]. They have gained increasing popularity over the last few years with the development of sites such as Friendster and Orkut.

A social network is a website whereby individuals describe themselves in a personal profile, reveal themselves through participation in communities, and form networks of interactions by declaring one

[21] http://www.friendster.com/
[22] http://www.orkut.com/
[23] http://www.match.com/
[24] http://www.casualkiss.com/

another to be 'friends'. The expressiveness of a social network is created through these networks, as 'friends of a friend' may be introduced to each other as having common interests, even though they may not have met previously.

2. Making Contact

Bloggers have long been aware of the networking possibilities inherent in their medium. This was expressed early on through the use of a Blogroll[25] on their website, a list of other blogs that the author of a given blog reads frequently. As a more precise accounting of the relations between authors was desired, bloggers began inserting into their RSS feeds a 'trackback' URL, so that one blog could notify another blog when a resource was cited or passed along. Techniques such as blogchalking[26] were used to explicitly identify communoty affiliation.

People like Seb Paquet[27] and Lilia Efimova[28] have for the last few years drawn this out explicitly. Efimova writes, "What weblogs create is two way awareness. If I read someone's articles online or check personal pages or "know" a person by reading comment in online discussion, in most cases this is one-way "getting to know": this person is not aware that I'm learning about him or her. Weblogs change it: if another blogger links to your weblog as least ones, he is likely to get on your radar."[29]

The relations formed between bloggers is similar to that formed between people in a social network. "This awareness creates something that I don't have a good name for. It's close to familiar stranger, but there is some kind of interaction (or, may be linking is similar to looking at person a physical environment, you don't expect a feedback, but another person is likely to notice that you have looked). I would say that this connection is one degree stronger than 'familiar stranger'[30] connection. And then this connection may turn into something stronger - 'weak-tied' conversations, with one more degree stronger. Then it may result in joint actions and "strong ties" at the end."

With the rise of social networking, bloggers have been looking more explicitly at the comparison between the two. There is a resistance, on the part of some bloggers, to creating an 'identity' on a social network: their blog is their identity.[31] Dina Mehta: A blog is "A profile that changes, grows, flows - not a cold resume or ‘about me’ page filled with past achievements and accolades - but is touchy-feely and one that says more about me through my thoughts, interests, preoccupations, rants, rambles and angst - that makes me more than just a consultant or a qualitative researcher - or a demographic statistic, ‘female blogger from India’."[32]

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[25] http://www.blogroll.com/
[26] http://www.blogchalking.tk/
[27] http://radio.weblogs.com/0110772/
[28] http://blog.mathemagenic.com/
[29] http://blog.mathemagenic.com/2003/12/21.html#a881
[30] http://berkeley.intel-research.net/paulos/research/familiarstranger/
[31] http://www.corante.com/many/archives/2004/01/27/dina_mehta_and_lilia_efimova_on_weblogs_asvs_snss.php
[32] http://radio.weblogs.com/0121664/2004/01/27.html#a356

3. A Broken Network

If the blogging network becomes a social network, however, what explains the rise of social networking services? That there has been a rise is indisputable. Research by Judith Meskill revealed more than 100 social network sites early in 2004. The launch of Orkut resulted in a storm of discussion across the internet.[33] It is evident that social networking sites are filling a need not provided by the blogging network.

What social networking preserves, that blogging does not (at least, not in an evident way) are identity and community. In the blogging network, links are formed exclusively between content items. A blogroll links to blogs. A linkback links to posts. While the author of a given article may be carried from post to post, information about the author - such as the author's blogroll or network of friends - is lost, obtained only through a tiring process of tracing back through the link to the blog home page and blogroll. This is alleviated somewhat with the share your feeds[34] service, but the link remains to content, not people.

And there are no explicit communities in the blogosphere, no way for an individual blogger to declare affinity with an entity rather than a piece of content. For many bloggers, this is a barrier. A blogger's content will become known only if it is shared by other bloggers, but other bloggers only read each other. If there is community in the blogging world, it surrounds the sites of major bloggers. The influence of these bloggers is exaggerated by the inability of others to penetrate this sphere, and is reflected in what Clay Shirky calls the 'power law' of blogging.[35]

Shirky depicts the power law as a normal state of affairs. "In systems where many people are free to choose between many options, a small subset of the whole will get a disproportionate amount of traffic (or attention, or income), even if no members of the system actively work towards such an outcome." However, this observation is based on a non-random set of observations. No such concentration of 'power' occurs in the telephone network, for example: there is no small set of individuals that receives the bulk of the telephone calls.

If inequality is a natural phenomenon, it is a phenomenon that is natural only in an environment of scarcity. In broadcast media, few people have access to the airwaves, and hence there are stars. In a telephone network, everybody has access to the airwaves, and no such stars emerge. The existence of a power imbalance in readership of weblogs is an indication of scarcity, and it is this scarcity - the opportunity to be heard - that is redressed through the formation of social networks.

"I've been playing around with Google a bit and I've seen some critiques of the inevitable and impending commercialization of the service, but very few real comments on a sociological level, i.e. we have this huge mass of people so desperate for a way to CONNECT that they put faith in what most of them have

[33] http://blog.topix.net/archives/000010.html
[34] http://feeds.scripting.com/
[35] http://www.shirky.com/writings/powerlaw_weblog.html

to admit, in their more self-aware moments, is a flawed attempt to do so. There's something in that which frightens me."[36]

4. There is no 'There' There

The rise of social networks has brought with it an almost immediate backlash. This backlash began with widespread disillusionment with sites such as Friendster and as rebounded with fresh critiques of Orkut. The criticisms can be summarized with a single phrase: there is no 'there' there.

Friendster foundered on the problem of fictional identities. "Currently, however, Friendster has a problem with 'fake users', generally imitators of celebrities. Since anyone with an email address can create a Friendster identity, some people make up these fake identities as a joke, which several others add to their list of friends."[37] This, in turn, was reflective of a deeper problem: "there is currently no way to maintain a consistent digital identity online. This is essential for most social systems, since most such systems must have a way to link actions to individuals over time."

In other words, an identity on Friendster - and also on Orkut - is empty, consisting of nothing other than the profile posted into the service. The many things that make up a person's identity - what I have elsewhere characterized as a 'profile'[38] - are missing. A Friendster identity is a hollow shell, and as a hollow shell is a prime candidate for spoofing.

Gary Lawrence Murphy writes of Orkut and social networks in general, "they are not social networks, only flat-taxonomy directories of questionnaire replies, and badly designed questionnaires at that (and) because they do not interoperate, because they cannot share data or interchange or allow identity migrations, they are essentially anti-social, building protectionist walls around people (called 'clubs' or 'communities' but really meaning the opposite)."[39]

In a social network, the concept of friendship - and hence of the network - is empty. Thus abuse[40] is a natural first consequence. So is the idea of refining a taxonomy of types of friendship.[41] [42] Such efforts, however, do nothing to mask the fact that, in a social software system, there is nothing at the end except a short profile and, if we're lucky, some contributed comments. The richness and subtlety of a blog identity, mentioned above, is missing.

5. Distributed Social Software

It is perhaps a bit of an oversimplification to say this, but the problem could be summarized with the following observation: the blogging network and RSS link content, but not identities, while the social

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[36] http://www.flutterby.com/archives/comments/6785.html
[37] http://www.lokislabs.org/~loki/weblog/archives/2003/06/12/friendster_and_digital_identity.php
[38] http://www.downes.ca/files/resource_profiles.htm
[39] http://www.teledyn.com/mt/archives/001649.html
[40] http://blogs.it/0100198/2004/01/29.html#a2216
[41] http://www.livejournal.com/users/news/75899.html
[42] http://www.flickr.com/

software network links identities, but not content. Exaggerating this problem, on the side of social software, is that a genuine network does not yet exist. Social software sites impose barriers to entry, and are not connected with each other.

The first step, therefore, toward addressing the shortfalls of the two systems is to break social software out of its site-specific mode. This has been suggested by numerous people already. Eric Gradman, for example, noting the problems already described, proposed 'distributed social software' having at its core a 'friend aggregator'.[43] Such a system already exists in the form of the Friend of a Friend[44] project (FOAF).

The idea of FOAF is that it is like RSS for personal identities. To enter the network, a person creates a FOAF file. Like RSS, an FOAF file is an XML file that can be aggregated by harvesters. The FOAF file can be used to express the same content as a person's Friendster or Orkut profile would contain. But the creation of a FOAF file does not depend on membership on a specific site. Any person can create a FOAF file using a FOAF generator[45] and place it on their home page. By submitting the URL of the FOAF file to an aggregator or by linking a FOAF file on their home page.[46]

The FOAF format, in addition to defining personal profiles, can define communities as sets of references to individual FOAF files. The FOAF project home page describes the use of FOAF to define affinity groups, project teams, and more. As Edd Dumbill writes, "I hope you can see the power that merging offers. By aggregating and merging the FOAF files, you can achieve the same effect as operating a centralized directory service, without any of the issues of single points of failure or control. This is a very attractive feature for many communities for which decentralized or devolved control is a requirement, either because of political structure or sheer size."[47]

This phase of the transition to the Semantic Social Network has already begun. Social networking sites such as Tribe[48] have begin to realize that they must allow people to create FOAF profiles from their network profiles.[49] The easy creation of FOAF files will have the same impact on social networking as a tool like Blogger [http://www.blogger.com] had on blogging. It will no longer be necessary to own a website to participate. It is, no doubt, only a matter of time before blogging software generates FOAF files, for they would otherwise lose the advantage to social networking sites.

6. Who I Like is What I Read

One of the major barriers to the use of a FOAF file is in the creation of a list of friends. This is the service social networking provides: it is possible to add a friend (usually on request) by clicking a few buttons.

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[43] http://www.gradman.com/projects/dss/final/index.html
[44] http://www.foaf-project.org/
[45] http://www.ldodds.com/foaf/foaf-a-matic.html
[46] http://www.xml.com/pub/a/2004/02/04/foaf.html
[47] http://www-106.ibm.com/developerworks/xml/library/x-foaf.html
[48] http://www.tribe.net/
[49] http://socialsoftware.weblogsinc.com/entry/8658888444587534/

But in the wider FOAF world, it has until recently required that information about friends be filled out manually into a web based form.

Such a construction of a list of friends, additionally, suffers from the same weakness of a list of friends in Friendster or Orkut. It is artificial. But to be of value, a social network must represent some sort of interaction. As David Weinberger writes, "But if you want to get at the real social networks, you're going to have to figure them out from the paths that actual feet have worn into the actual social carpet."[50]

Jon Udell notes, "I realized long ago, for example, that maintaining a blogroll by hand was going to be a losing proposition, and switched to a system that simply echoes the list of feeds to which I'm currently subscribed."[51] For example, FOAF autocreation[52] enables a person to generate a list of friends using their own OPML file. Since an OPML file lists the blogs a person reads (their blogroll), and hence (via content) a list of people, it is a straightforward matter to read an OPML file and generate a list of friends.

Such a solution is not complete, however. For one this, it would need to be incorporated into other tools; the reliance on a specific website to author a FOAF file creates unnecessary complexity. Additionally, this merely pushes back the problem of creation one step: it is still necessary to author an OPML file. Stand-alone OPML generators exist[53] and OPML may also be generated auto-magically by blog reading software. But what is needed, specifically, is a service that (a) creates a personal profile, (b) creates a blogroll, and hence creates the fully descriptive FOAF file.

Jon Udell again, "The reality is that every document published to the Web can help to define a relationship -- by linking to, quoting from, or more subtly supporting or refuting another document. Of these actions, linking is the only one that's always unambiguously machine-readable."[54]

Use of the FOAF autogenerator also reveals a second problem. Links in OPML files are to RSS files, or in other words, to content. A further step is required to locate FOAF files, and while the autogenerator tries to do this, the results are spotty at best. This points to an earlier noted problem: RSS files do not preserve identity.

7. Identity in RSS

It is perhaps a quirk of history, but the original definition of RSS did not include 'author' as a field in its item elements (using only 'title', 'link' and 'description'). Hence, in RSS as originally designed, unless the item being described was authored by the creator of the RSS feed, author information disappeared from references almost immediately.

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[50] http://www.corante.com/many/archives/2004/01/04/does_social_software_matter.php
[51] http://weblog.infoworld.com/udell/2004/01/04.html#a878
[52] http://www.tecknik.net/autofoaf/
[53] http://www.downes.ca/cgi-bin/xml/make_opml.cgi
[54] http://weblog.infoworld.com/udell/2004/01/04.html#a878

Later iterations of RSS (and specifically, RSS 1.0) address this through the use of the Dublin Core 'creator' field.[55] But while useful, the Dublin Core field points to people not via any sort of XML, but by using their names. The Atom syndication format goes further, creating a 'person' construct.[56] but while a URL is allowed, it is not clear that this URL points to an XML file.

RSS files should explicitly point to the author of items via their FOAF files. Though reference to a HTML file which contains pointers to FOAF files (i.e., 'autodiscovery') will do in a pinch, this is a needless complication. FOAF information can and should be available at the time an article is created (after all, authors create their own items) and may easily be embedded in an RSS file describing that item. Aggregators of these files can pick up a FOAF pointer as easily as it pucks up the URL to the article, and so if the article is cited in a blog, a pointer to the author's FOAF can and should be stored along with reference to the article itself.

As an aside: there is some ambiguity in the semantic web community about how to express pointers to XML files in metadata. As I outlined in a previous article[57] there is no clear means of determining, without actually opening the file, whether a given URL points to an HTML or an XML file. As Tim Bray wrote, "Everyone agrees that when you get confused about what's being identified, this is a bad thing and makes the Web less useful. As TimBL has said repeatedly: a resource can't be both a person and a picture of a person. Unfortunately, such ambiguity is not a condition that Web software can detect."[58]

In the same article, I proposed distinguishing between references to XML and references to HTML in the use of a URI, that is, by how it is placed in a metadata file. Specifically, I suggested that references to XML be contained in 'about' fields of metadata takes or address tags. Thus, for example, the 'person' element in an Atom file would point to a FOAF file as follows: and embedded links as follows: person's name. It seems reasonable to adopt the same protocol here, thus allowing designers of new systems to unambiguously know where to find FOAF information.

8. What Needs to be Done

The Semantic Social Network is tantalizingly close. As I posted to Orkut: An effective network could be created with very little:

- Get people to create personal metadata files. FOAF might do the trick, if extended. The personal file contains the usual profile details found on a site like this, plus options to say 'likes', 'hates', 'cool' other people.

[55] http://web.resource.org/rss/1.0/modules/dc/
[56] http://www.mnot.net/drafts/draft-nottingham-atom-format-02.html#rfc.section.3.2.2
[57] http://www.downes.ca/cgi-bin/website/view.cgi?dbs=Article&key=1061841698
[58] http://www.tbray.org/ongoing/When/200x/2003/07/24/HTTP-14

Needed: a simple FOAF management tool, the Blogger of FOAF, if you will, that people can use to create these files. A method for securing and verifying identity, to prevent fake FOAF files. A means of aggregating FOAF (already exists[59]) for use elsewhere.

- Reference to FOAF in other documents. FOAF by itself (like Orkut by itself, or any other sterile SN environment) serves no purpose. Place FOAF links into content metadata (such as RSS) and now the content metadata system and the SN metadata system can interact. Aggregators harvesting both FOAF and RSS have enormous expressive power.

- Extend FOAF, or RSS, or create a new type of format, for individuals with FOAF identities to attach values (like, dislike, loved) content items with RSS identities. Add to the mix. Aggregate.

I also wrote that SSNs work when...

- comments in boards point to profiles created by (and owned by) the people they describe, not isolated centralized islands like Orkut, Friendster, and the 100 or more similar separate sites.

- references to such FOAF (or similar) files - or something similar to FOAF files - are attached to content or content metadata (such as RSS), identifying the author.

- we can go to an aggregator and say, "Find all the articles by people that Clay Shirkey likes." or "Find all the articles about RSS by people who don't like Dave Winer." or "Find all the articles on Google by people who wrote articles that Jon Udell likes."

- when influence is determined not by the number of friends you can sign up, but by the usefulness of results produced by using your profile and preferences in a search.

- when all of this is used to do something, and not merely facilitate chatter.

9. The SSN Application

Possibly even by the time I finish writing this paragraph, the first semantic social network applications will begin to roll off the production line. A SSN application will combine these major functions:

- It will be a personal profile generator, like a social software site, that allows the user to create and maintain a FOAF file

- It will be a blog / comment / content reader that allows the reader to easily make notes about the item being read. In other woords, it will contain the equivalent of Radio's 'Blog This' button. [http://radio.userland.com/] In addition to typing a blog entry, readers may add the blog to their blogroll (OPML), indicate an affinity with the author or submit an evaluative rating.

- It will be a search / aggregation tool that uses FOAF and RSS aggregators to satisfy queries based not only on the content of an article but on information about the authors of those articles.

[59] http://eikeon.com/foaf/

- It will be an authoring tool that publishes not only blog posts but also an RSS file; the published RSS file will (automatically) include references to the author's FOAF and the FOAFs of any cited authors.

- It will allow the user to create and join communities, automatically tagging contributions to those communities (such as my posts to Orkut) so they may be syndicated to other readers, and so that the body of a person's contributions may be seen in a single place.

And - of course - much more. Because this basic functionality merely gets the Semantic Social Network off the ground. What lies beyond is limited only by the imaginations of software designers.

10. Why We Need a Semantic Social Network

What David C. Foreman says of learning software could be said of content-based software in general: "Most training and educational professionals have focused their efforts on learning in individuals, not organizations. [but] The competitive strength of companies and even countries is now tied not to physical resources but to the knowledge and skills of people. And these people do not work in isolation within companies; they work in teams, informal groups and in multiple roles."[60]

Foreman describes two major 'levels' of organizational learning: a 'contribution level', in which knowledge is created and input into the system, and a 'multiplier level', in which knowledge is shared and reshaped by a community, making the aggregation of the contributions greater than the individual parts.

At the contribution level, we see the advantages already cited of the blogging system: individuals learn by reading from others, they collaborate through blog conversations, they leverage what they know with new practices, and they build on the work of others to innocate. And the benefits of social networks can be seen at the multiplier level. People mentor each other through the formation of communities, they network and form new organizations, and they inspire each other by example and input.

Foreman: "The framework's levels and organizational capabilities are taken from the nexus between instructional design and organizational development where learning becomes both meaningful to the individual and to the organization. Some training and HR professionals may not want to enter this new organizational learning arena because it is ill-defined, complex and high-stakes. It is safer to retreat to our specialties. But organizational learning has great promise precisely because it is so important, yet poorly understood. If we come out of our silos, we have a lot to contribute."

What is true of learning organizations is true of online community in general. Content without community cannot achieve its full impact. Community without content is empty. It is only through the joining or fusing of these two levels that the full advantages of both worlds may be realized.

Moncton, February 14, 2004

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[60] http://www.internettime.com/blog/archives/001230.html

How RSS Can Succeed

I posted this item in response to RSS: A Big Success In Danger of Failure[61], by Bill Burnham.

I'm not so sure I agree that RSS is as deeply rooted in push technology as this article suggests, but I am in overall agreement with the main thesis. In particular, I believe that neither search nor classification will address the complexities introduced by large numbers of feeds. But alternative approaches will address these shortfalls.

What we need to keep in mind is twofold: first, that for the most part most content of most feeds will be irrelevant to any given reader. And second, as is suggested, metadirectories organizing and categorizing feed content provide enough filtering for most people.

As evidence, I cite my Edu_RSS service, and in particular, Edu_RSS Topics[62]. The output from this service is a set of highly focus, yet comprehensive, RSS feeds of interest to educational technologists.

Edu_RSS approaches the problem from two directions. First, it harvests from only a small subset of feeds - 300 or so out of the hundreds of thousands available. These feeds are representative - that is, since most of them are blogs, a collective gathering and filtering effort has already taken place. The actual list of sources numbers in the thousands, arguably the entire set of sources in the field.

After aggregating these feeds, Edu_RSS combines the content and organizes into a set of categories (or 'topics'). The topics are defined using Perl (and unix) regular expressions, a flexible filtering mechanism that allows the selection of numerous expressions within a single phrase. The use of regular expressions allows the service to identify string combinations characteristic of a given topic, and thus results in a well selected set of resources.

According to my website statistics, Edu_RSS is consistently one of the most popular URLs on my website, following only the two files that generate my referrer system (which is another story). The filtering system is very effective: if something significant is published on, say, learning objects, it will appear as one of the less than a half dozen daily items in the 'learning objects' feed.

The mistake made by the early advocates of push - and by a commentator just above - lies in the idea that 'brand' will replace intelligent filtering. Brand fails because in order for something to be a brand, it must appeal to a large mass of people. But if it appeals to a large mass of people, it will invariably disappoint people looking for something more specific. The early advocates of push tried to promote existing brands, and readers found in push nothing they couldn't find in mass media.

I have argued elsewhere that the only way to approach content location on the internet is to treat it as a self-organizing network. What this means is that inherent in the structure of the internet there are distinct layers of filtering mechanisms, each consisting of a "gather filter forward" mechanism. In some

[61] http://www.weeklyread.com/here/2004/02/20/rss_a_big_success_in_danger_of_failure
[62] http://www.downes.ca/cgi-bin/xml/edu_rss.cgi

cases, the mechanism is fulfilled by a human agent, as in the case of blogs. In others, it is fulfilled by automatic mechanisms, such as Edu_RSS. And it is likely that Robin Good's newsmasters will in their own way also play the same role.

What's important here is that each node of each layer need not worry about the rest, and need not be focused on the goal of the system. The agent seeks what is available, the way a retinal cell gathers light, and passes on what is relevant, the way a neuron passes on a signal. The filtering occurs not in the individual node, but through the independent actions of the aggregation of nodes.

The reason why this system works, while other approaches do not, is that there is no reasonable mechanism which can apply the vast requirements of filtering on a single resource. If we use metadata, the indexing soon outweighs the content. If we use search engines, each resource must be subject to extensive analysis to determine context (or, we do without context, which results in a search for 'calf' linking to sites on agriculture an anatomy).

The layered mechanism works because at no point is the entire weight of the filtering process concentrated in a single individual or a single resource. Decisions about selection and classification are made on a case by case basis using very coarse, and unregulated, mechanisms. It means that individual agents can work without the need for central control, with the only requirement for a functional system being an open set of connections between the agents.

RSS is, today, the transport mechanism of choice. There is nothing magical about RSS, except for the fact that it just is an autonomous agent system providing a high degree of connectivity. As tye system matures, additional encoding systems, such as FOAF, say, or ODRL, will play their own important roles, offering different kinds of connections within the same network. The decisions make will become richer, without a corresponding increase in the complexity of the system.

So, RSS could succeed. It will probably succeed. But it is important to keep our focus on what it does well: it allows an individual to scan, filter, and pass forward. That's all it ever has to do. The network will do the rest.

Moncton, February 24, 2004

EduSource: Canada's Learning Object Repository Network

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The eduSource project is a collaborative venture among Canadian public and private sector partners to create the prototype for a working network of interoperable learning object (LO) repositories. The project uses Canada's broadband Internet network CA*Net4 as a development and application platform, with capacity to operate as well on the commercial Internet. The project is charged with the creation and development of the associated tools, systems, protocols and practices that support a distributed LO repository infrastructure. EduSource is committed to the implementation using international standards; it is bilingual (French and English); and it is accessible to all Canadians including those with physical disabilities.

Each of the partners and their associates are bringing considerable resources to the project. Collectively, the contributions of the partners from 2002 to 2004 amount to C$5,330,000 of the total project value of C$9,830,000. CANARIE, Canada's advanced Internet development organization (*CANARIE home page*, 2003) and Industry Canada are contributing up to $4,700,000.

EduSource Organizational Structure

EduSource is a CANARIE project with six designated primary partners: Athabasca University AU), the Netera Alliance (Netera), New Brunswick Distance Education Network/TeleEducation NB (NBDEN), the New Media Innovation Centre (NewMIC), Téléuniversité du Québec (TéLUQ), and the University of Waterloo (UofW). The Netera Alliance serves as the lead contractor. The consortium includes several associates in the private and public sector representing companies and learning institutions from across Canada including the National Research Council (NRC). In addition, a team from the University of Alberta (UofA) is conducting a formal evaluation of the project (See Figure 1).

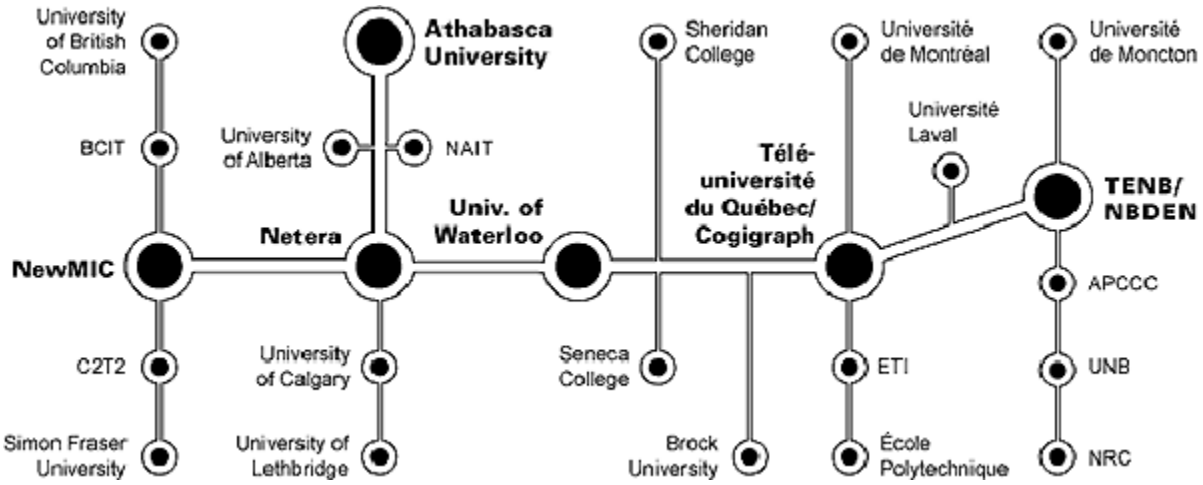


Figure 1. eduSource Organizational Structure

A principal objective of eduSource is the creation and deployment of a functional suite of tools capable of supporting the infrastructure for a national network of LO repositories. To accomplish this, eduSource is promoting a set of guidelines for the practical implementation of the IEEE LOM and SCORM standards for metadata, known as CanCore (*CanCore home page*, 2003). Research for the implementation is also being conducted in the areas of protocols, network engineering, hardware/software integration, software applications, service quality, security, and digital rights, while paying special attention to the requirements for quality pedagogy and accessibility for the physically challenged. The tools are being used to investigate problems involved in the repurposing of educational materials as LOs, user support, professional development, peer review and community building.

To achieve these goals, the EduSource team identified ten specific objectives:

Address and examine issues of interoperability by connecting a critical, mass of LOs housed in repositories across the country.

Play a leadership role in developing and promoting national and international standards.

Develop a blueprint for the rights management of LOs.

Link and integrate the development of repository software programs.

*Create a physical test bed of servers linked together through CA*Net 4.*

Build a bilingual pan-Canadian community of practice.

Examine new business and management models for object repositories.

Develop a communications plan for the dissemination of these results.

Accomplish these goals within the context of a comprehensive program of evaluation and feedback. And

Ensure that that these repositories will be accessible to all Canadians and particularly to those learners with disabilities. (*eduSource Canada*, no date)

The EduSource project has been sub-divided into nine work packages, each with a lead institution as package manager (See Figure 2):

Repository Content Development: NBDEN and NewMIC

Metadata Development: AU

Software Development: Cogigraph (TÃƒÂ‰LUQ)

Hardware Integration: Netera and NewMIC

Digital Rights Management: NRC

Evaluation & Testing: UofA

Business and Management Models: Netera

Community Building: UofW

Project Management, Co-ordination and Communications: Netera

Repository Content Development is led by NBDEN and NewMic. This group is charged with leading the development of LO repositories and LO metadata repositories. The team along with other partners is developing interfaces, templates and protocols necessary to connect existing and emergent learning object repositories (LORs) such as Alberta's CAREO (Campus Alberta Repository of Educational Objects) (*CAREO*, no date), New Brunswick's CanLOM/TeleCampus (*TeleCampus*, no date), Ontario's CLOE (Co-operative Learning Object Exchange) (*CLOE*, no date) , the Athabasca University's Digital Library in a Box (ADLib) (*ADLIB*, 2003), and others across Canada and internationally, ensuring interoperability. Content of various types from the different project partners and associates is being repurposed, and adapted to form LOs. This includes the storage, indexing and segmentation of media types ranging from text to Java Applets; the development of archival standards for digital masters; and an evaluation of the effectiveness of the delivery of these objects through a variety of media including broadband, medium band, and wireless networks.

NBDEN is using the CanCore specification to build a next generation metadata directory, based on the TeleCampus engine, known as CanLOM. The University of Calgary (UofC) Learning Commons is also developing the CAREO metadata and LO repository using CanCore and is developing a sophisticated standalone tagging and content packaging tool known as ALOHA (*ALOHA*, 2003). Similarly, Athabasca University is building ADLIB as their university LO repository using the same standards and specifications thus ensuring interoperability.

Metadata Development is led by AU. Metadata is what separates repositories from the chaos of the World Wide Web. In this respect, the development of the CanCore metadata application profile is one of

the most important deliverables of the entire project. EduSource is building on this success and furthering Canada's leadership in this area. The team is developing, extending and reinforcing CanCore, which is being translated/adapted into French. The most recent version is available at the CanCore web site (*CanCore home page*, 2003). EduSource is not merely conforming to internationally recognized metadata specifications. Its members are actively engaged in setting those standards. This project acts as a springboard for promoting the use of interoperable common vocabularies when implementing the IEEE LOM standard.

Software Development is crucial to the success of the entire project. TÃƒÂ‰LUQ is leading the partners in the development of an integrated suite of software tools for the implementation and management of the LO metadata and LO repositories. These software tools form the foundation of the pan-Canadian repository network. This basic project infrastructure is built on open source solutions to ensure the adoption and use of these tools across a full spectrum of Canadian and international educational organizations.

A crucial dimension of this work is the integration of existing software tools developed during the first phases of the E-Learning Program. These include eduSPLASH (*EduSPLASH*, 2002) for the creation of peer-to-peer networks of repositories; Explor@ II (*Explor@ 2*, 2003) for the management of repositories and the integration of resource into courses; ALOHA (*ALOHA*, 2003) for managing a LOR from the Learning Commons at the UofC, as well as ADLIB (*ADLIB*, 2003) and the MARC to LOM convertor (*MARC - LOM converter*, 2003) from Athabasca University for the metatagging of LOs. By making these tools and others work together and augmenting them with new applications and some strategic software ‘bridges’, eduSource is providing a comprehensive suite of repository building tools.

EduSource is experimenting in new areas of research and development such as the semantic web. "The Semantic Web is an extension of the current web in which information is given well-defined meaning, better enabling computers and people to work in cooperation." (Berners-Lee, Hendler, & Lassila, 2001). In other words, it makes it possible for information on the Web to be both syntactically and semantically understood by computer applications.

Most projects to date have focused on the formal description, tagging and distribution of educational objects. While this is an important first step, successful learning experiences are known to be dependent upon many other factors besides the availability of content. Recognizing this limitation, researchers have developed educational modeling languages (EML) that formally describe other critical components of the learning transaction. The IMS Learning Design specification (*IMS Learning design specification*, no date) based on EML from the Dutch Open University is expressed in formalized notation (using XML) to facilitate the searching and retrieval of LOs as well as the automated application of knowledge resources of various types on the semantic web not only by humans but also by autonomous agent software applications. AU, TéLUQ, and UofW are working together on prototype implementations using IMS Learning Design. They are developing Open source tools for editing, packaging and playing Learning Design files.

Hardware Integration. As project managers responsible overall for project integration, Netera is working as the lead with NewMIC on this work package. The national eduSource test bed is designed to accommodate servers from various users and of various sizes, capacities and operating systems as well as exploring different architectures including both peer-to-peer and centralized server models. In all cases this package is informed by the principles of open systems and interoperability. The primary delivery mechanism for this network is the broadband Internet (CA*Net 4), but it is also investigating the delivery of LOs by other means. This includes the commercial Internet and wireless and satellite systems as well as the use of caching servers and other devices to enhance delivery and performance.

Digital Rights Management is being led by the NRC in Moncton, New Brunswick. This package began with a comprehensive survey of the literature in the fields of commerce and information management, on the current state of DRM theory and technology, and an examination of emerging international standards such as the ODRL or Open Digital Rights Language (*Open digital rights language initiative*, 2003). Based on this research, a series of recommendations regarding DRM has been prepared and work is underway based on an XML DRM schema (See Downes & Babin, 2003).

Evaluation and Testing is being led by the University of Alberta, which has implemented a project evaluation strategy. Upon completion of the project, a summative evaluation will assess the impact of the project on practice within the participating organizations. It will also assess the project's success at meeting the initial project goals. Formative and summative data is being gathered through extensive interviews with key partners, associates, funders, surveys of end users and functional reviews of products created during the project.

Business and Management Models are being led by Netera, which is developing a business and management strategy. To this end a variety of funding models have been assessed. These include memberships, subscriptions, support and service contracts, licences and pay-per-use. This work is closely coupled with the Digital Rights Management Package. This work package also explores the sustainability of the LOR infrastructures among and within educational institutions.

Community Building is led by the University of Waterloo, which is developing networks of exemplary Canadian communities for the design, development, evaluation and exchange of LOs. COHERE (Canada's Collaboration for Online Higher Education and E-Research) is one such network in the post-secondary domain, where it demonstrates the use of online subject area communities to achieve efficiencies and promote cost-effectiveness (*COHERE*, no date). This community building is being extended into the K12 environment in collaboration with the Council of Ministers of Education Canada and provincial ministries of education.

Instructors at universities, colleges, schools, adult training centres, and the workplace are critical to the development of robust networks of communities. Project partners are developing exemplary proto-type networks of discipline-specific online communities to integrate local collaborations within their larger communities of use linking them to eduSource's pan-Canadian network of repositories.

Project Management, co-ordination and communication is the responsibility of the Netera Alliance which is providing central management functions, accounting and administration for the project as well as fulfilling the reporting requirements as stipulated by CANARIE.

Working Groups

There are three eduSource working groups: 1. the vision group; 2. the development group; and 3. the solutions & sustainability group. In addition, a management committee and a steering committee oversee and provide direction for the overall project. Figure 2 shows that the development group is coordinating activities in work packages 1, 2, 3, 4 and 5 (on the left of the figure) while the solutions and sustainability group is acting to coordinate activities 6, 7, 8, and 9. The vision group has been created to identify overall orientations of the project and provide them to the other two groups as well as the management and steering committees. The three working groups meet regularly to help the steering committee orient and coordinate work in the nine work packages. The steering committee is responsible for taking the final decisions.

The vision group is responsible for continuously monitoring the norms and standards, elaborating the general orientation principles, defining use case requirements and functional architecture orientations, taking into account implementation specifications from the development group. It also ensures the preparation of proper user documentation, approves the evaluation process and suggests requirements on business models to the solutions & sustainability group.

The development group defines the system's architecture taking in account use case requirements and the functional architecture from the vision group. It selects the technologies, protocols and development tools, defines the implementation and deployment specifications, develops the software infrastructure for LORs, provides unitary testing and writes the developers' documentation.

The solutions and sustainability group organizes product evaluation and a deployment strategy to obtain useful feedback and recommendations from potential users. It develops partnership frameworks for content providers and specialized service providers, coordinates the integration of digital rights and other business tools and defines a framework for the sustainability of open source components, including both software and protocols. While keeping their own managing responsibilities, the five primary partners provide the human resources to achieve the eduSource deliverables (*EduSource software development and integration work package plan, Version 0.3*, 2002).

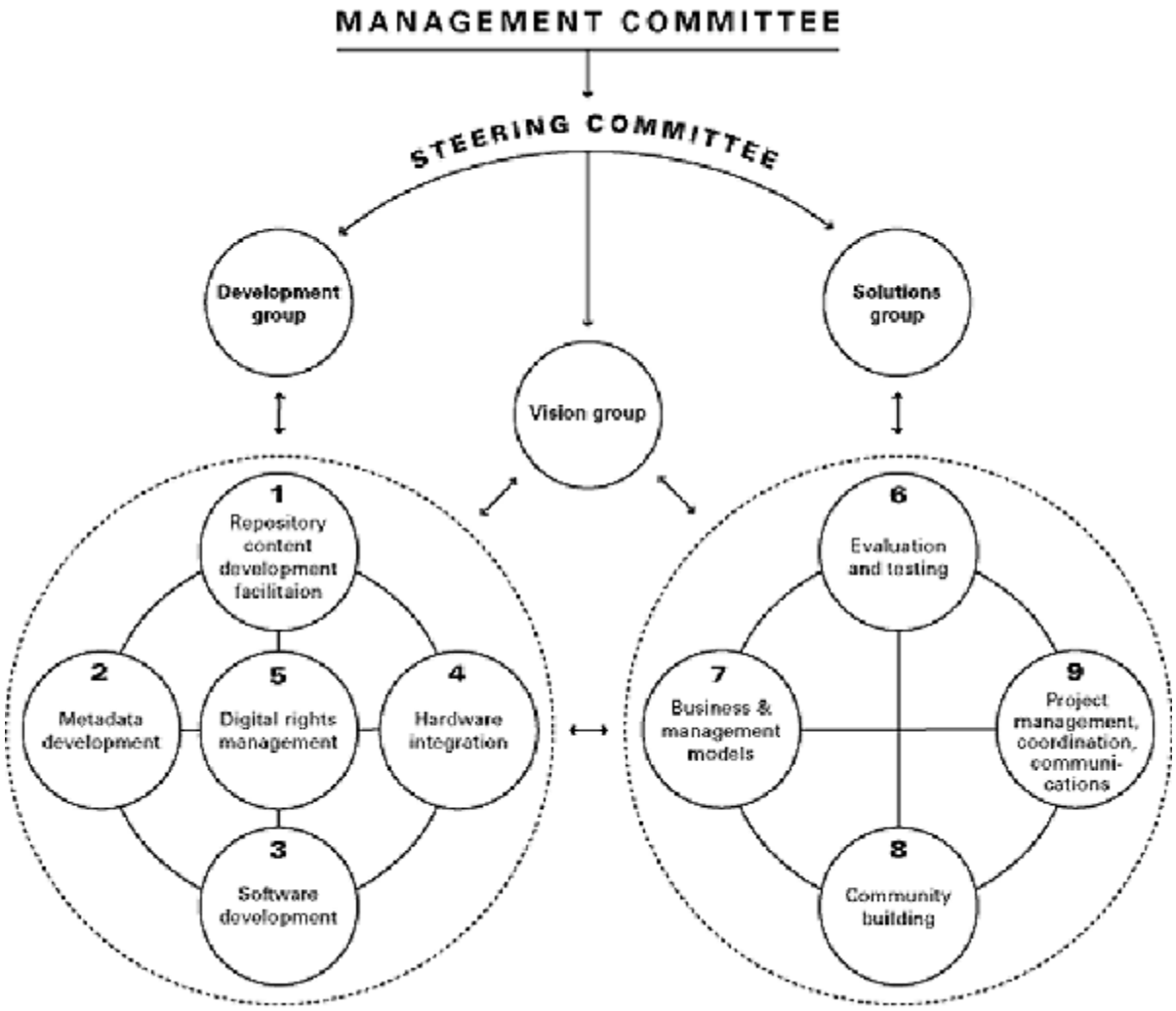


Figure 2. Working Groups

Canarie funded projects are dependent upon the participants paying for 50% of costs of the project. To ensure accountability for the project extensive book keeping, time sheet completetion and rigourous accounting standards are required. To facilitate effective implementation of these accountability standards, the management committee, led by the lead Netera group, meets to ensure that fiscal planning and accounting is given a high priority.

Principles

The following design principles have been adopted in order to guide the development of the architecture for the creation of a distributed LO repository network(Downes et al., 2002).

Network model as opposed to a silo model with separate repositories fed by publishers often on the basis of separate licensing agreements that increases the cost and restricts the choice of learning materials for all users and especially for small users.

Royalty free standards and protocols. Wherever possible, the eduSource software system infrastructure is providing open source solutions to ensure the adoption and use of these tools across a full spectrum of Canadian and international educational organizations. However, this open source approach is limited to the distributed infrastructure. The applications and services built upon the infrastructure can be either open or commercial or both.

Implementation and support for emerging specifications such as the CanCore metadata application profile and related IMS specifications, whenever practical, including support for the use of defined and controlled vocabularies so as to provide semantic interoperability and functionality to end users searching for and retrieving LOs.

Enable, don't require, such that applications work using the widest variety of open standards, recommending and not dictating, aiming to achieve a consensus among core participants where possible and allowing dissent when it occurs without imposing conditions for use of the applications.

Infrastructure layer and service layer. The set of software tools comprising the infrastructure layer are to be distributed as royalty-free open source applications. Over and above the infrastructure layer, some components with increased functionality are being developed as free and open applications, while others include commercial and proprietary components.

Distributed architecture. EduSource infrastructure and services are being designed as a set of related components, each of which fulfills a specific function in the network as a whole. Any given software tool provided by eduSource may be replicated and offered as an independent service to provide robustness and ensure that no single service provider or software developer may exercise control over the network.

Open marketplace. EduSource supports the registration and indexing of various providers, this registration will be free and optional. EduSource will accommodate free, co-operative or shared, and commercial fee-based content distribution.

Multiple metadata descriptions of a given learning resource are possible, ensuring that different users of the same learning resources can obtain, input, and access multiple descriptions of that material.

EduSource is an implementation and extension of the semantic web, accommodating sector-specific ontologies in the design to support the widest reach possible and reduce the duplication of effort between developers working in specific domains and educators working in the same domain.

Open digital rights Management. Where possible, the acquisition of rights and the exchange of funds is automated. Multiple digital rights models are being provided for free materials, cooperative sharing, and commercial offering on pay-per-view, or subscription-based, or other models. No single rights agency will govern all transactions. A given provider of learning materials may work with one of many brokers who sell to multiple purchasers, and a given patron may use one of many agents who conduct transactions with multiple vendors.

Edusource tools and services

The eduSource suite of applications consists of a set of inter-related components distributed over the Internet and capable of communicating with each other. This is accomplished by rejecting an integrated system architecture, and adopting a distributed model made up of distinct, stand-alone components that communicate over TCP/IP. Rather than one big application, the eduSource project allows for multiple components (even multiple similar components) as well as multiple LO metadata and object repositories. These repositories may be highly specialized (e. g., Egyptian Archaeology objects; a Blues music archive) or more generic (e. g., a large museum collection; a picture archive; a school board LO collection). This model is more in keeping with the distributed ideal of the World Wide Web.

The core components of the network are the LO repositories, which are hosted by the LO copyright holders and the LO metadata repositories, which may or may not be housed with the LO repository. Metadata repositories harvest metadata from LO repositories using applications like the OAI-MHP (Open Archives Initiative Metadata Harvesting Protocol) (Friesen, 2002) or directly from a Learning Content Management System (LCMS) or Learning Management System (LMS) using queries.

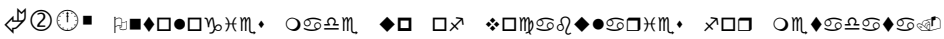
This core functionality is relatively simple and is already established in other domains, for example, in news syndication (Dumbill, 2000). Other implementations, including IEEE/P1484.1/D9>(Sonwalkar, 2002) employ a model whereby learning materials are treated like books in a library (or, in some other way, as "content" to be managed). Consequently, implementations of the architecture enable access to collections of this content, typically (but not always) stored on location. The process is therefore: acquire, index, and deploy.

In a network model, there is no need to manage collections of content. So, instead of working solely with formally structured LOs, the network works with "learning resources", or "learning opportunities". This includes, but is not limited to LOs. Journal articles, academic papers, seminars, instruments, games, actual in-person classes, or the instructors themselves. They can all be accessed using this model. EduSource enables this by tolerating the use of different schemas in LO metadata repositories.

Other features that are enabled by eduSource include component registry services by which organizations can provide indexing or registration assistance (seeFriesen, 2002). These and other components stand alone and are not dependent on the other functions in the system to become operational. You implement them only if you need them. You can choose among a variety of different components that can reside inside or outside of your particular system. EduSource also supports multiple instances of third party metadata. This is metadata that is created by diverse users and housed on different servers, but describing the same LO (See Nilsson, PalmÃƒÂ©r, & Naeve, no date). For example, a library may create Dublin Core metadata; a university might use the IEEE LOM for its metadata; a private company might use its own proprietary metadata. These and other eduSource components such as that for Digital Rights Management, Middleware and Resource Management communicate with each other using a common communication language called the EduSource Communication Language (ECL).

EduSource Communication Language (ECL)

The ECL messaging protocol is based on a SOAP specification. It supports communications among a variety of communities, providing applications that map between different languages and ontologies. Using the eduSource suite of tools, user communities can render their repositories interoperable using the most up-to-date, internationally recognized specifications and standards (See Figure 3). This is accomplished in four different ways:



Two middleware components support interoperability: 1) Semantic cobblestone, which enables new repositories to connect into the eduSource network by supporting mappings on the metadata and ontology layers (See Richards & Hatala, in press) and 2) a gateway that supports interoperability between the communication protocol and language layers. This ensures interoperability with other repository initiatives whether they be legacy using Z39.50 or new using the IEEE LOM.

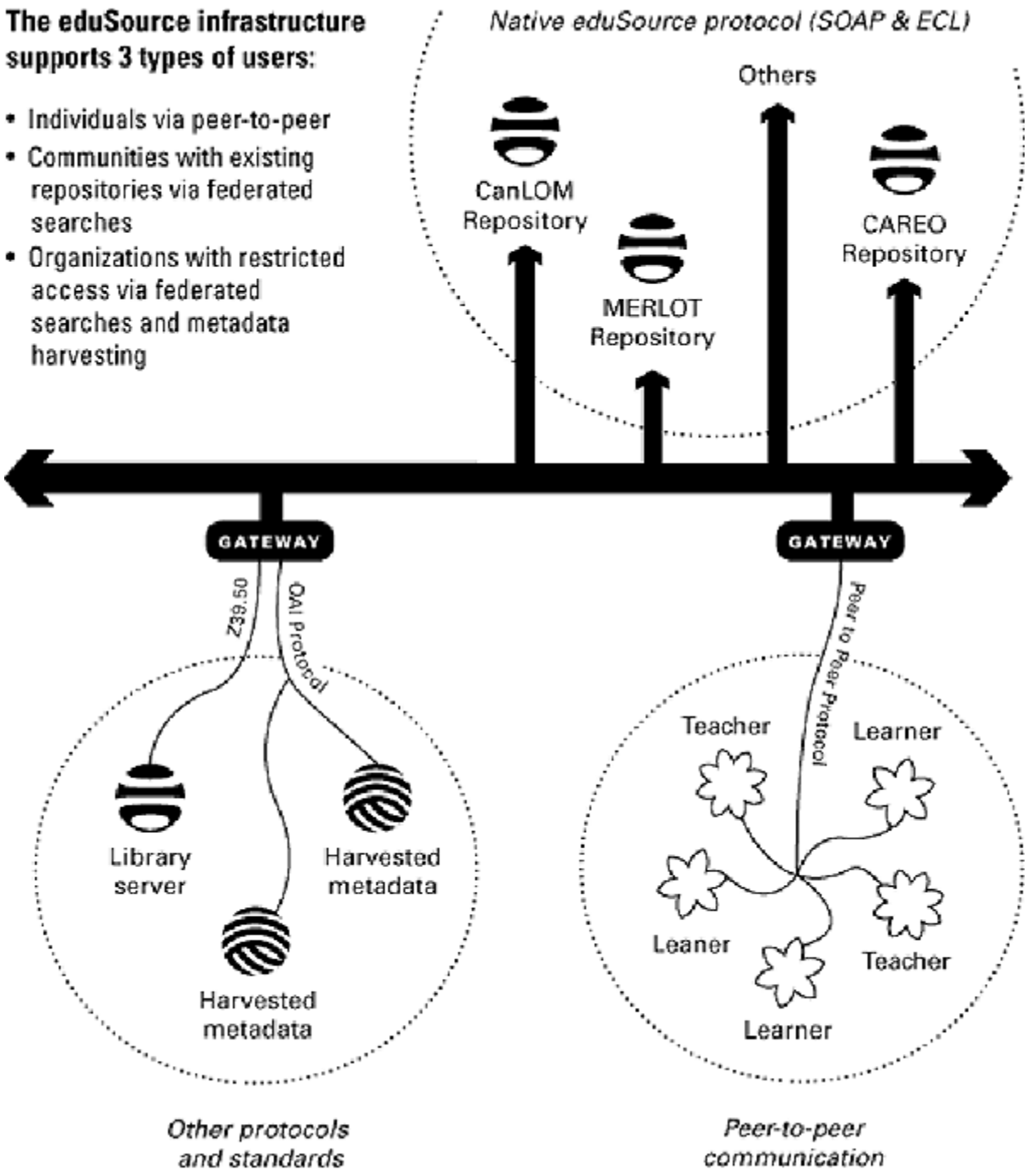


Figure 3. EduSource Communication Language

EduSource infrastructure

The Java programming language is being used for the implementation. J2SE (Java 2 Standard Edition) version 1.4.1 is required along with SOAP 1.2 with an attachment compliant engine to run it. AXIS (See *Concurrent Versions System*, 2002). The following features are presently under development and testing.

An application programming interface (API) for ECL is being specified at the gateway and at the client level. This forms the gateway framework for the suite of tools and communications among repositories. The first translators under construction are those between OAI and ECL and MARC and LOM. A Z39.50 translator is also being built along with other translators between different metadata profiles. And, to enlarge the communication capabilities of the existing systems, a generic ECL client API is being implemented, together with the specific code needed to link ECL with each of the CAREO, eduSplash, Athabasca University (ADLIB), and Explor@ systems. A Web services publishing registry, possibly using the UDDI standard, is being implemented to make the above services, and services from the other work packages, available and interoperable to internal and external LMS, LCMS or software agents.

EduSource middleware services consist of different components including a searched metadata viewer and resource launcher hook, which displays the result of searching metadata repositories using harvesting, federated or distributed search methods. It provides different views on the record set and it outputs the address and other information (for example DRM information) for a resource launcher to either facilitate or prevent launching. An IMS-LD graphical editor is being constructed that provides a user interface to create Learning Design components and produce the corresponding XML files according to the IMS-LD specification.

Metadata repositories services include bilingual (French/English) metadata indexing user guidelines. The levels are defined in the Cancore metadata application profile. Special guidelines addressing some difficult issues regarding catalog entries and unique identifiers have been analyzed and incorporated into the "good practice" recommendations. In addition, the guidelines present knowledge representation solutions linking metadata and the semantic web.

The IMS Digital Repositories Interoperability (DRI) specifications are being implemented for both federated searching and harvesting in multiple repositories, taking into account different communication protocols and different metadata application profiles, specifications and standards. Software components for peer-to-peer and client-server storage and deployment of metadata are also being developed, based on a network architecture of metadata repositories and resource repositories. A test bed network is being used to trial the components.

An open source content packaging tool is being constructed, based on the IMS and SCORM specifications. In conjunction with existing tools this application can enable the transfer of resources and their metadata for use by different eLearning systems or agents. This includes a robust version of the IMS-DRI submit/store specification enabling the movement of resources to and from repositories linked to network-accessible locations. One version of this IMS-DRI request/deliver specification is being implemented to transport, launch and deliver resources to and from LMSs. In addition, different resource aggregation methods are being studied, including those proposed by the EML-based IMS Learning Design specifications, to define an abstraction level for elearning system building.

A Digital Rights Management (DRM) software component is being implemented enabling any eLearning system or agent to display any type of provider-defined DRM model. A user searching for LOs or other resources will be informed of the conditions and methods for accessing them. Another software

component enables a user-agent to make requests to provider-agents, allowing them to access the resources if they possess the required permissions.

Figure 4 offers a general functional view of the suite of eduSource software tools and services. It presents three sets of components based on an open network approach. On the right side, there are two classes of repositories, one for metadata and the other for digitized resources (assets). In the Centre, five groups of services compose the infrastructure of the eduSource suite of tools. On the left side are existing or future e-learning systems, Learning Management Systems (LMS), Learning Content Management Systems (LCMS), agents or tools that can contribute to build and/or use repositories.

Each *Metadata Repository* houses a set of metadata files describing educational resources sometimes referred to as learning objects. Here we use a very broad definition of a LO as in the IEEE LOM document and the IMS Learning Design specification. This definition is also in line with the taxonomy of resources provided by the MISA instructional engineering method (*MISA learning systems design tool*, 2003). It includes the following categories of resources:

Documents and educational materials (multimedia, Web pages, texts, software, data records, etc.) that hold information and knowledge;

Tools and applications that support the processing of information and knowledge;

Services provided by people such as subject matter experts, trainers, technical assistants, managers;

Events (or learning opportunities) such as courses, seminars, learning activities, conferences, and discussion group meetings;

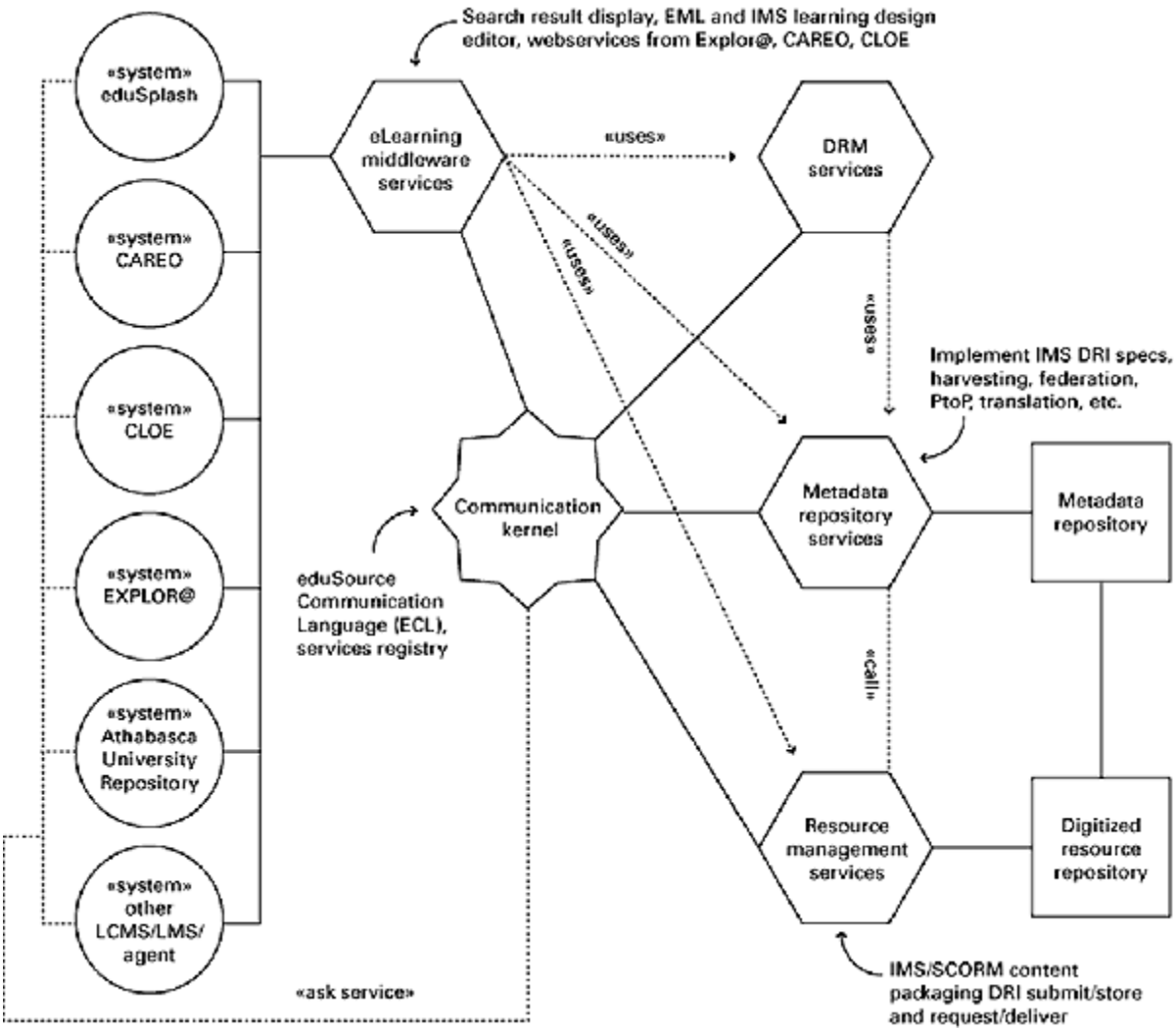


Figure 4. EduSource general functional diagram

Each *Digital Resource Repository* holds a set of digitized resources. The core of the system lies in the **five main software packages** at the centre. They hold the suite of software components that are being developed by the eduSource team. These services are all being referenced in one or more *eduSource Service Registries* available from the Web. Any service can be called upon by any e-Learning System or agent.

The Communication Kernel includes the ECL, which (as previously mentioned) is a meta-protocol offered to all eduSource users that enables interactions between tools, services and communication protocols, in particular OAI and Z39.50. It also contains the eduSource Services Registry (ESR) that references all the components in the infrastructure from which an eduSource user can select the services that he or she wishes to use.

The E-Learning Middleware Services component groups all the interactions to functionalities in elearning systems or agents whose providers agree to be referenced in eduSource. It includes services giving access to functionalities supported by Explor@, eduSplash, CAREO, ADLib and other systems external to the eduSource infrastructure. It includes one or more tools to display metadata and the associated resources resulting from searches implemented

in the metadata repository services. It also includes a Graphic Learning Design Editor producing EML/IMS-LD code that can be passed on to a content packager producing content to be read by any compliant elearning system.

Metadata Repository Services is a package that implements the most essential functionalities to fully exploit a set of (partly redundant) metadata repositories. In particular, this package is implementing some of the IMS DRI specifications for searching, harvesting, and federating such as gather/expose and search/expose, as well as peer-to-peer distributed search. It also includes translation services between metadata specifications or standards such as DC, IEEE LOM, and MARC, and also between natural languages, including French-English translations of metadata.

Resource Management Services is a package that takes care of operations needed to launch, aggregate, package, or transport the actual resources required by any other service or system. It is implementing an IMS-SCORM content packaging service, and DRI submit/store and request/deliver functions.

Digital Rights Management Services is a package grouping all the components for the management of interactions on digital rights and intellectual property between providers and users of resources and services. It houses a *Provider Broker* to enable a LO provider to select a particular DRM model and produce the associated DRM metadata. This service contains a *Purchaser Broker* providing user identification, payment transactions and authorization to deliver the LO. It provides a simple encryption mechanism to secure transactions and adapt the LOM metadata for digital rights management.

The links between these components show a variety of attributes maximizing the flexibility of interactions between existing systems and new components. There is a many to many correspondence between metadata repositories and the LO repositories. This is a way to implement a full network approach as opposed to a silo approach. It enables (but does not require) a metadata repository to reference resources in more than one resource repository and, conversely, a resource repository to be referenced by more than one metadata repository. At the individual LOM level, it supports multiple metadata descriptions of the same resource.

There is no central piece in the system and components can be duplicated for redundancy and robustness. Registries can be one or many. And services can be offered in more than one version. The architecture of the eduSource system embeds these principles right from the start, providing for future evolution.

Community Building

As previously noted, eduSource is also charged with building the community of LO users. After examining different organizations, the UofW work package leaders chose MERLOT (*CAREO*, no date) as a model for community building. Using the MERLOT concept and starting in Ontario, the team created a consortium of post-secondary institutions called CLOE (Co-operative Learning Object Exchange). A vibrant CLOE community has been established with representatives from each CLOE partner institution. They attend quarterly face-to-face meetings and participate in monthly teleconferences. All CLOE partners are promoting LO repositories on their campuses. For example, CLOE advertisements are posted in appropriate areas at all CLOE partner institutions. As well, many talks have been given at partner institutions regarding LO repositories. CLOE partners have established various initiatives within their institutions. For example, Queens has established CLOE@QUEENS as a Community of Practice regarding LOs and repositories (*CLOE@QUEENS*, no date).

Although based on MERLOT, CLOE has made some significant alterations to the original MERLOT concept. For example, MERLOT does not host LOs but rather is a ‘referatory’ to the LO which continues to reside on the author's

site. The LOs and the relevant metadata are both actually hosted at the CLOE web site. This gives CLOE much more control over versions and control over ensuring that materials does not get deleted or changed significantly. It also allows producers and managers to quantify the number and, type of LOs as well as the context for which each object is being downloaded.

MERLOT also has an established peer review process (having completed more than 1000 reviews by the Fall of 2003). The CLOE team is using the MERLOT peer review process as a guideline, and is examining the entire system with a view to making the peer review robust and auditable so as it can be used to enhance an author's professional portfolio for purposes of promotion and tenure (see Kestner, in press). In addition, MERLOT has no way of tracking what LOs have been reused. CLOE on the other hand produces reports each semester that detail all the reuses of LOs in CLOE. This information, coupled with the peer review, can often be valuable in enhancing an author's professional portfolio.

The original community building focus has been on Ontario universities (through CLOE) and internationally through MERLOT. The experience of getting the CLOE group Ã¢Â Â˜on track' is seen as a necessary Ã¢Â Â˜first step' before attempting any significant national community building. The chief effort so far, has been to host the MERLOT International conference in Vancouver (*MERLOT International Conference*, 2003). This conference brought Canadians together with Americans in a forum to discuss issues associated with LOs and repositories. This major international conference has been supplemented by an ongoing series of workshops in cities across Canada and international presentations at a variety of different venues.

The different eduSource partners continue to disseminate their vision and results of their research among the eduSource community and a variety of stakeholder communities. These include other universities, community colleges, school boards and departments of education, other government departments, private companies and interested organizations. International connections have been established with ARIADNE in Europe (*ARIADNE*, 2002), the Education Network of Australia (*EdNA Online*, 2003), the IMS in the USA (*IMS*, 2003), and other groups in Japan, Korea, Taiwan, Singapore and China.

The eduSource Canada website is also being used for community building (*eduSource Canada*, no date). It has been live since December 2003. It changes and develops along with the project to reflect the needs of emerging user communities and internal project evaluative feedback. Added components include an internal web-based document sharing system, a digital rights clearing house component and a detailed presentation and news information section.
The eduSource site is bilingual (French and English) and all relevant documents are posted in both official languages.

Summary

This eduSource project represents a constructive collaboration among a diverse group of participants who have accepted common basic principles for the design and construction of an open network of learning repositories. The initial goals have been outlined along with descriptions of the actual work in progress including descriptions of the organizational structure, the workgroups, work packages, and the tools and services to be integrated into the eduSource suite of tools. This project aims to provide leadership in Canada and internationally in the development of interoperable repositories using the developing semantic web.

Abbreviations and Acronyms

ADLIB Athabasca University Digital Library in a box

API Application Program Interface

AU Athabasca University

AXIS a specific implementation of SOAP

CANARIE Canada's broadband Internet organization

CANet 4* Canada's broadband network

CLOE Co-operative Learning Object Exchange

CVS Concurrent Versions System

DRI Digital Repositories Interoperability (from IMS)

DRM Digital Rights Management

ECL eduSource Communication Language

EML Educational Modeling Language

HTTP HyperText Transfer Protocol

IEEE Institute of Electrical and Electronic Engineers

IMS Instructional Management System

J2SE Java 2 Standard Edition

LCMS Learning Content Management System

LMS Learning Management System

LD Learning Design

LO Learning object

LOM LO Metadata

LOR LO Repository

MERLOT Multimedia Educational Resource for Learning and Online Teaching

NBDEN New Brunswick Distance Education Network Inc. (TeleEducation NB)

NewMIC New Media Information Centre of British Columbia

NRC National Research Council of Canada

OAI Open Archive Initiative

OAI-MHP OAI Metadata Harvesting Protocol

ODRL Open Digital Rights Language

SCORM Shareable Courseware Object Reference Model

SOAP Simple Object Access Protocol

TÃƒÂ‰LUQ TÃƒÂ©lÃƒÂ©universitÃƒÂ© du QuÃƒÂ©bec

UDDI Universal Description, Discovery, and Integration

UML Unified Modeling Language

UofA University of Alberta

UofC University of Calgary

UofW University of Waterloo

XML Extensible Markup Language

XML-RPC XML Remote Procedure Calls

Z39.50 (Protocol for library information retrieval)

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Learning in Communities

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With the discussion and - dare I say it - hype surrounding online courses, learning objects, and other forms of online content, people have to a large degree stopped talking about the idea of the learning community.

But they shouldn't. Learning - even online learning - still occurs for the most part in communities. Students take part in online classes and seminars, they exchange thoughts and ideas in mailing lists and on discussion boards, they work in project teams and work groups. The concepts of learning and community are almost inseparable, even for the self-study student.

Why the emphasis on community?

First, because a community supports improved learning. Collaboration and discussion expose people to new ideas and outlooks. The collaboration that occurs in environments such as classrooms and communities, as Wienicki says, is necessary for the process of shared cognition', the idea that a group of people can create a more complete understanding than a single person working on his or her own.

Second, a community generates a sense of commitment not created merely by an individual working on their own with the content. As Rheingold notes, "People everywhere seem more interested in communicating with each other than with databases." (http://www.Rheingold.com/vc/book/) People working in communities have a deeper sense of commitment to the process and the product, whether in learning or any other endeavor.

Third, learning in communities promotes what may be called learning beyond the content. In particular, learning in communities teaches a person how the content may be applied in a wide variety of situations, and communities provide these examples. The community becomes what Wegner called a 'community of practice', and the student learns "the practices of a field, its social organization, and its mores".[63]

And fourth, learning communities help reduce the workload of those providing instruction by allowing students to help each other and by allowing an instructor to help many students at once. Russ Albery writes, asking students to participate in communities, "you're giving more people the chance to help you (and) you're helping all the people who come after you that may have the same question."[64]

[63] Gordin, et.al., http://www.ascusc.org/jcmc/vol2/issue3/gordin.html
[64] http://www.eyrie.org./~eagle/faqs/questions.html

What makes a community successful?

First, a community has to be about something. I remarked in this in a recent paper when, as a critique of Orkut[65] I said, "there is no 'there' there."[66] A community must be centered around some topic or activity, or as Hegel and Armstrong (Net.Gain) say, they need a "distinct focus".

Second, there must be, as Figallo (Hosting Web Communities) says, a creation of the sense of the whole. Members need to feel that they belong to something larger than themselves, that there is a web of relationships between the members. This requires an ongoing exchange - of messages, of thoughts - between the members, and the fostering of relations that alst through time.

Third, content and communication must form a seamless whole, that is, the two must be integrated. On discussion lists, people complain when members go off topic or "hijack a thread". In successful communities, such as Slashdot[67], the conversation is regularly 'seeded' with content and activities proposed by moderators. Communities such as IFETS[68] or ITForum[69] typically centre conversation around a discussion paper.

Fourth, there must be an appreciation of participant contributions. One of my major criticisms of the Poynter online community[70] is that contributions submitted to the discussion board seem to languish, never being read, not even by site organizers. A person needs to feel like a somebody on an online community, to have a persistent and unique identity, to see themselves reflected in the whole.

Fifth, a community is sustained only through ongoing communications. It must be remembered that communication and interaction are the primary objectives of a community, not an adjunct or secondary activity.

Sixth, a successful community empowers its members. This is especially important in learning, where a community enables student to build their own learning. But to make this happen, community organizers must provide access to resources and information. As Gordin, et.al., write, "when students are engaged in school-based learning communities they must do more than be passive collectors of previously digested information." They must be encouraged and supported in the creation of something new. "[71]

Seventh, a learning community in particular must have an educational orientation. As activities, resources and support are added to the community environment, they need to be structured with a pedagogical purpose. In a community with static membership, this means a gradual progression toward more complexity and deeper discussion. In a dynamic community, where members come and go, this means providing from time to time introductory materials along with the more advanced (this is why you see communities like WWWEDU regularly redistribute their FAQ).

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[65] http://www.orkut.com/
[66] The Semantic Social Network. http://www.downes.ca/cgi-bin/website/view.cgi?dbs=Article&key=1076791198
[67] http://www.slashdot.org/
[68] http://ifets.ieee.org/
[69] http://it.coe.uga.edu/itforum/index.html
[70] http://www.poynter.org/
[71] Gordin, et.al., http://www.ascusc.org/jcmc/vol2/issue3/gordin.html

And finally, eighth, a successful community will have a sense of history. Such a community does not begin and end with the classroom. It is something that members have a reasonable expectation will endure beyond a particular course or class, and that the contributions and connections made will have a lasting impact. A community should have an archive, created by earlier students, that later students can build on.

Thanks to its long history, we know quite a lot about online communities. As part of their tremendously useful Moderators HomePage[72], for example, Collins and Berge link to documents like Howard Rheingold's 'Art of Hosting Good Conversations Online'[73] containing not just good advice ("both civility and nastiness are contagious") but thoughts on the nature of such environments (the idea, for example, that a discussion area is grown, not built).

Yet for all that, it seems to me that there remains a great deal of misunderstanding regarding the role and implementation of online discussion and online communities in online learning.

Probably the greatest misapplication of online community lies in the idea that it is an adjunct to, or following from, the creation and design of an online course. This is perhaps most clearly exemplified by the existence in itself of course discussions. In more institutions that I can count, when a course is offered online, the discussion community is created with the first class and disbanded with the last. The community owes its existence to the course, and ends when the course does.

This relation of dependence is reflected in the design of learning management systems such as Blackboard and WebCT. In these environments, the course structure provides the primary means of navigation, and as the students (in a group) traverse the material from topic to topic, they are sent to a discussion area to answer (usually) predefined questions. Even authors with a good perspective on the importance of community ask questions like, "What are the educational advantages of supplementing a course with on-line discussion tools?"[74]

The design of these learning management systems also reinforces the idea that discussion is not central to the course, that it is something tacked on. One 'leaves' the course material (usually via the main menu) to go to the 'discussion area' (imagine, by analogy, if once a professor finished his lecture the entire class got up and walked across the hall to the 'discussion room').

If there is a single point that I would like to make in this article, it is that the relation ought to be the other way around: that the course content (much less its organization and structure) ought to be subservient to the discussion, that the community is the primary unit of learning, and that the instruction and the learning resources are secondary, arising out of, and only because of, the community.

Moncton, March 4, 2004

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[72] http://www.emoderators.com/moderators.shtml
[73] http://www.emoderators.com/moderators/artonlinehost.html
[74] http://tlt.its.psu.edu/suggestions/discuss/

Sensitize / Desensitize

In my days as a student activist (days that have never really ended, but that's another story), I learned some important lessons about the nature of propaganda and persuasion. When people think about propaganda, they typically think in terms of a simple cause and effect relation: a person hears a message on the radio, say, and goes out on a murderous rampage. But of course propaganda does not work in this way.

What I learned was that as a student activist I could empower points of view (and actions) sympathetic to my leanings by reframing the discussion. By taking a position that many would describe as hardline or radical, I was able to shift the domain of discourse, to stretch the boundaries of hat would be considered mainstream and what would be considered extreme. People could say (if not aloud), "You think I'm radical, but I'm very reasonable; just be happy I'm not like that Stephen Downes."

In political discourse, we can see this effect in action by looking at the various media from different nations (something the internet now allows anyone to do). What constitutes 'the left' in the United States, for example, would be characterized as moderate to conservative in Canada. When I observe a 'balanced debate' on PBS, what I see appears to me to be various shades of right wing analysis. And, no doubt, Americans view the political choice in Canada as varying between pink and red.

What makes the debate about frames of reference more urgent in contemporary society is the emergence of new means of communicating these concepts. Today, for example, I was able to listen to some discussions of the use of virtual reality and gaming to shape attitudes. The lessons of the day were not about the effectiveness of the technology - though it was in part - but about the newer and wider uses of the technology to shape perception, cognition and attitudes.

To open the discussion, Geneviève Robillard introduced us to the use of virtual reality (VR) in cyber psychology. Virtual reality, she observed, allows people to navigate in three dimensions, and therefore to be able to be immersed in their environment. It thus allows sufferers of phobias to confront their fears in a virtual environment.

There are numerous reasons why psychologists would want to use virtual reality. For a person with a fear of heights, for example, the use of VR is much safer; it allows psychologists to create the experience of a situation without exposing people to the risks of, say, ascending to the top of construction cranes.

Additionally, in VR, there is much more control over the experience. A person with a fear of flying can experience numerous take-offs and landings; the simulation is simply rewound. Simulations also reduce the cost of exposing a person to an environment, sometimes in obvious ways (such as the reduced cost of airfare) and sometimes in less obvious ways (such as the cost of maintaining animals - "I had a spider," she said, "but I was unable to keep it alive.").

Robillard described the various types of VR equipment she uses, varying from helmets to large computer screens to projections to immersive rooms, such as the CAVE. But the major equipment used are

helmets and position trackers - fully immersive environments like the CAVE are too expensive, and other environments are not sufficiently immersive. You need presence, she said. "Without presence, people think it's a game, and it doesn't work."

What is interesting and important here is that with the right equipment, it does work. Robillard cited numerous studies (alongside her own work) attesting to the effectiveness of VR in treating phobias. "Exposition in a real situation is efficient," she noted, "VR is just as efficient," where efficiency in this context is described as the capacity to elicit an avoidance response and feelings of feel and apprehension.

When people are in such environments, they learn how to respond. They learn to breathe, she observed, and they learn to restructure their thoughts, to understand that the situation in which they have been placed is not dangerous.

We may be entering a new era of such immersive reality. While a custom VR system can cost $10,000 Robillard's team has been adapting Playstations and game software. "Instead of a gun we give them a magazine, so people can hit the spider with the magazine. It's a total attack."

Such virtual reality systems are useful not only for treating phobias, but also in addressing a wide variety of psycho-social issues. In some cases, children are shown simulations of historical monuments, so they can experience the presence. In others, the wandering attention of ADHD suffers can be tracked. In still others, improved motor skills for autistics can be taught. And teen-agers can learn and experiment with social and behavioral skills.

What's important here is that the information presented is not merely presented cognitively; it is the immersion, the experience, that has the effect. Robillard's work is about changing perceptions, changing attitudes, about the environment. This is not the mastery of cognitive skills or facts; it operates at a deeper level, changing a person's frame of reference, their understanding about what is possible and what is not within their world view. In the case of those with phobias, it is clear that this is a necessary and good thing, as it allows them to cope with the world. But the techniques and the technology have a wider applicability.

Danish researcher Gonzalo Frasca approached the same question by underscoring the importance of games. "Games have been dismissed as trivial things, just for kids, for thousands of years," he said. But people today are taking them more seriously as they are beginning to discover that games can teach us a lot about human nature.

In a sense, games allow us to deal with things that would be taboo in everyday life. "I have been killing monsters for many many years," he said, "but not one in real life." But in addressing these topics, we see that games can penetrate further into our assumptions and world views. Games can be and have been used to express political and cultural values. Monopoly, argued Frasca, was originally developed as a protest against a land tax.

But we reach a point where it may seem inappropriate to use a game, in that it may be seen to trivialize our beliefs and values. We are used to narratives, he said. We learn the stories. For example, the Diaries of Anne Frank[75] teach us about values, about the holocaust. "What if we made a video game about Anne Frank?"

This would be seen as disrespectful, he noted. And if we changed the story - so that a player playing as Anne Frank could survive - that seems to really undercut the message. "You are trivializing the value of her death." But perhaps, he suggested, you could use the same medium to teach about oppression, about social and political issues.

In the months and years after 9-11, more than 150 games circulated around the internet. Many of these were simple games, he noted, created by a single person, usually in Flash, and usually written by boys (so, naturally, the objective was to dismember Osama bin Laden). These games were designed not so much as games but as statements. "In the 60s you would write a song, today you design a game."

One of Frasca's projects, Newsgaming.Com[76], release a post 9-11 game in which the objective was to kill the terrorists lurking among the civilians in a Middle Eastern city. The weapon used was rockets, and you would aim the rocket and shoot at the terrorist ("you didn't need to teach people that, they just knew," he said). What would happen is that the rocket would explode over a large area, killing civilians and destroying buildings. Each time this happened, many new terrorists would pop up, so by the end of the game you would have nothing but a ruined city filled with terrorists.

"But now that you've seen this," he said, "it's wrong. It's just me making a statement. I got plenty of hate mail about it. But this is just me telling something. I am here, you are sitting down, and I have the truth. But I don't have the truth.

If such a game is just an expression of opinion, then, what would count as an objective game. Yasmin Kafai, is a (now out of print) book titled *Minds in Play*, observed that the making of games could be used to teach. Make things people care about - and children care *a lot* about video. And children can learn by making games.

Of course, noted Frasca, this is closely related to the constructivist approach to education, where people create their own learning. But constructivism, he said, is somehow limited to science. It is the ideology of a rich country, it requires a lot of technology, a lot of expertise.

But the same approach can be taken in a non-technological environment. Fresca cited Brazilian Augusto Boal, whose "Theatre of the Oppressed" built on the ideas of people like Paulo Freire, who explore Piaget's idea of the transfer of knowledge as being something more than just through authority, but through social construction. Boal's approach was designed around the idea of theatre for actors and non-actors, to allow people to explore a concept by shaping it themselves.

[75] http://www.kirjasto.sci.fi/annefran.htm
[76] http://www.newsgaming.com/

It's a breaking, said Frasca, just as Piaget wanted to break the power of the microphone. For example, in "Forum Theatre", a person facing an issue - say, a cheating husband - would create a five minute play. If she said "but I don't have a solution, I don't have act three," she would simply create the first two acts. Then the play would be performed, over and over again, with the audience allowed to step in at any time to assume the role of the protagonist.

The idea here is not to find a solution, but to be able to view the problem through multiple perspectives, multiple lenses. "It is to detach yourself from the situation and to analyze the situation, to be in another's shoes." It's not just psycho-drama, not just catharsis, but rather about understanding multiple perspectives.

So, suggests Frasca, why can't you use the same technique for video games? Wht can't the game be taken apart, and modified, and replayed in many different ways? Take a game like Space Invaders - could this be modified to address a social issue? Frasca showed a gay student modified the display to have the aliens being students hurling insults at a gay person. Then other people modified the game, to show gay people responding by grouping together, responding by firing back with culture and art, responding by creating an umbrella of dialogue.

So where does this leave us? It seems clear that online multimedia, and especially immersive simulations and games, are powerful teaching tools. They teach, not merely by transferring facts, but by reframing world views. They are, or could be, therefore, effective propaganda.

What is important to recognize about a simulation - any simulation - is that it creates a world view, and therefore shapes - not in a direct way, but in an indirect way, by reframing the possibilities - one's expectations and beliefs.

In my own experience, I have played numerous video games and have come to experience this first hand. In Sim City, the reality is that your city thrives if you lower taxes. In The Sims, the reality is that if you have more friends if you're rich. In many strategy games, the reality is that it is usually better to strike first, rather than let the opponent find the way in your cities. These games can have, over time, a subtle but persistent effect in shaping our understandings of civic politics, sociology and military strategy.

Again, and let me stress, this is not a simple cause and effect relationship. It's not about killing monsters, and then going out and killing people. Rather, it is about shaping one's understanding of the world. As moderator Renée-Marie Fountain summed up nicely, it's about "how to sensitize, how to desensitize, and who gets to do that."

In the world of print and literature, we have long since been able to amass a wide set of tools that allow us to counter propaganda. We have our knowledge of fallacies, for example, that tell us when a political leader is setting up a false dilemma, attacking an opponent through a straw man, or simply engaging in character assassination. These tools are at our disposal in order to sort out the reasonable and the unreasonable in social and political discourse.

But what is the equivalent in the world of simulations? What sort of logical and critical tools can we bring to bear? The creation of a simulation is not the creation of a neat argument or tract that we can disassemble, understand cognitively, and address through reason. The transfer of knowledge occurs at a basic, less cognitive level, and takes the form not of propositions but perceptions.

I think that the answer may lie in the philosophy of counterfactuals and possible worlds. Writers such as Richard Stalnaker and David K. Lewis have taken us a long way into evaluating the truth of statement like "brakeless trains are dangerous".

On this picture, we can think of a simulation as being like a possible world, but with some of the variables changed. The key in understanding a simulation lies in understanding which variables have been changed and what follows from that. So you're Anne Frank, say. What follows from that? Some things are relevant - you are hiding out from Nazis in WWII Holland - and some things are not - you are wearing a pink dress. Some things are possible - you get aid from the locals - and some things are not - you get super powers and fly to safety.

Two major factors spring to mind with respect to the evaluation of simulations. The first is salience - that is, whether or not the variable being considered is relevant to the context of discussion. The second is verisimilitude - that is, whether the resulting possible world is maximally similar to the world it is modifying.

To some degree, children already know this. Change their war-game, and you may elicit a remark like, "Daddy, orcs don't fly." Well, of course, they don't, but neither do they exist. So how does the child know that orcs don't fly? The scenario has a logic that the child has internalized, that create a sense of what is allowed and what is not, in a simulation.

And just so, this sense operates in the case of other simulations. In an Anne Frank simulation, Anne Frank can't survive. It has nothing to do with making the game pliable or winnable, but everything to do with respecting the limits of the scenario. In the post 9-11 game, not all weapons kill indiscriminately. Again, the game must respect the range of tools available to the person fighting terrorism.

If we are to use simulations as a new vocabulary, as a new means of teaching and talking and of expressing ourselves, then it will be important that we also elicit an evaluative semantics from the form, that we draw out, make clear, and *teach* children how to assess and to criticize these games. It involves creating and providing tools that allow them not only to play, but also to create and modify games, so that they can see for themselves the effect of modifying this or that variable.

For after all, as I well know, the best way of learning how to respond to a propagandist, is to become one.

Quebec City, March 16, 2004

Learning Environmentalism

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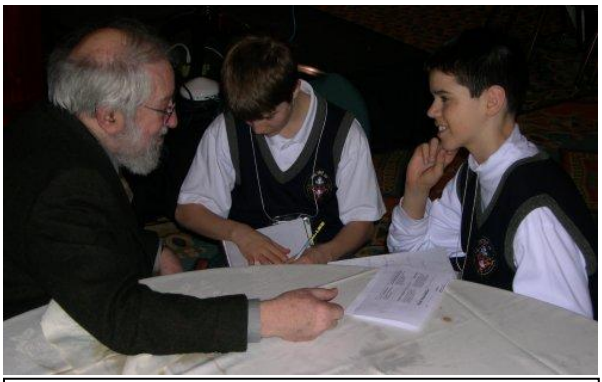
Imagine a world in which the people had a diet of suet[77]. The health of the population was generally bad, since suet is not especially healthy, but the people had good doctors who were able to attend to their diet and to cope with problems that came up.



Papert with students from the Institut St-Joseph, who attended the conference and were posting on their weblog what they saw and heard.[1]

Now imagine what happens when someone comes along and suggests that the people eat a more healthy diet, one with meats and fruits and grains. The population would not be able to change, not because suet is so much better, but because their doctors don't know anything about the new diet, and would not be there to help them.

Our schools, says Seymour Papert, feed students a diet of suet, "for reasons that once made sense." But who knows how to make a new diet? This is not a question that has an obvious answer.

Speaking to the RIMA ICEM conference[78] in Quebec City, Papert raised the issue of what is fundamentally a sick school system and wondered aloud about what to do about it. "Instead of trying to make children love the math they hate," he said, "why not make a math they love." He paused. "Because it's very hard."

When we look at the issue of school reform, it seems clear that reform should come from the outside, he said, remarking that it was notable that the RIMA ICEM conference was sponsored by the Chamber of Commerce. "It's not the suet makers who should be making changes to the diet," he quipped.

Relating this to the laptop programs - he was a key figure in launching the Main Laptop Program - he noted that in an equivalent program in France, the change was actually opposed by the Ministry of Education. In Maine, as well, the change did not come from within the educational system, but was launched by the Governor.

Putting laptops in schools, he noted, is not tantamount to educational change, but it's the seed of educational change. It is the act of putting the change in motion. But it couldn't have come from within.

[77] http://baltimorebirdclub.org/by/suet.html
[78] http://www.rima2004.org/fr/default.html

Ask educators what the proper ratio of computers to students is, and you may hear, %:1, 6:1 - but the proper answer is 1:1 - but that is something that can be said only outside the system.

Consider, he said, an advanced civilization that had not yet invented writing. Then, the day comes, and the question is asked: how many students should we have for each pencil? Should we have a separate room for writing?

But the answer is clearly that each student must have a pencil, and it's the same with computers. Any resources, he argued, that make students make do with fewer computers is just a waste. And yet, "It's quite clear to me that if we had started by asking the educational sector, it would not have been 1:1.

So, let's step back, and take this in perspective.

Consider the growth of the environmental movement. "When I was a child," he argued, "'the environment' didn't exist." The word existed, but the concept of the environment, in the sense of a global system, didn't exist. It was only Rachel Carson's[79] publication of *Silent Spring* that precipitated this movement.

It was a 'tipping point' - it's not like the problems weren't there before, but they were localized. You could deal with the London fog, the silting of the Mississippi, the Amazon rain forest, at the local level. But there came a point where you couldn't do that any more. You couldn't do it in this fragmented way.

When we think about the learning environment, we are in the days before the tipping point. "We use the little room (for writing)" but we don't have the whole concept. "You have specialists in pre-school, e-learning, adult learning - but who is there whose job it is to take it as a whole? There are people, but these aren't professionals, we don't recognize them as professionals."

Now take someone like James Gee, who yesterday talked about the role of games[80] in learning. "I work with kids, saying, mostly, help me learn this game. They say, 'You'll never learn.' How come?

The kids, argued Papert, are learning in a new way. It's a new paradigm. A new game comes out, and you want to be the first on your block to master it. Your learning has a distinctive beginning, middle and end. You are in control. "How seldom in this world people have this kind of discrete learning experience."

But the kids don't have the words to articulate this - they need to use games as a way to develop a framework for thinking and talking - and in the home, we need to think about how we develop a "learning culture" as a family, including such things as what jokes are told and who knows how to program the VCR.

In the case of environmentalist, there were many pieces before the specialists, looking at the environment as a whole, stepped forward. We are not there yet in education. "My father was a scientist," said Papert, "but he never gave two thoughts to my learning math - it wasn't his business, it

[79] http://www.rachelcarson.org/
[80] http://www.downes.ca/cgi-bin/website/view.cgi?dbs=Article&key=1079385148

was the school's business." It wasn't that he had rejected the idea, it was that it never came up. But today, thousands of parents are thinking about this, and trying to think of new ways to tech math. "Such parents are wonderful people, but they are not qualified to make that decision." But again, "Who is qualified?"

Another example: kids are learning to despise schools. They are learning that the way schools do things is not the best way - and they have many other examples to learn from. Society is changing, and the kids can see that, but the schools are not changing, and the gap is growing perceptably larger.

"Maybe they were happy eating suet until they learned there was something else."

But what is this something else? The laptop program is part of the answer, but "don't mistake that for really deep change - we need deeper change." A study of one of the older programs, for example, showed that after the initial excitement, the results weren't nearly as striking - the kids weren't looking after the machines. "The kids had high expectations but they soon learned it's the same stuff in a new bottle."

Consider, by analogy, the Soviet Union. What made the difference between that system and our own? In a word: centralized planning. Such a system can't work, because you can't innovate. But you need innovation - "something like Darwin's evolution." As Dennett says, in Darwin's Dangerous Idea[81], that dissolves away prejudices. "Our school system is the closest we have to the Soviet structure. I think it will collapse."

The question we face today is not whether we can save the school system - we can. It's now a question of what we can build in it's stead. Think about how unchangeable the Soviet system looked in the 1980s. We need to think about what comes after the collapse.

To save the schools, we have to break them. The current move toward standardization is a last gasp, "the last twitch of the dragon's tail" as the old system dies. It is natural, in such a time, for the bureaucracy to close ranks, to centrally impose something like standardization "instead of its direct opposite, higher standards." We're losing the chance no have better learning, he argued, but not only that, because trying to be static will lead only to decline.

Quebec City, March 16, 2004

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[81] http://www.2think.org/ddi.shtml

A People, Once Liberated...

I have had my debates with Steve Eskow in the past and will not linger overly long with this one[82]*. I appreciate his faith in my technological insight, and respect his doubts about my prognostications. And as always, I recommend that anyone reading my thoughts do so with a reasonable degree of scepticism.*

The metaphor of a pendulum is often a useful one, and there is no doubt many oscillations that may be seen in society, from political temperament to economic fortunes to preferences in fashion and style. But not everything oscillates; there is also progress, and some things are left permanently behind, and some systems and beliefs, when advanced, do not need a conservative countervail.

To be sure, there is often a nostalgia associated with the former way of doing things. The advent of machine shops brought a new appreciation for hand-crafted carpentry. Electric lighting accentuated the intimacy of the candle. The printing press presaged a desire to preserve the art of calligraphy.

But nobody would have suggested that, in the main, furniture ought to be hand-crafted, lighting ought to depend on candle power, or that the daily newspaper ought to be hand written. The appreciation for the more traditional arts is continually overwhelmed by the desire to share the benefits of furniture, lighting and knowledge with a much wider audience.

Progress - useful, irreversible progress - occurs not only in technology but also in society. Over the last centuries we have experienced here in the West and more broadly worldwide a gradual increase in the social, political and economic liberties enjoyed by all. To be sure, there are those who long for the days when privilege was reserved for a few, but a people, once liberated, does not easily return to bondage.

In my mind, technological change gives us the capacity to bring a fuller and more rewarding education to the large majority of the population. And just as the printed word may not be as beautiful as the handwritten, the use of computers may be a little rough around the edges. But while no doubt some make prefer to read their hand-written copies of the Bible or Das Kapital, the vast majority are able to choose only between the printed version or nothing at all.

And in my mind, technological change often enables, and is accompanied by, social change. In my view, the provision of an accessible and affordable education to the majority of the world's population is a form of enfranchisement, of emancipation. And though this new form of universal suffrage is not a technological revolution, but rather a social movement, it is also not possible without technology.

Attempting to provide an education to a global population without the use of technology is like attempting to create a literate population with only handwritten texts. Scribes, though talented and valued, are and always will be in too short a supply to meet the demand. People must be given the

[82] http://lists.psu.edu/cgi-bin/wa?A2=ind0403&L=deos-l&D=0&T=0&P=18466

means to write or print for themselves. And in order to produce the volumes of printed text and writing machines required for such a feat, technology must be employed.

Steve Eskow's response to the sorts of changes I describe is two pronged. On the one hand, he is concerned that technology-supported writing is inferior to calligraphy. In that, he is almost certainly correct. And he is concerned that, as writing becomes commoditized, as it certainly would with the use of typewriters and the printing press, it will also become commercialized. In that, too, he is almost certainly correct.

But he mistakes the implications of this. He believes that we will lose what is of genuine and underlying value if we accept an inferior and commoditized form of writing. But the value, in writing as in learning, is not found in the illumination of the beautiful manuscripts of the Middle Ages. It is found in the content, the knowledge, which is now available, for the first time, to all.

What is important, again, is not the technological change, but the social change. In the years after the Renaissance, what transpired was not merely a change in the way scribes went about their work, but in how the work itself was done. And most significantly, we moved from an era where reading and writing was once done for us, to an era where reading and writing was something that we could do for ourselves.

And Eskow needs to understand, that this was not merely a desirable change, nor was it a change made solely for the sake of rebellion, but because it was, even with the new technology, the only way the benefits of the written word could appreciate to the population as a whole. And it was a change, once undertaken, that could not be reversed, so much so, in fact, that the corresponding liberties associated with public writing - freedom of speech, freedom of the press - were enshrined in the constitutions of nations around the world.

And we would not want to return to the days when literacy, and writing itself, was the domain of a privileged few, and those who wax nostalgic for such days are, quite rightly, regarded as heralds of a darker time.

So it is with learning. The capacity to learn, the right to learn, is a new form of freedom, and it is only in the last generation or so that we have seen the effects of a genuinely educated population. Universal education, the democratization of the university, the advent of the learning culture - these are only recent developments. They required, in the richest societies in the world, enormous effort and expenditure, yet even this achievement - limited to only about one percent of the human population - has revolutionized knowledge and society.

But they cannot be sustained. Eskow, while in one breath talking about the enormous demand for education, talks with the next about the shrinkage in the university system, the pressures on public school funding, "the withdrawal of thousands of classes." Though demand continues unabated, access is - and has been, gradually, over the last decades - eroded.

It should be apparent that the enormous effort to educate a population through traditional means cannot be sustained without extraordinary effort, even in the world's richest democracy. But it is also true that a people, once liberated, does not easily return to bondage. And though many may be banging at the doors of academia, many more, especially those always beyond the reach of educational emancipation, are taking the matter of education into their own hands.

Eskow does not respond to the evidence I adduce in my previous post - the students who are 'voting with their feet'[83], parents who are opting for alternatives, the success of institutions like Athabasca University (and I may add, the Open University and the University of Phoenix), the massive use of MIT's Open Courseware, and the millions of self-help and self-learning sites online. He simply pretends it does not exist.

He says that "if there is shrinkage in classroom enrollment, it is forced by public policy and support," seemingly unaware of increasing reports in the university business press of increasing competition between universities for enrollments. It is a willful blindness, it seems, though it is not surprising. he sees the demand for learning, the aspirations of a population to become educated, but cannot imagine how else it could be accomplished except through traditional means.

So while Eskow, with all the good intentions in the world, calls for more scribes, I, with some current understanding of the technology, call for the printing press, because it is better than no press at all. And more, and most (it seems) controversially, I call on the right of people to write for themselves, and to learn for themselves. Because that's the only way to reap the benefits of the new technology.

When I say that the purpose of technology is not to save the classroom, I mean it in the sense that the purpose of the printing press is not to save the scriptorium. And I mean it not merely in a technological sense - though, of course, I mean it in that way as well - but also in a social sense. Writing, when restricted to the monastery halls, is not free, is not accessible, is not liberating.

Eskow says that this change will not come, cannot come, because it is not good enough. I say that it is here, and that it will have to be good enough, because it is all we've got. Eskow warns that learning will be commoditized, will become crass and corrupt. I say that if our hands are dirty and our manners coarse, it is only because we have for too long been excluded from cleaner and more cultured places.

In all that Eskow writes - and he writes a lot - he cannot or will not address the question of access, of the right of all people to an education, regardless of their nationality, their social status, or their income level. And while Eskow perceives a steady stream of the affluent and the privileged lining up at his door, and concludes that there is no desire on the part of the people for change, he ignores the gathering storm, as by and by, more and more, people learn to learn for themselves. The days of the scriptorium are dead, yet Eskow, the scriptmaster, sees only the bent heads in front of him.

It is ironic that Eskow is willing to listen to Downes the technologist, whose skills are entirely self-taught, but not to Downes the philosopher, the product of a formal and traditional education. But more

[83] http://www.downes.ca/cgi-bin/website/view.cgi?dbs=Article&key=1052247576

significantly, what he has not seen is the third Downes, the Downes who for many years was denied access to higher learning, who to this day is paying back student loans, who carries with him more than just the learning of the self-taught and the culture of the educated, but also (and forever) the rage of the dispossessed.

Eskow is the Master, sitting on his throne in the castle, denying that his exclusive hold on right and privilege is shaken, unaware that his walls are surrounded by the newly literate demanding the right not only to think and speak for themselves but the right to freedom itself. He yearns for the days of old, barks contemptuously at the idea of the uncouth and unclean mob governing itself, certain in the conviction that the quality of leadership they give themselves could never equal the cultured and deep wisdom only those skilled in the traditional arts could provide. But flickering torches paint the night sky red, and he thinks of Prometheus, and he exercises his outrage as he hears the pounding on the gates.

Moncton, March 24, 2004

Creating and Capturing New Knowledge

This article published as Creating and Capturing New Knowledge in LearnScope April 6, 2004.

In the previous article, I discussed learning in communities, describing some of the essential features of a successful learning community. This article followed from a series of articles describing the generation of knowledge, its codification in the form of learning resources, the syndication of these resources, and the use of them in learning communities. Now, in this, the last article of the series, we come full circle.

Twelve months ago, I began with an observation from Noam Chomsky to the effect that it is astonishing that we know anything at all. But as has become evident during the course of the past year, we do know things. In fact, we know so much that a great deal of our effort must be devoted to the passing on of knowledge in the form of learning.

It is tempting, indeed, to say simply that the answer to Chomsky's paradox, the answer to the question of how we come to know so much with such limited means, is that we teach it to each other and to our children. But that would be to gloss over the mechanism by which this happens, the creation of what we call knowledge from the activity we call community.

This, of course, is the Golden Hind of the knowledge management community, what they call the â˜capture' of what they call â˜tacit knowledge', the codification of same, and the storing and forwarding of this knowledge in the form of new learning. But tacit knowledge, by its very nature, is something that cannot be captured. It is, by definition, ineffable. This means that it cannot itself be rendered into words, no more than could the teaching of how to ride a bicycle.

In Quebec City just recently, several speakers repeated this same point over again. James Paul Gee, for example, argued that while traditional education is based on what he called the "content fetish" genuine learning occurs within an interactive and immersive environment, such as a game or simulation.[84] And researcher Genevieve Robillard provided evidence that learning by immersion is effective, so much so that we must, with Gonzalo Frasca, ask ourselves about the ethics of using simulations for teaching and learning.[85]

What is it about a community that causes it to not only produce, but also transfer, knowledge? It is certain that a community produces artifacts, codifications of the knowledge it creates â“ look at any academic society and the first evidence of its work is the set of journal articles and other publications it produced. But belonging to (and earning membership into) such a community requires much more than merely learning the content of its discourse. It requires immersion into the practices of the community, learning, as Kuhn said, how to do the problems at the end of the chapter.

[84] http://www.downes.ca/cgi-bin/website/view.cgi?dbs=Article&key=1079385148
[85] http://www.downes.ca/cgi-bin/website/view.cgi?dbs=Article&key=1079457885

Knowledge is not, cannot be, merely a set of isolated facts. We've seen this already in this series: knowledge and learning occur within a domain of practice, within a world view, within a context. In order to understand the psychology text, one must begin to think like a psychologist, indeed even, to be a psychologist. The process of acquiring knowledge is not like a transfer, as though knowledge were a set of blocks, but a process of immersion, as through knowledge were a body of water.

This is why content â" whether in the form of textbooks or in the form of learning objects â" can never be at the center of a learning environment, but may only form a part of the surround. They way people learn, quite literally, is to swim in knowledge, and the way to swim, is to have a direction to swim to. Learning communities provide that direction, and a new learner is, as it were, swept up with the school as it swims in a certain way, in a certain direction.

I tried to get at this in my paper, The Aeffability of Knowledge Management.[86] What happens when learning occurs is not that the experience or perception is passed from person to person, for experiences and perceptions are not the sort of thing that can be transferred. Rather, the objective is to create the same perceptual state in the learner as in the teacher. And this involves much more than merely transferring facts; it requires replicating the experience in the student, based on the instructions of the teacher.

Now if this is true, then when knowledge architects attempt to capture knowledge, they are attempting to capture exactly the wrong thing. They should not be trying to capture the knowledge itself, but rather, the set of environmental cues and conditions that would prompt in the learner the same experience as previously existed in the teacher.

As I said in my paper, "the challenge of knowledge management, and hence of online learning, therefore consists in this: of being able to capture those artifacts, of being able to recognize the salient features of the context of transmission, of being able to store them in digital form, and of being able to recognize new contexts in which the same transmission would be of value. Though this sounds daunting, it has already been accomplished in simple form; the trick is to make it work with the complexity and richness of actual human communication."

This would seem like an impossible task were we starting from scratch, but we have since the beginning of history developed a rich and complex set of cues designed to invoke experiences. A sentence, spoken as a description, is intended not so much to convey information as to evoke an image, an experience, or an empathy in a listener. The forms of art flourish because our desire for communication isn't for the purpose of transmitting facts. We say what we want to say very deliberately, without words, with the Mona Lisa or the 1812 Overture.

If the teacher ever forgets that the purpose of a classroom is to create an experience, a society, a metaphor, then she has lost the art of teaching. In a similar manner, if our learning design abstracts so much from the experience that all that remains is bits and data, then we too have failed in our mission.

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[86] http://www.downes.ca/cgi-bin/website/view.cgi?dbs=Article&key=1059564050

It is for just this sort of reason that skeptics such as Dreyfus and Noble question the validity of online learning.

But we can remain true to the objective. We can remain honest and effective teachers and learners, by understanding that in the end our purpose is not merely to speak and to listen, not merely to show and to tell, but to create music, art and life. We need to communicate not only the mechanics of biology, mathematics or psychology, but also the special society created by these practitioners, and above all, the joy and delight they feel when they see the correct solution to the problem.

Because, it is like riding a bicycle. Once you've felt it, you need never go back. There are not success conditions. You'll just know.

Moncton, April 6, 2004

L'état, C'est Moi

By Stephen Downes

The problem becomes the loss of common norms, and common standards for those common norms. The "not-normative" schools you propose might decide that they won't try to create the democratic citizen, or the competent reader, but will substitute, say, the Christian, or the Jew, or the Muslim, and they will not create the skilled reader, but the skilled web designer. The issue, then, becomes the loss of a common culture. We become a nation that's all multiculture, all pluribus and no unum. - Steve Eskow

Racism, we agree, is wrong. But what if race were not a matter of involuntary genetic heritage, but something we could choose, akin to, say, the length of our hair or the cut of our clothes? Would racism then be permissible, even encouraged? One wonders what the ground for such discrimination would be, for there would certainly be no more ground than exists for discrimination today. But if racism in such a case were still wrong - as I argue it would be - then it would follow that it is wrong not because race is inherited but because race is irrelevant. Being of one or another race is not, in any justifiable sense, wrong.

There are of course numerous explanations for any instance of discrimination, whether it be on the basis of race or any of dozens of other traits. Among these a single explanation looms large, the desire to create and foster a unity among a people. The motto "E pluribus unum" is in no sense an expression of racism, but it is clearly an expression of a desire for unity. In the past, such desires have certainly led to instances of racism and to other forms of discrimination and conflict. The desire to achieve unity is historical fact, justifiable by the successes evident of a unified people, and psychologically compelling as a means to belong to something greater than oneself. But the fact that some senses of unity are desirable and some are not leads us to conclude that unity, in and of itself, cannot form the justification for a policy of discrimination, and by implication, for social and political policies in general.

Unity was once thought of in terms of having a common nature or essence. We would not think of a single thing as having different parts, but rather, of having different aspects or different instantiations. The elk was not an individual elk, but rather, an instance of the universal concept of Elk-kind. This Aristotelian and Platonic worldview was reflected in political economy. Tribes, nations, and peoples - these were not thought of as collections of individuals, but as instantiations of a single kind. A people. The body politic. The leader was not a representative of the nation, he or she was the instantiation of it. "L'état, c'est moi" was not merely the exclamation of an arrogant tyrant, it was the last gasp of a worldview that ended, decisively, with the *Magna Carta* and the French and American revolutions.

Replacing this view was a philosophy based, not on quality, but on quantity, born in the atomist philosophy of Leucippus and Democritus and nurtured in the Cartesian framework. What constituted a unity was an aggregation of individuals sharing similar properties. A piece of metal, for example, was called 'gold' if it were composed of an aggregate of atoms all bearing the same atomic properties. The

'goldness' was not in the piece of metal, but in the constituent parts. In a similar manner, political unity came to be that expressive of, to follow Rousseau, the 'will of the people'. Leaders came to be viewed not as instantiations but as representatives. Their essential qualities - their birth and inheritance - came to be seen as less important, their ability to speak for a majority, more important.

In order for such a unity to come into existence, there must actually be a commonality among the people. The great conflicts of the nineteenth and twentieth centuries had their seed in how this common will, this unity, ought to be founded and defined. In some prevailed the view that unity is based on genetics, and that the aggregate therefore needed to be purged of any impurities. In others prevailed the view that unity is derived from religion or faith. In still others, political and ideological purity was the official objective of the state. And in others, unity was defined simply as the expression of the primacy of the individual, a belief that unity could be obtained through an "invisible hand" if no restraints were placed on the rights and freedoms of the individual.

By and large, this last view has prevailed, though the conflicts against racism, fanaticism and fascism continue in pockets of resistance to this day. But though this last view has prevailed, there is a sense that it, like the others, defines unity in terms of certain essential properties of the individual, and there is a sense in which it, too, is ruthless in its determination to eradicate impurity. The dispute between communism and capitalism - two variants of the 'liberation' theme - nearly brought the world to ruin, and exercises such as blacklisting, McCarthyism and even the French ban on head scarves constitute evidence that, in freedom and democracy, unity is also sought, and that sometimes this desire for unity is capable of becoming an end in itself, superseding the very values on which freedom and democracy were founded in the first place.

Unity is a good thing; history demonstrates this. But at this juncture it is worth questioning whether unity as defined by the sameness of its constituents is a good thing. The world is in conflict today at least partially because there is the perception on the part of many people that E pluribus unum is beginning to define not only the nature of a certain nation, a certain people, but of the world as a whole. There remain people both in North America and around the world who define themselves in terms of their race, their religion, their political beliefs, and even their views on economic distribution, sexuality, recreational drug use, and the length of their hair. The suggestion that there is, or ought to be, a single culture, created out of the similarity (enforced or otherwise) of its constituent parts, is a suggestion they find strikes at the very core of their being.

Certainly from a global perspective, but even from a national perspective, the existence of distinct and fundamentally different political, religious and cultural affiliations is a fact. And though the belief may prevail that a unity could be obtained were only all to align to a single perspective, even if only a partial perspective, allowing some sorts of diversity while disallowing others, this belief is misguided. For there is no means of determining which such perspective should prevail, at least, no means that would be satisfactory to those with an alternative perspective. A means must be found that produces unity without requiring that the constituent parts be the same or even similar. I have encapsulated that political philosophy with the slogan: in diversity, harmony.

Just as a definition of unity based on quality was replaced with a definition based on quantity, I believe that today it is appropriate to consider replacing our contemporary definition based on quantity with one based on relation. In a nutshell, the thesis is this: the unity of an entity is based not on the nature of its parts but on the relations those parts bear to one another. Now one needs to be careful here, for this theory is not to do away with quality and with quantity, but rather, to change our perspective on the functional role of quality and quantity. When we changed our understanding of a piece of gold, the 'goldness' did not disappear, but our understanding of what made it 'a piece' of gold changed. In a similar manner, when we talk of a unity as being created by the relations between the parts, the quality and number of those parts does not go away, but our understanding of what makes it 'a single thing' has changed.

This is not a new concept. Just as counting and measurement existed long before Descartes, so also the concept of relation has existed long before today. And, indeed, just as aggregation was used before Descartes to identify, in some cases, entities (such as, say, a pile of stones), so also we depend on relation, today, to identify some types of entities. A collection of the same number of identical carbon atoms is universally recognized to be, in one configuration, coal, and in another configuration, diamond. Water molecules, organized one way, are ice, and organized another way, are steam. A cloud is distinct from a lake not by the nature or number of its constituents, but in the manner these constituents are related to each other, the earth, and to us. And moreover, for something to be a cloud (or a lake) does not depend in any crucial way on the nature or number of its constituent parts: our experience with other planets suggests that clouds may be made of methane, lakes of molten sulphur.

In political philosophy, then, the unity of a state is defined, not by the culture and beliefs of its people - in other words, not by any property of the people themselves - but rather, by the way the people are related with each other. And the measure of what constitutes a good political philosophy is not whether the beliefs, cultures or religions of its members (or its leaders) are 'good', but whether the network of relations enabled by that philosophy foster the maximum cohesion, and minimum discord, even (crucially) if its constituent entities are very different. In diversity - the antecedent condition - harmony - the desired outcome. A 'good' political philosophy is one that enables a person to undertake a maximal number of interactions with a minimal disruption of personal nature. Or, in pragmatic, concrete terms: the realms of culture, morality, religion and race are separated from politics. There is no 'common culture' - merely a mechanism that allows all people, no matter what their culture, to seek their own good in their own way.

Our educational system, therefore, should not seek to define a common sense of 'good', 'right' and 'just'. These are values that a child will inherit from his or her parents, just as he or she inherits a history, a language, and a skin colour. And at a certain point in time, these are all things that an adult may make his or her own decision about (even, in the age of genetic manipulation, skin colour). No, our educational system ought, instead, to be teaching *how* to live and interact in a multicultural environment in such a way as to allow his or her personal good to be satisfied. The criteria - the definition - of statehood should have no more or less moral import than learning how to drive on a highway, how to make change using a monetary system, how to communicate a message, and these criteria should be taught in the same way. For any other way of teaching is to revert to a definition of

unity based on changing the properties of an individual, and will invariably lead to discord and conflict, the disruption of the global net.

This is not to say that there should not be cultural, religious, or other teaching. Quite the contrary. These common cultural heritages are treasures, as important to our eventual future as genetic and biological diversity, and should be preserved, cared for and fostered. Each language represents a unique insight on the world; it would be an incalculable loss were humanity reduced to speaking a single common tongue. Each religion carries with it an important perspective on metaphysics and morality, and we are weaker if any religion is silenced. Our cultures defined, in a fundamental way, who we are and why we exist, and the loss of this would be a tragedy. But it is for this very reason that our sense of unity should not seek to subsume everybody under one common ethos. The role of the state - and the primary role of public education - is not to drain our individuality, but to allow us to express it maximally, in harmony with those of different faiths and beliefs.

It is not religion I oppose, but fanatics. It is not political belief I oppose, but fascism. It is not capitalism I oppose, but oppression. It is not democracy I oppose, but demagogues. It is not unity I oppose, but uniformity.

A system of public education should have as its primary objective the teaching of means and mechanisms of interaction with others in a maximally harmonious network of distinct and autonomous individuals. If such a system of public education has as its core purpose the fostering of unity through political, religious or any other form of conformity, then it may as well be dispensed with all together, for it has ceased to be a system of education, and has become instead a club.

Moncton, April 6, 2004

Distributed Digital Rights Management: The EduSource Approach to DRM

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Abstract

This paper describes the design and implementation of the distributed digital rights management (DDRM) system as undertaken by the eduSource project, a national network of learning object repositories built by a consortium of universities and other agencies in Canada. DDRM is foremost a system of rights expression, with transactions managed by a set of brokers acting on behalf of purchasers and providers. Rights are described using ODRL, contained in files managed by the provider broker, and accessed by means of pointers in the learning object metadata exchanged within the eduSource network.

1. eduSource

The eduSource project is a network of Canadian learning object repositories providing access to all Canadian educational institutions to a broad array of educational resources. Funded by the contributions of project partners (more than 30 universities, agencies, and businesses across Canada) and by CANARIE, Canada's Advanced Internet Development Organization, the intent of eduSource is to "create a test bed of linked and interoperable learning object repositories."[87] The development of eduSource involves not only the design of a suit of software applications, referred in project documentation as the Repository in a Box (RiB), it is also intended support the ongoing development of standards based tools, systems, practices and protocols necessary for a national learning infrastructure.

eduSource is based in part on three prior CANARIE funded initiatives: Explor@, "a software environment for the delivery of courses or distance learning events"[88], POOL (Portal for Online Objects in learning), a peer to peer learning object distribution network[89], and CanLOM, a learning object metadata repository.[90] Added to these were CAREO (Campus Alberta Repository of Educational Objects), a

[87] McGreal, et.al., 2003. eduSource: Creating learning object repositories in Canada. Rory McGreal, Griff Richards, Norm Friesen, Gilbert Paquette and Stephen Downes. Learning Technology, Volume 5, Issue 1. IEEE Computer Society Learning Technology Task Force. http://lttf.ieee.org/learn_tech/issues/january2003/#1
[88] Technologies Cogigraph, 2003. Explor@. Web site. http://www.cogigraph.com/en/explora.htm
[89] eduSplash, 2003. Splash. Web site. http://www.edusplash.net/
[90] CanLOM, 2003. CanLOM. Web site. http://canlom.telecampus.edu/my/index.cfm?fuseaction=login

learning object metadata repository (CAREO, 2003), institutional services provided by Athabasca University, and a variety of smaller initiatives.

The eduSource project team identified four major goals:

To promote and refine a repository metadata framework through the ongoing development of the CanCore protocol;

To support experimental research in key areas such as pedagogy, accessibility, protocols, network engineering, hardware integration, quality of service, security, rights management, content development and software applications;

To implement a national testbed to investigate processes such as peer review, content repurposing, user support, professional development and content transactions; and

To communicate and disseminate its findings through cooperation and partnership with other federal and provincial agencies, institutions and the private sector.[91]

Work on the eduSource project began in the summer of 2002. As of this writing, eduSource is projected for launch at the end of March, 2004.

2. eduSource Vision

The eduSource Digital Rights Management initiative has its origins in the eduSource vision. Making eduSource unique was not only its distributed nature, it being an attempt to link a geographically dispersed set of online resources and services, but also the diverse and sometimes conflicting points of view characterizing member initiatives at the outset. For example, while POOL is fundamentally a peer to peer system, similar in many ways to products such as Napster, Explor@ was a relatively traditional learning management system and CAREO a centralized metadata repository.

Moreover, as additional projects came into the fold, a wider array of points of view was added. With the addition of business partners came a desire to see implemented a digital rights management solution, and as a consequence this was incorporated into the original approach. Through the duration of the project, the emergence of such projects as the Open Archives Initiative (OAI) and Rich Site Summary (RSS) added yet another content distribution model for members to consider.

At the crux of many of these different visions lay digital rights management, and accordingly, Canada's National Research Council e-Learning group, as the DRM package manager for eduSource, initiated a 'Vision Committee' to draft broad

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CAREO, 2003. CAREO. Web site. http://www.careo.org/

[91] McGreal, et.al., 2003. eduSource: Creating learning object repositories in Canada. Rory McGreal, Griff Richards, Norm Friesen, Gilbert Paquette and Stephen Downes. Learning Technology, Volume 5, Issue 1. IEEE Computer Society Learning Technology Task Force. http://lttf.ieee.org/learn_tech/issues/january2003/#1

meters for the eduSource project. After wide consultation, the Vision Committee produced the following statement as part of its overall document:[92]

> eduSource is to be designed not as a single software application, but rather, as a set of related components, each of which fulfills a specific function in the network as a whole. This enables users of eduSource to employ only those tools or services that suit their need, without requiring that they invest in the entire system. It also allows for distributed functionality; an eduSource user may rely on a third party to provide services to users. The purpose of this principle is to allow for specialization. Additionally, it allows eduSource users to exercise choice in any of a variety of models and configurations.
>
> Any given software tool provided by eduSource may be replicated and offered as an independent service. Thus, it is anticipated that there will be multiple instances of each type of repository in the network. The purpose of this principle is to provide robustness. Additionally, it is to ensure that no single service provider or software developer may exercise control over the network by creating a bottleneck through which all activities must pass.

In order to realize this objective, the vision committee also endorsed the principle of open standards and open source. Accordingly, they wrote:

> EduSource repositories will use Open Rights Management standards and protocols. The purpose of this is to ensure that there is no a priori overhead cost incurred by agencies wishing to offer services compatible with eduSource. Imposing an a priori cost immediately poses a barrier to small and medium sized enterprises that may wish to participate and it biases the network toward the provision of commercial content only.

This vision was endorsed by the eduSource Steering Committee, which in turn resolved to license all software under the Lesser GNU Public License[93] and to endorse the use of Open Digital Rights Language[94] to express digital rights in the eduSource project.

3. DRM Vision

In addition to statements about the design of eduSource as a whole, the Vision Committee defined specific metrics for the development of eduSource Digital Rights Management: [95]

Any provider of learning materials may prepare and distribute learning materials through the eduSource repository network. eduSource will support the registration and indexing of various providers, this

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[92] Downes, et.al., 2002. EduSource Vision. Version 3. Stephen Downes, Toni Roberts, Rory McGreal, Norm Friesen, John King, Terry Anderson, Michael Magee, Mike Mattson, Gilbert Paquette, Griff Richards. eduSource. http://www.downes.ca/files/vision3.doc

[93] LGPL, 1999. GNU Lesser General Public License. Version 2.1, February 1999. Free Software Foundation, Inc. http://www.gnu.org/copyleft/lesser.html

[94] Ianella, 2002. Open Digital Rights Language (ODRL) Version 1.1 W3C Note 19 September 2002. Renato Ianella. http://www.w3.org/TR/odrl/

[95] Downes, et.al., 2002.

registration will be free and optional. The purpose of this principle is to ensure that providers are not faced with a priori `membership fees' or similar tariffs in order to gain access to potential purchasers. This does not preclude restrictions, tariffs or controls on specific instances of an eduSource-compliant repository. However, in any case where a restricted component, such as a for-profit metadata repository, exists, an equivalent unrestricted component, such as a public metadata repository, will also exist.

There will be no prior restraint imposed on the distribution model selected by participants in eduSource. Specifically, eduSource will accommodate free content distribution, co-op or shared content distribution, and commercial fee-based content distribution. The purpose of this principle is to ensure fair and open competition between different types of business models, to ensure that users are not `locked in' to the offerings provided by certain vendors, to provide the widest possible range of content options, and to ensure that prices charged for learning content most accurately reflect the true market value of that content.

Multiple parties may provide metadata describing a given learning resource. There is no prior restraint exercised by providers of learning materials on evaluations, appraisals, comments and other descriptions of their learning material. The purpose of third party metadata may be to provide alternative classification schemes, to indicate certification compliance, or to provide independent assessments and evaluations of learning resources. The purpose of this principle is to ensure that potential users of learning resources can obtain and input multiple descriptions of that material. It is also to create an environment for the creation of optional but value-added third party services for which fees or other costs may be charged.

eduSource should be considered as an implementation of and an extension of the semantic web. This means that metadata and services provided by eduSource repositories should be available to the semantic web as a whole. It also means that eduSource repositories and tools can and should incorporate elements of the semantic web, such as sector-specific ontologies, into its own design. The purpose of this principle is to ensure that eduSource is capable of the widest reach possible. It is also to reduce the duplication of effort between developers working in specific domains and educators working in the same domain.

The principle behind fee-based and subscription-based transactions is that it should be easier to buy material than to steal it. Thus where possible, the acquisition of rights and the exchange of funds will be automated. The purpose of this principle is to reduce transaction and clearance costs for purchasers of learning materials.

In addition, the structure of DRM within the network should be such as to allow for multiple digital rights models. For example, it should be possible for a government or agency to distribute free materials, for a college association to establish a cooperative system for sharing, and for a commercial provider to sell content on a per-view or subscription based model. Individual learners should have the option to access and, if necessary, purchase materials directly, or they should be able to obtain access to materials through their school board, provincial learning ministry, or employer.

Thus there is no single rights agency governing all transactions. A given provider of learning materials will work with one of many brokers who sell to multiple purchasers, and a given user may one of many agents who conduct transactions with multiple vendors. Vendors and users may select from any number of brokering services, so that no single transaction agent controls the network. Vendors and purchasers may act as their own brokers. A vendor or purchaser may elect to employ multiple brokers. Brokers acting on behalf of, say, a provincial department of education, may represent a given populations, such as the students of that province. The purpose of this provision is to eliminate the need for the creation of multiple accounts, to allow users to user resources from multiple vendors, and to provide a choice of brokers, and therefore a greater likelihood of trust.

In addition to describing digital rights on behalf of content providers, the network should assert individual rights and preferences on behalf of users. Users of the system own their own personal data. Brokers within the network may operate on behalf of the user, and releases information or money only with the agent's explicit consent. The purpose of this principle is to engender trust in the system and to ensure privacy when dealing with multiple agencies.

4. DRM in eduSource Use Cases

The eduSource architecture development process employed a standard methodology, preceding from the vision document, though a set of use cases, and the creation of a UML diagram describing the overall system. The Digital Rights Management package participated in this part of the development.

Use cases provided by the DRM package described typical procedures whereby a person (using IMS DRI terminology, an 'infoseeker') would search for, select, and ultimately purchase an online learning resource through eduSource.

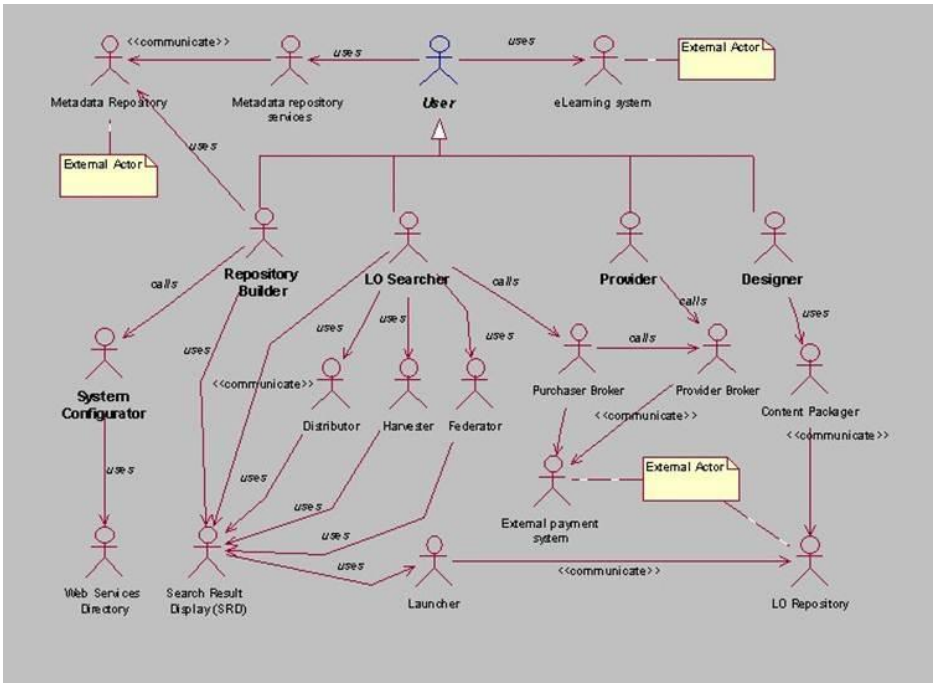

Figure 1. eduSource Use Case Diagram - Overview. Paquet, et.al., 2003

In figure 1, several features of the DRM system to be described below are evident. Digital rights functionalities are provided by two major actors within the eduSource system, the 'purchaser broker' and the 'provider broker' (sometimes documented as the 'vendor broker'). Financial transaction between the two brokers are managed by an external payment agency, such as PayPal or a credit card transactions company. The purchaser broker, in turn, interacts with the LO Searcher (infoseeker), while the provider broker interacts with the provider. This process is displayed in more detail in figure 2.

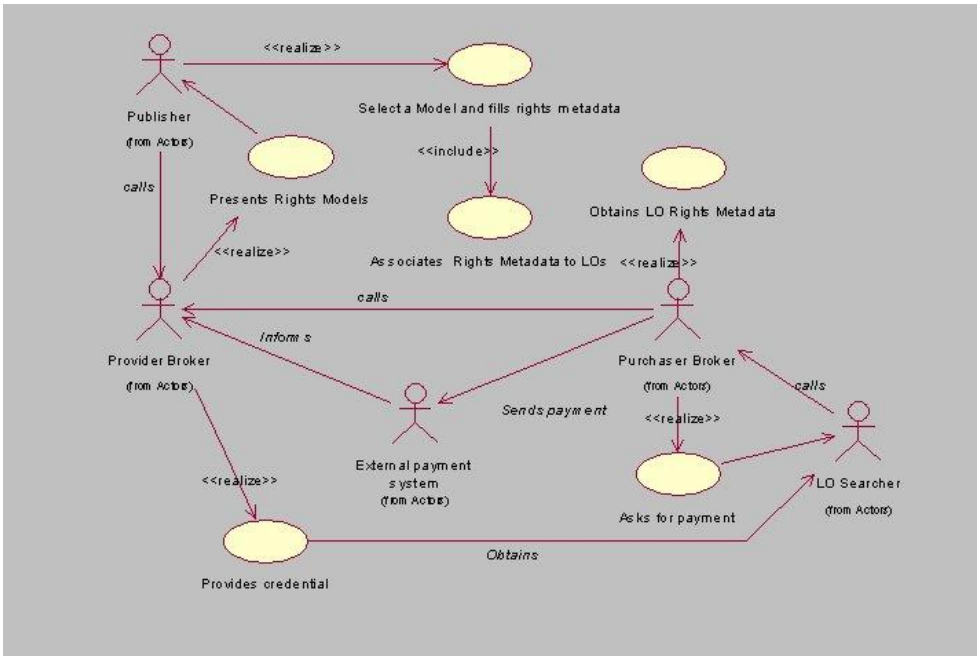

Figure 2. eduSource Use Case Diagram - Digital Rights Management. Paquette, et.al., 2003

As this expanded diagram shows, the provider (or 'publisher') works with the provider broker to create or select a 'rights model'. Information about this rights model is then embedded in learning object metadata. When a searcher retrieves the learning object metadata, he or she may then locate the rights model, which is provided on request by the provider broker. If specified by the rights model, a payment is made for use of the object, via the purchaser broker, and access to the learning object is granted, which is then returned to the infoseeker.

The process of assigning and employing rights is included in the overall eduSource process diagram:

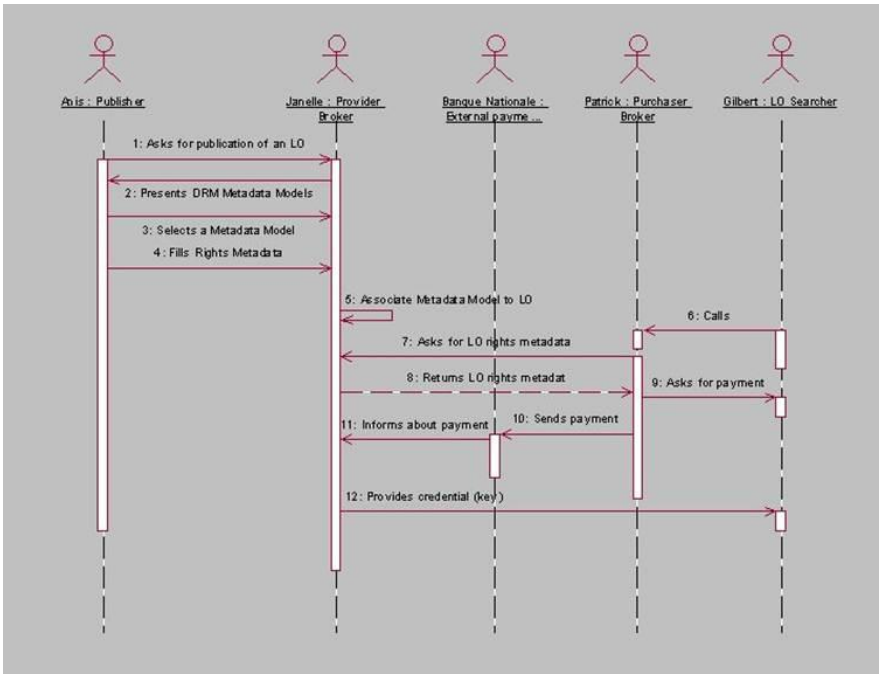

Figure 3. eduSource Process Model - Digital Rights Management. Paquet, et.al., 2003

The process diagram in figure 3 is more explicit about the payment and delivery mechanism. What should be noted is that the payment is made, not directly to the provider or even to the provider broker, but rather, to the purchaser broker. The purchaser broker then notifies the vendor broker of the payment, which in turn returns a key that provides access to the learning object.

5. Explanation of the Use Cases

The digital rights model proposed in the use cases introduces some major new features to online digital rights management. First, it introduces the idea of the purchaser broker, in addition to a vendor broker (which, under various names, may be found in other systems, such as the Microsoft Rights Management Server). Second, instead of embedding digital rights metadata in an object or object metadata, it stores only a pointer to that metadata. These are depicted in figure 4.

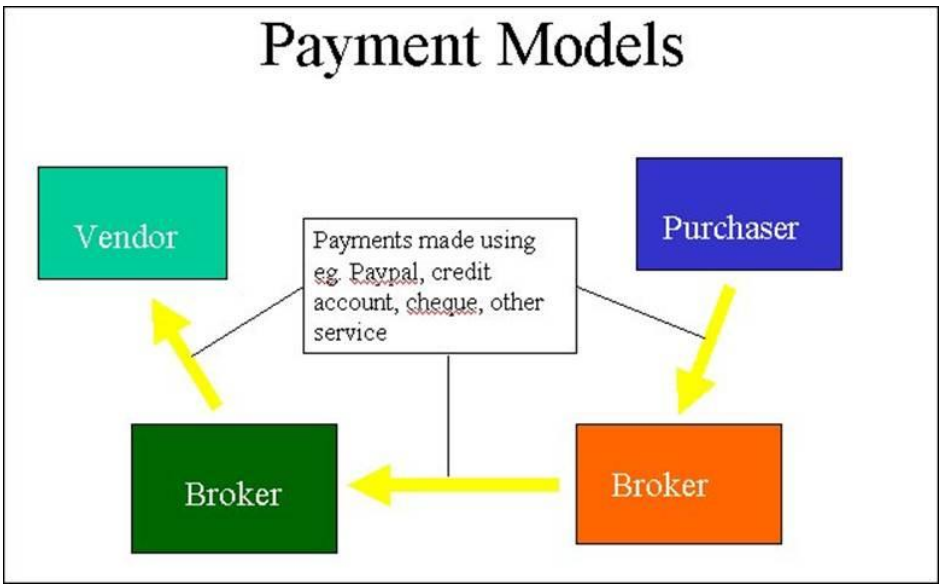

Figure 4. Distributed Digital Rights Management Model. Downes, 2004

The purpose of these features is to instantiate some of the requirements set out in the vision statement. In the vision statement, for example, it was proposed that eduSource be designed not as a single software application, but rather, as a set of related components. Thus, the various functions required of a digital rights system are displayed in the use cases as set actors. This proposal was adopted by the eduSource Vision Committee in order to ensure that there are no sole-source components of the system. Any given function performed by eduSource may be provided by any number of providers.

In practical terms, what this means is that, in eduSource, there is not only one vendor broker; there can be many, each vendor broker representing one or more vendors. In a similar manner, there is not only one purchaser broker, there may be many. This allows both vendors and purchasers to choose the entity that will provide digital rights management services. No vendor can lock in a purchaser to a given rights management service, and no purchaser can require than a vendor employ a given rights management service.

The division of the eduSource model into set actors also allows some actors to be bypassed if they are not needed. This performs a critical function for eduSource: it allows for the distribution of both free and commercial content in the same system. Because the digital rights management component, and in particular, the lock and key mechanism, is not an essential part of any eduSource service, it can be bypassed if not needed. Thus, even though free content is distributed through the same network as commercial content, it is not encumbered by the needs of a locking and payment system.

The addition of a purchaser broker into the system, in addition to protecting a purchaser's privacy and security, allows eduSource to "make it easier to buy than to steal." The price of learning resources, and particularly small items such as images, may be very low. Transactions involving such small amounts of money are called 'micropayments'. A major objection to micropayments is that the effort required to make a payment is greater than the payment is worth. There are financial transaction costs, and also

what Szabi (1996) calls "mental transaction costs," the hesitation a user experiences when deciding to pay a minute amount for a learning resources.

Typically, the purchase of an inexpensive item occurs as a part of a purchase of a larger item. This practice, known as 'bundling', typifies most online content sales. Corbis, for example, sells not a single image but access to an image library. Elsevier sells access not to a single journal article but to a journal library. However, this approach creates barriers for both content providers and content consumers. Content providers must assemble and market bundles of content, usually through a publisher, before they can enter the marketplace. Moreover, free content is not bundled (since there is no need) and may be excluded from the set of available content. And users, when accessing content through a bundle, are able to search and use only resources provided by the vendor of a particular bundle.

The eduSource digital rights management system addresses these problems by bundling, not content, but financial transactions. Through the use of vendor and purchaser brokers, many small transactions from different vendors may be lumped into a single payment. A purchaser, therefore, may opt to use only one purchaser broker, making a single monthly payment, and even pre-authorize transactions under a certain amount. A vendor, in turn, may work with a single vendor broker, receiving (and managing) only a single monthly payment, no matter how may purchasers are supplied.

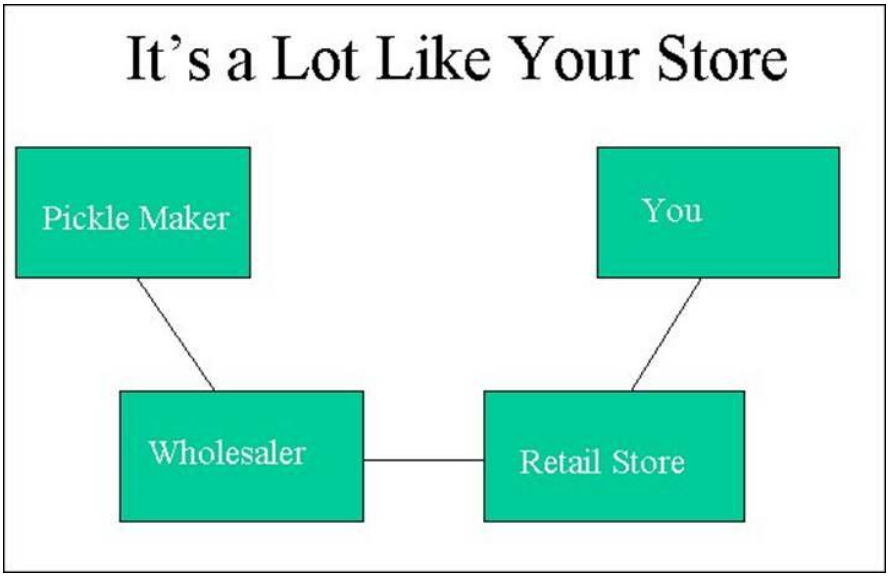

Figure 5. Distributed Digital Rights Management Analogy. Downes, 2004

Though new to online management of digital rights, the use of vendor and purchaser brokers is widespread in other commercial communities, as the analogy shown in figure 5 suggests. Vendors typically employ wholesalers to distribute their products. And purchasers typically access goods from a wide variety of marketers through their local store. It is rare, indeed, that a purchaser pays a provider directly for a good or service.

Finally, the use of a rights model, rather than an embedded description of rights, was necessitated by the commitment to a distributed system. Once metadata is released by content providers, it is beyond

their reach. Thus, once an offer is made, through the provision of rights metadata, it cannot be rescinded or amended. This makes it difficult for vendors to adjust the prices of their products to react to changing consumer demand, timeliness of the information, or changing economic needs. By maintaining the rights metadata in a se

te environment, one that is within the vendors control, the terms for the use of an object may be changed at any time up to the point of purchase. Additionally, the use of rights models allows one model to be applied to many objects, greatly simplifying the creation and maintenance of rights metadata for the vendor.

6. The eduSource Architecture

In order to enable a distributed network of object repositories involving many different search and distribution models, the eduSource architecture was designed around a set of commonly available web services. At the heart of these services is the Edusource Communications Layer (ECL). Instances of particular eduSource components, such as a repository or search service, are expressed to the network as a whole through eduSource registries. Common tasks, such as providing object identifiers, are provided by the same means.

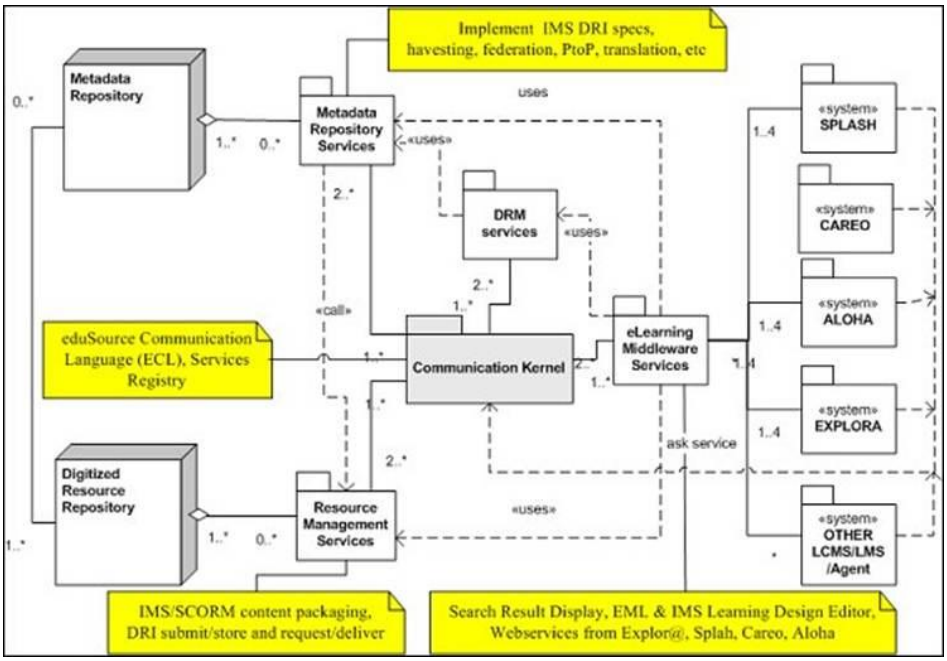

Figure 6. eduSource General Functional Diagram. Cogigraph Technologies, 2002

In the eduSource architecture, the digital rights management system is one of five major software packages; the others are the ECL communications kernel, e-learning middleware, metadata repository services, and resource management services. Since any function from any service must be available to all eduSource instances, communication and data transfer is handled through the use of web services. Thus the eduSource architecture committed the digital rights management system to providing a certain set of web services.

The eduSource architecture defines a 'broker' as "A software agent representing a person that wants to publish a new Learning Object to a metadata repository or to modify rights metadata of an existing LO. The Provider Broker presents a set of rights metadata models to the Provider. Each model includes secondary metadata that specify conditions, for example a certain form of payment that must be fulfilled in order to gain access to the object. The Provider selects a model and fill out specific conditions that are associated by the Provide Broker to the LO to be integrated by the Repository Builder."

In particular, a 'provider broker' is "A software agent representing a person that wants to publish a new Learning Object to a metadata repository or to modify rights metadata of an existing LO. The Provider Broker presents a set of rights metadata models to the Provider. Each model includes secondary metadata that specify conditions, for example a certain form of payment that must be fulfilled in order to gain access to the object. The Provider selects a model and fill out specific conditions that are associated by the Provide Broker to the LO to be integrated by the Repository Builder." And a 'purchaser broker' is "A software agent acting on behalf of a person that want to buy access to an object, obtains rights metadata and asks the purchaser (a utilizer) for payments prescribed in the rights metadata. It sends any required payment to an External Payment System," where an 'external payment system' is a "A computerized system that receives payment from a infoseeker or its Purchaser Broker in a DRM system. It informs the Provider of the learning object so that it can send a credential (a key) to the infoseeker."[96]

7. eduSource DRM Architecture

Based on the eduSource architecture and use cases, eduSource DRM functionality was expressed in greater detail through a set of DRM use cases. For example, figure 7 describes the requests that an LCMS must be able to make of the eduSource DRM system.

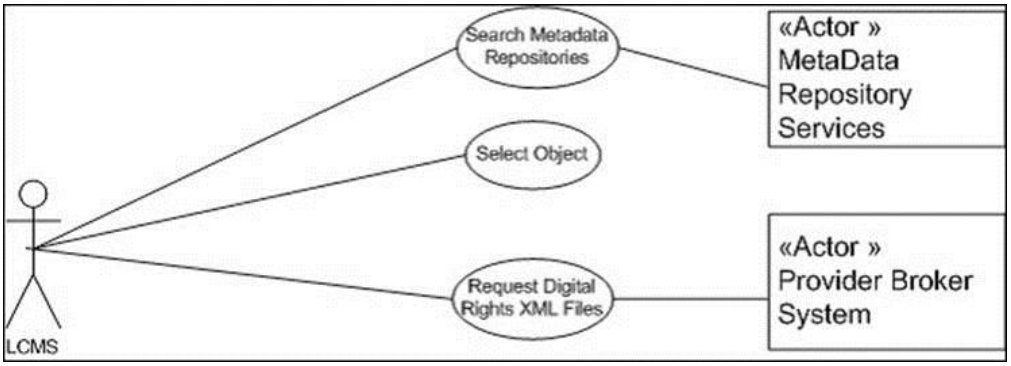

Figure 7. Request Digital Rights Information. Babin, et.al., 2003

Use cased were incorporated into the overall architecture of the DRM system. This architecture first captured in a sequence diagram to describe the steps of the DRM process (figure 8). An system data flow architecture was employed to specify more precisely the communications requirements between

[96] Paquette, et.al., 2003a. eduSource Suite of Tools Glossary of Terms Version 1.0. Gilbert Paquette, Karin Lundgren-Cayrol, Gérard Levy and Stephen Downes. eduSource. September 29, 2003. http://www.edusoruce.ca

the various systems (figure 9). It describes the two brokers along with the end user, learning object repository and external broker system.

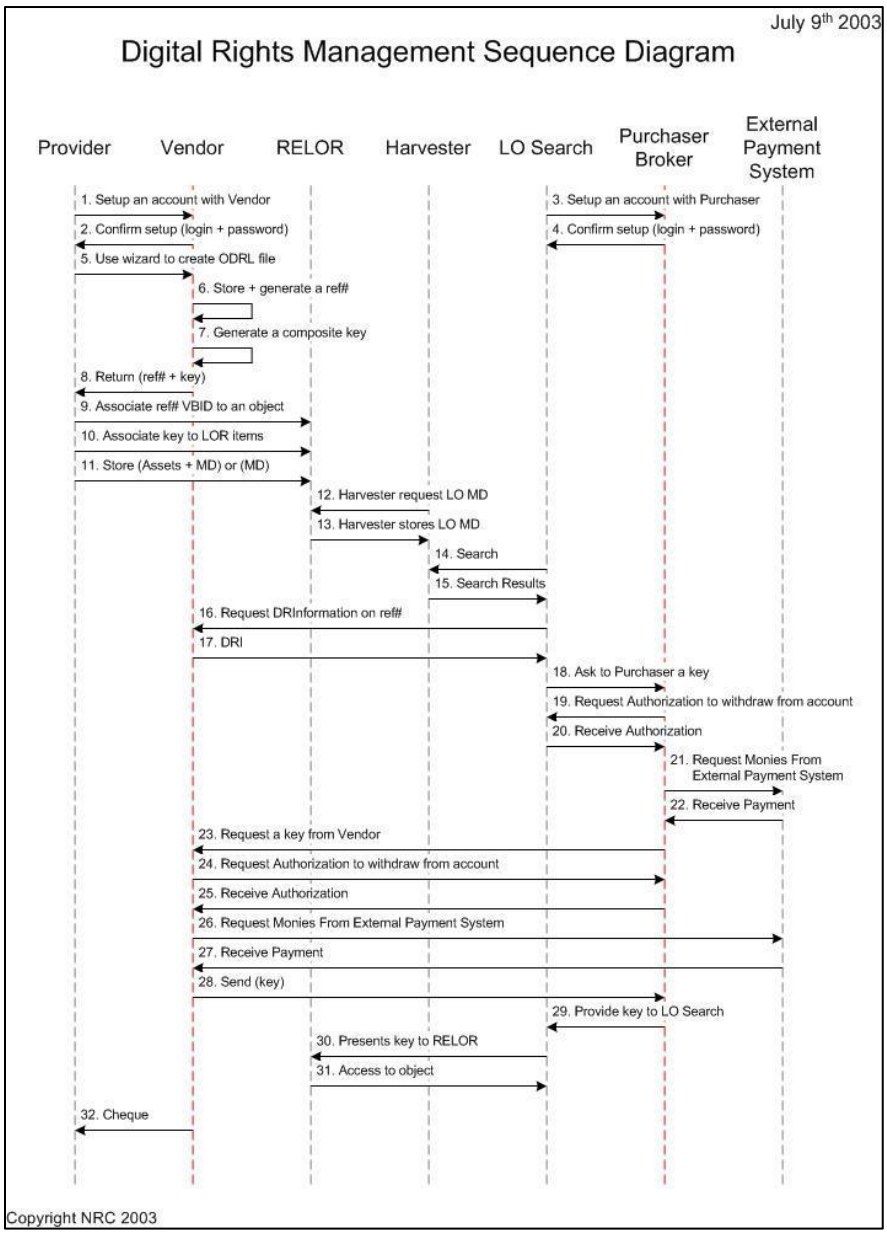

Figure 8. Digital Rights Management Sequence Diagram. Babin and Downes, 2003

The Sequence Diagram provides a preliminary understanding of how the digital rights will flow within a network.

- A Learning Resource Provider sets up an account with a Vendor System.
- The Vendor System generates a username and a password for each Learning Resource Provider.

- After logging into the Vendor System, the Learning Resource Provider is presented with an ODRL Wizard which can be used to express rights in a XML format.
- The generated ODRL File is stored on the Vendor Broker System and a REF# to the record is generated.
- Based on the requirements expressed in the ODRL file a Composite Key is generated.
- The REF# and in some cases a KEY are returned to the Learning Resource Provider.
- The Learning Resource Provider then associates the REF# to an object in a Learning Object Repository.
- The Learning Resource Provider also associates a KEY to an object in a Learning Object Repository.
- The REF# is be added to the LOM Metadata and the LOM is be stored in the Learning Object Repository.
- The metadata containing the REF# is harvested by some harvesters.
- The harvester stores the metadata containing a pointer to the ODRL file in its database.
- An object consumer searches for Learning Objects via a search agent.
- The search results contain MetaData, of which one element is a pointer to the ODRL file
- In some cases the Learning Object Consumer or his client software requests the Digital Rights information .
- The Vendor Broker System sends out the ODRL file for reading.
- If a key is required (that is, there is some cost or condition of access expressed in the ODRL) the Learning Object Consumer asks the Purchaser broker for a key.
- The Purchaser Broker asks the vendor broker for the purchasing information and compares this to the consumer's profile file.
- The Purchaser Broker receives the information and acts accordingly, either acting automatically or requesting confirmation from the consumer.
- If necessary money will be requested from an external payment system.
- The Purchaser Broker receives the money. Because of the small amounts the Purchaser Broker may deduct from an account rather than conducting a transaction with an external system every time a learning object is requested.
- The Purchaser Broker then contacts the Vendor Broker System to buy the key.
- The Vendor Broker request permission to withdraw from the purchaser broker's account.
- The Vendor Broker receives OK to withdraw
- The Vendor Broker requests money from external system. Again this may be done on an account basis if transaction costs exceed object costs.
- The Vendor Broker receives money from the external system.
- The Vendor Broker sends the key to the Purchaser Broker.
- The key is forwarded to the object consumer (the one who did the search)
- The object consumer presents a request for an object + the proper key to the LOR
- The LOR validates the key and returns the object

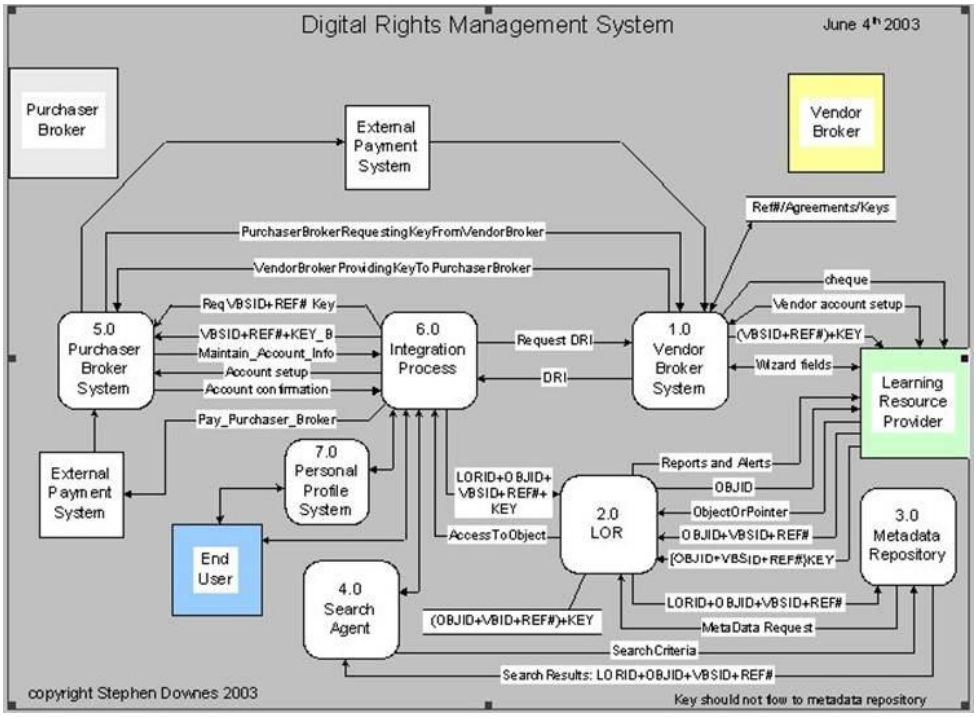

Figure 9. System Data Flow Architecture Diagram. Babin and Downes, 2003

The DRM System works in conjunction with other Systems such Search Agents, LORs, Harvesters, External Payment Systems. Keep in mind that this system is designed for a near future where there will be many low cost or free objects available with most transactions happening transparently at a machine level. A learning resource provider (LRP) wishing to sell objects (LO) sets up an account on the Vendor System. The Learning Resource Provider uses a wizard to create an ODRL XML rights description file which is going to be stored on the Vendor System. The ODRL file is parsed and a key token is created for every ODRL item requiring a key. The key tokens are aggregated into a composite key. The ODRL file and key are stored the Vendor System Database generating a REF# id. The Learning Resource Provider receives the REF# and the Composite Key.

To transform a LO into a Rights Enabled Learning Object (RELO) the Learning Resource Provider will associate the REF#/Composite Key to one or more of the Learning Object Repository (LOR) Learning Objects. The Harvester plays an important role in this model. As LOR get harvested the REF# become visible to end users thereby making it possible to access the ODRL files from the Vendor Broker System. A Rights Enabled Learning Object Repository (RELO) will be able to process keys and release info upon presentation of a proper key. The REF# will be exposed to harvesters but the composite key will not.

8. Provider Broker Web Interface

The Provider Broker providers a web interface where resource vendors may manage their account. The Provider Broker demonstration is available at http://drm.elg.ca/ProviderBrokerSystem/ProviderBrokerSystemLRP

The following figures demonstrate Provider Broker functionality. Figure 10 displays the account management screen and the list of functions available in the eduSource Provider Broker: Manage Account, ODRL Wizard, Manage ODRL Files, Search Report, Manage Purchasing Agent Accounts, Manage Provider Accounts, Invoices, and Monthly Cheques.

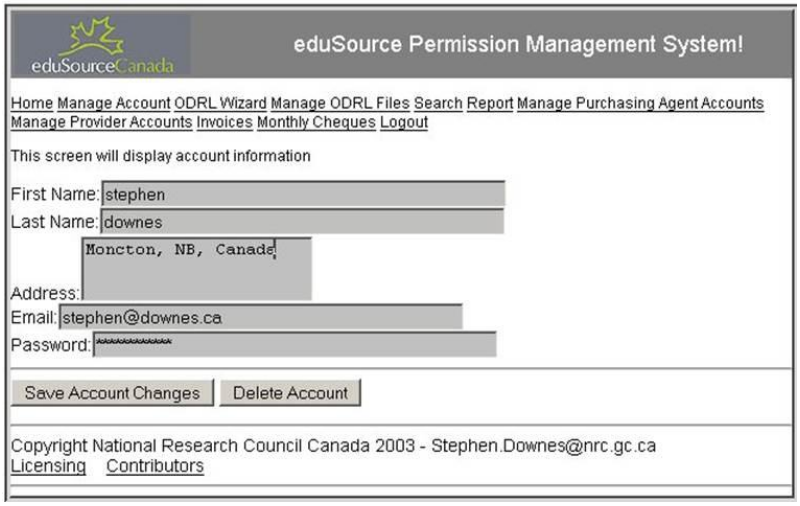

Figure 10. eduSource Provider Broker Manage Accounts.

In order to create an ODRL model, a provider accesses the ODRL wizard. This program is available at http://drm.elg.ca/english/ODRLGenerator

The ODRL wizard allows the user to create a rights model automatically, by selecting one of several preset options, as demonstrated in Figure 11.

Figure 11. eduSource Provider Broker ODRL Wizard Preset Options.

Additionally, the wizard allows a vendor to customize the present options or generate a new offer or agreement from scratch by selecting from the web based form. A partial screen shot is shown in figure 12.

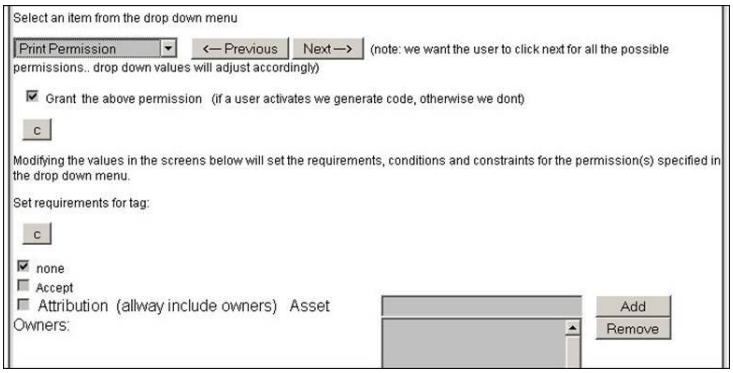

Figure 12. eduSource Provider Broker ODRL Wizard Modify Options.

When the user desires, the Wizard generates ODRL for the current set of options. This XML listing may then be edited at the source level, if desired (note: this is generally not recommended). The output display is demonstrated in figure 13.

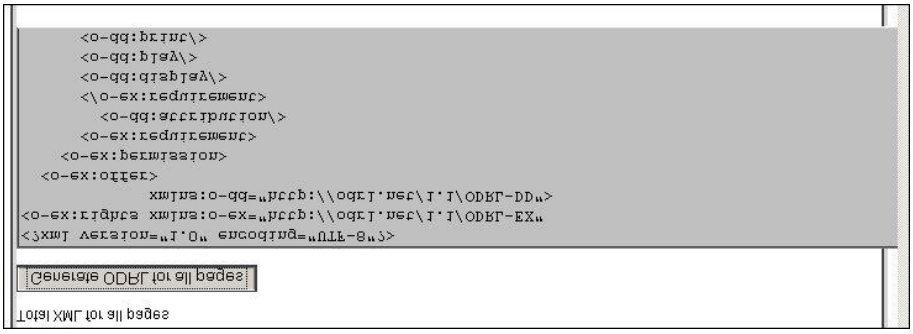

Figure 13. eduSource Provider Broker ODRL Wizard Generated ODRL Markup.

When the ODRL XML listing has been generated, the vendor may now save the file as an ODRL model by giving the file a name and selecting key options. The model may also be displayed in human readable form (English, French and Spanish output is currently supported). Figure 14 demonstrates the creation of an ODRL model. Subsequent to creation, a vendor may edit an ODRL file by selecting the rights model from a list provided on the 'Manage ODRL Files' screen. A sample ODRL file generated by the system may be found at http://drm.elg.ca/GetODRL?id=38

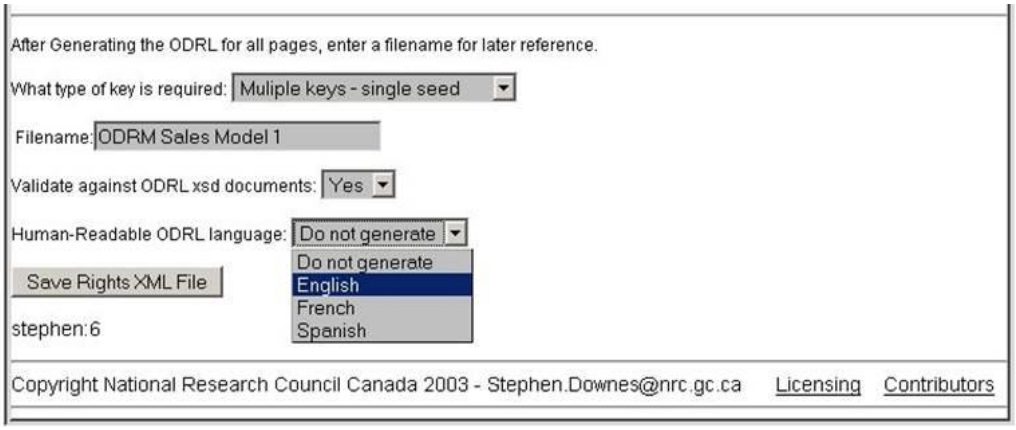

Figure 14. eduSource Provider Broker ODRL Wizard Create ODRL Model.

9. Provider Broker - Tagger Interaction

A 'tagger' is a tool used by learning object authors to create metadata for a learning object. It may be a stand-along tool, or it may be incorporated as a part of a more comprehensive authoring tool. The eduSource Repository in a Box includes a tagger as part of the software set available to users.

Once a vendor has created an account with a Provider Broker, the functionality of the Provider Broker may be accessed from within the tagging tool through the use of web services. Figure 15 is a mock-up of what such an interface would look like. The list of ODRL Models available is shown in the drop-down. The tagger obtains this list from the Provider Broker using a web service.

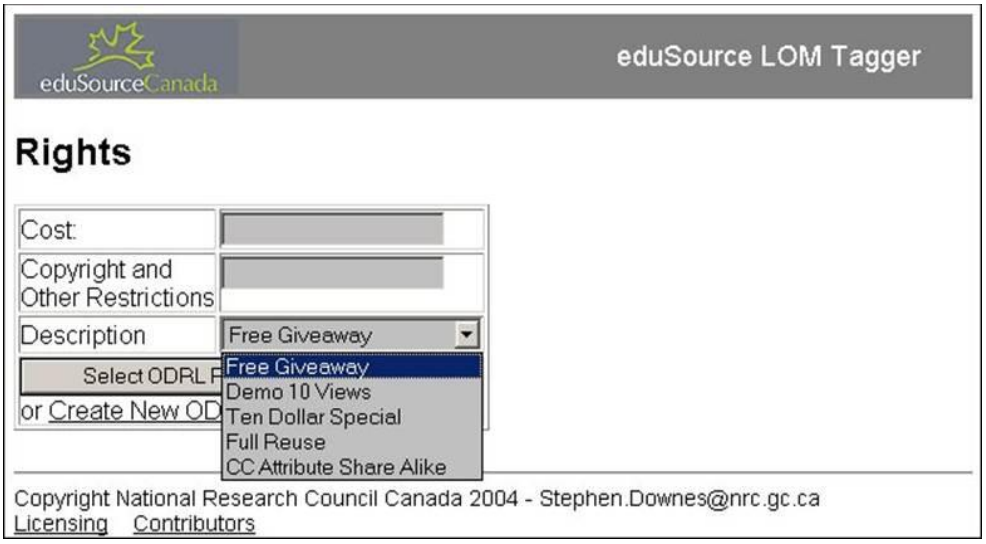

Figure 15. eduSource Provider Broker Tagger Interface.

When the rights model is selected, a second web service is called by the tagger, and the Provider Broker returns the address of the ODRL model. The tagger then inserts this address into the rights description field of the Learning Object Metadata (or the appropriate field if a different XML format is being used). The resulting rights XML is as follows:

Figure 16. ODRL Model Reference in Learning Object Metadata.

10. Purchaser Broker

As described above, a purchaser broker acts as an agent for a content purchaser (or 'infoseeker'). To use the Purchaser Broker, the infoseeker creates a purchaser broker account. Included as part of the account, as depicted in Figure 17, are conditions for pre-authorized purchases. As noted, the creation of pre-authorized purchases eliminates the mental transaction costs associated with micropayments.

Figure 17. eduSource Purchaser Broker Manage Account.

Though services offered from one Purchaser Broker to the next may vary, the idea is that a purchaser may employ any number of payment methods, including monthly invoice, addition to an Internet Service Provider billing, credit card payment, or online payment service such as PayPal. Figure 18 displays this selection in the Purchaser Broker Account Manager.

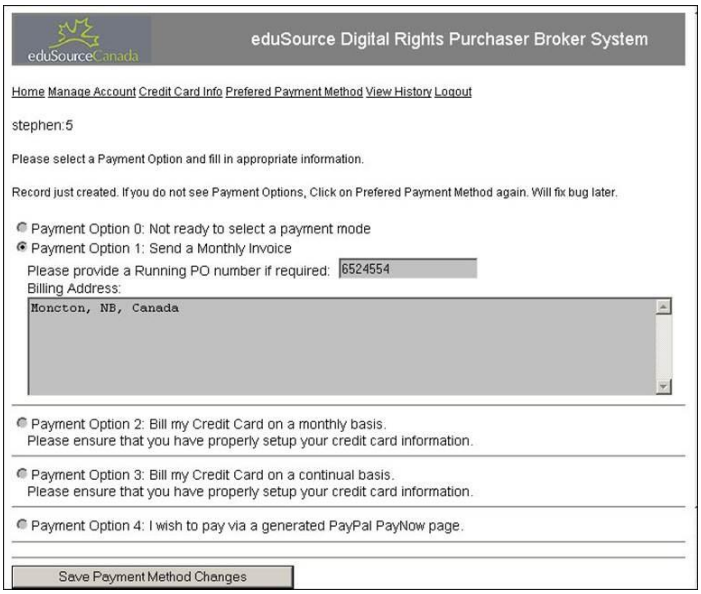

Figure 18. eduSource Purchaser Broker Manage Account.

11. Learning Object Browser

To demonstrate the functionality of the eduSource DRM system, a learning object browser (LOB) has been created. The LOB conducts a search across the eduSource network and displays the search results. http://drm.elg.ca/ObjectBrowser/ObjectBrowser

The LOB provides a user with access to Purchaser Broker functions. Figure 19 displays the LOB search form, with a choice of Purchaser Brokers displayed (recall that a user may opt to use one or more purchaser brokers). By selecting a purchaser broker, the user determines which of these services will conduct transactions on his or her behalf.

Figure 19. Learning Object Browser Purchaser Broker Select.

12. LOB - Vendor Broker Interaction

When search results are returned and displayed to an infoseeker, client software should also retrieve rights information automatically (using the URL located in of the metadata to retrieve the ODRL rights file from the rights broker). Displays may vary, of course, but an infoseeker would not typically click 'rights' -- they would select an action (view, print, etc). *If* rights clearance is required in order to perform the action, then the rights subroutines take effect; if no rights clearance is required, then the action simply happens.

For example, a person types in a search request that is sent to eduSource: 'Roman History' eduSource returns a set of LOM records. In each LOM record is a reference to an ODRL file. The person's client requests each ODRL file. This information is now displayed together.

For example, imagine the possible set of search results:

History of the Roman Empire
Fred's Roman History $
New Edited Roman History
All the Romans in the World $$
No Romans No More $
Rome Are Us

We can see from this display that some resources have a cost, and others are free. You do not need to click on anything to see this.

If a person clicks on the title of a free resource, it simply displays (that is, a request is sent directly to the provider's learning object repository, the resource is returned, and then displayed to the viewer).

If a person clicks on the title of a pay resource (indicated with $), then the request is sent instead to the purchaser broker. The purchaser broker retrieves the ODRL file from the vendor. In some cases, the payment is preapproved, so it simply conducts the transaction and sends a key to the users client, which then presents the key along with the request to the provider's learning object repository. In other cases, it must ask the user to select from a set of one or more options (offers) to approve (or reject) payment. If payment is rejected, the transaction terminates. If payment is made, then the transaction is conducted, a key obtained, and sent to the client program, which makes the request from the learning object repository.

We do not display ODRL information (except in rare cases). We use ODRL information to make decisions.

13. DRM Security Model

Digital rights management has three major aspects:

- Expression ? the description of the resource, ownership of the resource, and the terms and conditions of use

- Authentication ? verification that the person using the resource has the right to use the resource, and
- Protection ? means, such as encryption, to ensure only authorized users have access

In addition, DRM may be applied in any of three domains:

- Resource ? a particular document or digital resource ? for example, a document may be locked or encrypted
- Access Point ? a content server, such as a website ? for example, a website may require a login
- Network ? the connections between servers ? for example, ATM network

This creates a DRM design decision metric, as displayed in figure 20.

	Resource	Access	Network
Expression	Copyright notice	Terms of use notice	Rights expression language
Authentication	Password to open document	Password to access website	PIN to use ATM system
Protection	Encrypted document	Secure sockets layer	Virtual private network (VPN)

Figure 20. DRM Design Decision Metric.

In the decision metric, it is possible to identify increasing degrees of security, as demonstrated in Figure 21.

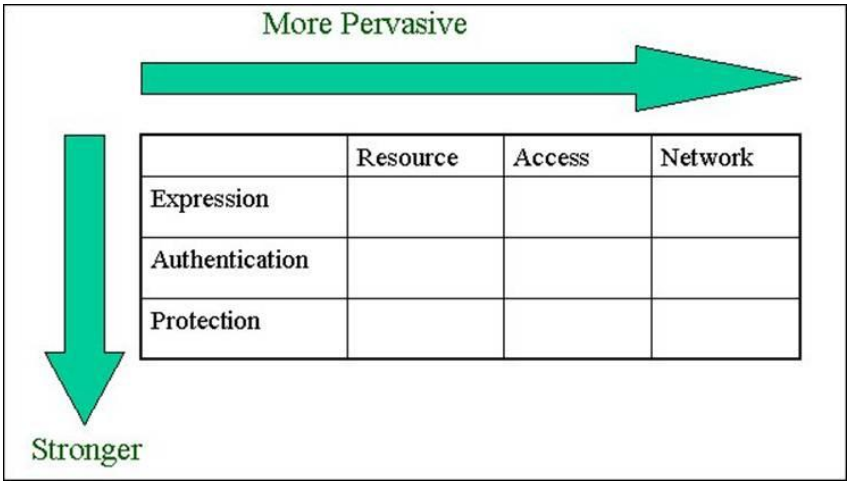

Figure 21. DRM Degrees of Security.

We may therefore distinguish between: *weak DRM*, where expression is in the resource only, there is no authentication and no protection, as in a web page with a copyright notice, book with a copyright page, property with a ?keep out? sign; and *strong DRM*, where expression is in the resource, access point, or network, authentication is in the network using a single login, and protection is network wide, as in the ATM Bank Machine system requires that you provide credentials to use the system, and encrypts all data and communication.

In the debates regarding DRM, two major positions have evolved, corresponding to these degrees of security:

DRM is too weak: in networks like the web and Napster, expression alone is insufficient to ensure that rights are respected

DRM is too strong: proposed DRM systems require a unique userid (eg., MS Passport) and fully secured network (eg., Rights management server, ?trusted? applications), violate privacy, fair use

The DRM mechanism proposed by eduSource DRM is a 'middle way' between these two extremes. Expression is supported at the network level through the use of a rights expression language (and specifically, ODRL). Authentication is supported at the access level through the use of keys. And protection is supported at the document level with locks or encryption.

Criticism regarding the proposed system has, not surprisingly, originated from both extremes. From one point of view, the eduSource DRM system is too strong. Advocates of open content, for example, fear any DRM system will prevent people from freely sharing content. However, it is arguable weak enough. In order to use free resources, rights must be declared, and any further level of authentication and protection is at the discretion of the resource owner. On the other hand, others have argued that the eduSource DRM system is too weak. Commercial providers, for example, want stronger protection, such as authentication at the network level, to prevent file sharing. But in response, it may be argued that it's strong enough. A key system makes it difficult to obtain unauthorized access to content, but leaves it easier to buy content than to steal it.

Critics of eduSource DRM must ask themselves, "What causes file sharing?" There are two answers. When DRM is too weak, there is no incentive to go through the extra work and cost to pay for content; commercial content is not viable. But when DRM is too strong, free content is not viable, and the transaction cost is too high, so it is easier to look elsewhere for the same content.

Vienna, Austria, April 14, 2004

Barbarian Inventions

I think there's a theme. There may be a theme. But don't spend time looking for one; it's not written that way.

One

Please let me be clear about my objection to registration.

For access to services where a unique ID is by definition required - participation in a mailing list, for example, posting a personal blog or discussion board comment, accessing personalized content - then I have no problem with registration. I have many such user IDs and even have a registration form on my own site for the same purpose.

But when links are posted on the open internet, as though they are accessible with a single click, and the user is presented with a registration form instead the content they were expecting when they clicked on the link, then that's where it becomes not just annoying but damaging.

Such links are nothing more than spam. A type of link spam. Trying to lull readers in with a false promise in order to sell them something for a price.

Sure, the price is low low low. Sure, the product or service can't be beat. And, of course, the company couldn't service without your business. I know the message from the newspapers. And I'd be more sympathetic if I didn't see exactly that same message from the links pretending to be email messages polluting my in-box.

We've heard on this list from people with years of newsroom experience attesting in favour of registration. Well I come in to this debate with years of internet experience. I remember when the Green Card Lottery swept across UseNet. I remember when commercialization of the internet was still a living issue. So I can say this with some authority: I've seen this play before.

We will be hearing from various studies and surveys that most people don't mind registration, that most people provide accurate information, that most people see it as the cost of supporting content on the internet. These people are responding at a time when registration sites are relatively few in number. But as they begin to report success, the bandwagon effect takes hold.

Ask the same people what they think in an age before every second link takes them to an advertisement, not the content it promised. People will have much shorter tempers by then. You can't depend on the surveys to guide you here. You have to ask yourself - is what we're doing fundamentally honest? Because while a little dishonesty today may be tolerated, a lot of it in the future won't be, and people will react with a much stronger than expected anger, because they will feel that their tolerance and good nature has been abused.

The message is: stop the false advertising. What I see, though, is the false advertising accelerating. I saw an item today about Wall Street Journal RSS feeds. Now what use is an RSS link from the WSJ? Unless you are one of the few who subscribe, it's nothing but spam. I hit a link today from the Kansas City Star - it let me in to read the story, but the second time (when I went back to verify a quote) it demanded a registration. It was basically trying to trick me, an occasional visitor, into providing a link to its onsite advertising.

Now the beauty of Bugmenot is that it really only works against those false advertising sites. If your site isn't putting out misleading links all over the internet, people aren't going to be getting annoyed at you and using Bugmenot to gain access. And even if someone has created some Bugmenot accounts, there won't be people using those accounts because you're not duping people into staring at a registration screen. So there's no reason to worry - or to get upset - unless you're polluting the web with misleading links.

And from where I sit, if your major means of interacting with the web and welcoming new readers is with a lie, then you should not be surprised if people respond in an angry manner.

Newspapers themselves can be honest with links. Put "(Registration Required)" in your page titles so that aggregators and Google display appropriate notice in link listings. Don't ask for registrations for content you intend to widely publicize. If you run a registration site, keep the deep web deep - don't pollute out browsers with misleading advertising. Or best of all, participate in the exchange that defines the web by putting your content out there for free (the way the rest of us do) and save registration for where it's needed.

So think of Bugmenot as an honesty meter. If its creating unwanted (and unregistered) traffic, then your means of promoting yourself online is in some way dishonest, and you are paying the price for that. And don't expect anyone to be sorry about the fact that you're paying that price.

You reap, you know, what you sow.

Two

Re: Dreyfus. Community in the Digital Age: philosophy and practice. 2004.

In Kierkegaard's book Present Age: "More basically still, that the Public Sphere lies outside of political power meant, for Kierkegaard, that one could hold an opinion on anything without having to act on it. he notes with disapproval that the public's 'ability, virtuosity and good sense consist in trying to reach a judgment and a decision without ever going so far as action.' This opens up the possibility of endless reflection. If there is no need for decision and action, one can look at all things from all sides and always find some new perspective.....All that a reflective age like ours produces is more and more knowledge...." by comparison with a passionate age, an age without passion gains in scope what it loses in intensity".....Life consist of fighting off boredom by being a spectator of everything interesting in the universe and of communicating with everyone else so inclined. .....

Such a life produces what we would now call a postmodern self---a self that has no defining content or continuity and os is open to all possibilities and to constantly taking on new roles.....the anonymous spectator takes no risks....When Kierkegaard is speaking from the point of view of the next higher sphere of existence, He tells us that the self requires not 'variableness and brilliancy but 'firmness, balance and steadiness (Either /Or)...Without some way of telling the significant from the insignificant and the relevant from the irrelevant, everything becomes equally interesting and equally boring, and one finds oneself back in the indifference of the present age.

It is, of course, illusion that there could be a life free of choice, even for the most dispassionate and idle spectator. The fact of being human forces choice on us every minute of every day. Will the ground support me if I take a step forward? Will this food nourish me or poison me? Should I wear clothing today? It is true that these choices are in a certain sense mundane and everyday. But at the same time, they are foundational, the most important choices a person can make - a commitment to at least a minimal ontology, a decision to continue living and the means toward that end, an understanding and acceptance of social mores. It is true that most people make such choices without reflection - showing that there must be something to meaningfulness over and above choices - but it is also true that people who seriously reflect on such choices, who consider both alternatives to be genuine possibilities, nonetheless in the main come to the same resolution as those who make such choices automatically. In matters that are genuinely important, choice is itself an illusion. And in cases where choice is not an illusion, it is also the case that the decision is not so fundamental. The two outcomes are of relatively similar value, at least in comparison to fundamental questions of existence, life and living.

If by failing to make a choice in this or that matter, if by remaining dispassionate and accumulating, as it were, more knowledge, if by doing this one may remain insulated from any consequences, it seems evident that the choice one would have you make in such a case falls in the opposite extreme, a choice not about that which is fundamental, but about what is trivial. Though it may be true that we may suffer some consequence by acting one way or another, if a failure to act affects us not in the least then there is no motivation for action, and the choice we believe we face is illusory, and therefore the meaning we would derive from making such a choice illusory also. The choices that engender meaning in our lives are not those we can duck in order to live in a post-modern idyll, but those we cannot avoid, similar in nature to those of a fundamental nature, but less wide in scope.

To make a choice simply to attain the distinction of having chosen is to trivialize the nature and import of making a choice. If one chooses a religion only in order to claim membership in the ranks of the converted, such a choice mocks the devotion that results from the presentation of religious phenomena or experience. If one chooses a political affiliation only in order to have voted, then this decision renders meaningless the resolution of affairs of state implicating individuals and nations in matters of economy and war. It is, indeed, the making of such decisions purely for the sake of making a decision, by a person who has no stake in the outcome, that causes the greatest amount of hardship and suffering. The firmness, balance and steadiness of a person who has made a choice for sake of making life less boring is to be feared the most, because such a person has made a choice that did not need to be made, and would have no motivation to alter or sway their course of action in a direction more compassionate or rational. "She has a very deep conviction to some very shallow ideals," it was once said of a politician

friend of mine, and the result was action without knowledge, and in the end, nothing more than an illusion of relevance.

Many people criticize me for the moral and political relativism I advocate in numerous spheres; this does not mean that I have made no choices, but rather, that I have made choices - about value, about right, about religion, about society - only when such choices were required by circumstances, and only applicable to a scope in which such a choice were relevant. Kierkegaard is right, though the process of choosing, one can come to believe, and to thereby make the facade originally accepted a reality in fact. But the sort of choice he advocates, there is no need to make. Like Julian of Norwich, presented with religious phenomena or experience that make a previous life incomprehensible, a choice of religion may be the most rational or sane alternative. But God, as they say, does not speak to everyone, and those to whom God has not spoken need not formulate a reply.

When life presents itself as a fighting off of boredom, of finding nothing or more or less important, the usual cause is not that a person has not committed him or herself to a certain set or beliefs or a certain course of action, but rather, because the person has not accumulated enough knowledge to understand the choices that need to be made. The post-modern stance of observing, countenancing, and experiencing a wide variety of moral, social, political and religious beliefs (among others) is the rational and reasonable approach; when one does not have enough data to make a decision, and a decision is not forced, the rational course is to gather more data, not to prematurely make an ill-informed decision. This to me would seem evident! Why, then, laud the merit of meaningless choices in order to give life meaning? The meaning of life will present itself soon enough; in the meantime, the only thing a person ought to do is live it.

Three

Re: Unshaken Hands on the Digital Street, by Michael Bugeja.

The author assumes that interaction with the physically present must take priority over the physically distant (and electronically connected). Remove the assumption in this article, and require that it be supported through argumentation and the impact of the dialogue is lost.

In fact, it seems to me, the order of precedence of interaction ought not be resolved by proximity, which is typically merely accidental, but by two more salient factors: priority (that is, all other things being equal, the interaction that is most important to the actor takes priority) and precedence (all other things being equal, the interaction that began first takes priority). Most interaction is a case of these two stipulii coinciding in two people: for each, the interaction with the other is the most important of those available at the moment, and will continue until concluded. 'Interruption' is the process of one person suggesting that the importance of an interaction is greater than one already in progress, and it is (of course) the right of the interrupted to make the determination as to whether this is so.

In the pre-digital age, priority and precedence coincided with proximity. That is, all the choices of interactive possibilities were of people located in physical proximity, and physical proximity being a limited quantity, precedence assumed a much greater importance. But it would be a mistake to equate

proximity withy priority and precedence; with electronic communications, it is now possible to have a situation in which a communication by telephone is of greater priority than a presently existing in-person interaction. When a telephone rings, this is an interruption, and the receiver typically makes an assessment (often by looking at the caller ID) as to whether the telephone call is likely to be more important than the present interruption.

What is also true, in an increasingly crowded and mobile world, is that the value of physical proximity is diminished. In less mobile, less crowded times, one could assign a high degree of probability that a person wishing communication while in close proximity was also a person with whom communication would be a priority - it would be a spouse or child, a business associate, or a customer. But today's physical interactions are increasingly with strangers with whom one has no prior attachment, and so the probabilities have now tipped the other way: it is more likely that a telephone call, from one of the few people in the world to know your number, is of greater importance than a conversation with a stranger on the street or in the office.

When a person in physical proximity interrupts a person using a mobile telephone or similar electronic device, the probability is that their priority to the person being interrupted is less than the priority of the person being talked to. Where once people apologized for being on the telephone when a stranger wished to speak, it became apparent that no person need apologize for talking with his spouse, child or friend, and that it is the stranger imposing the interruption and making the request. Breaking off a telephone call (or even shutting off an MP3 player) to help a lost tourist is a mark of altruism, and as the stranger had no prior claim on the person's time, such behaviour ought to be thanked rather than criticized when written about in an article.

The mistake being made in the article below is in the assumption that the virtual interaction is somehow less real, somehow inherently less important, than the proximal physical interaction. "By the time they attend college, they will come to view technology as companionship." But this is a fallacy, a confusion between the message, which is a product of the media (a "phone" call), and the content, which is a product of the interaction (a call "from John"). More straightforwardly, the vast majority of online and electronic interactions are with real people, and there is no a priori reason to assign a real person lesser importance on the basis that they are distance (and, given such a person's prior attachment with the caller in question, very good reason to assume the opposite, that the distant person is of greater importance than the proximal). Electronic communications may be caricatured as communications with the non-real, but to draw any conclusion of important from this characterization is to ignore an obvious and self-evident truth: real people communicate electronically.

The characterization of the product of electronic communications as "dumb mobs" is an assassination ad hominem. Were it true that drunken parties the only consequence of such forms of virtual communication (were it true that such parties were known to be caused by such communications at all, as though they had not occurred prior to the advent of the telephone) then perhaps one might have a case. But electronic communications have conveyed messages as vital as the birth of a child, the formation of a business, the death of a relative, humanity's step on the moon, and so much more. Empirical observation shows that the party-generation capacity of electronic communications is a

minimal, and infrequently employed, use of the medium. It makes no sense, then, to assign to the communication the morality of the mob.

The reactions of a person who, by dint of physical proximity, assume priority and precedence over any and all electronic interactions, are, quite frankly, the reactions of a self-important boob. They convey the impression of a person who believes that his or her mere physical presence ought to command the over-riding and immediate attention of all who come within his or her purview. They show no respect for the importance a caller may place on communicating with friends, family or associates, and demand immediate and sole attention to the matter at hand, namely, him or herself. In a world of competing interests and of increasing demands for interaction, people have learning that they must from time to time take their turn. This author strikes me as one who hasn't learned this yet.

Four

While it is a fact that each of us, as knowers, is situated in the world (situated bodies) and we learn by bumping (commonsensical understanding) into the world; What constitutes knowledge is not reducible to any of us or to our bodily presence, any more that what constitutes the English language depends upon the use of English by any speaker of the language or what constitutes mathematical truths depends upon any person's calculations.

Trivially, this is an assertion to the effect that a recognizable entity (such as knowledge, language or mathematics) that has an existence outside ourselves is not reducible to states of affairs inside ourselves. If we argue from the outset that these are social phenomena, then it follows by a matter of definition that they are not reducible to mental entities. But this is no more revealing than to say that a house is not reducible to our perception of a house. Such a statement is necessarily true, assuming the independent existence of the house.

More interesting is the perspective where we are silent on the external existence of the house. We presume that our perceptions of a house are caused by a house, but it is also possible that our perception of a house was caused by something that was not a house, or caused by the convergence of discrete perceptions that have no discrete external status at all. After all, we can have perceptions (or, at least, thoughts) of a unicorn, without at the same time asserting that a unicorn has an independent external existence.

The real question is, is our concept of a house reducible to our perceptions of a house. That is to say, can we arrive at the idea of a house through some form of collection and organization of perceptions? The logical positivist answer to this question was that we could, though the entities and mechanisms proposed (an observation language, logical inference) proved manifestly inadequate to the task. A similar stance seems to be being taken here. Our concept of a house cannot be reduced to a set of mental entities; no mechanism of inference appears to be adequate to the task.

When we look at this more closely, we see that the assertion is that the entity in question - our idea of a house - is not composed of the entities from which it is supposedly derived. That is to say, we could replace one or even all of our mental entities (thoughts, perceptions, etc.) with distinct instances of

those entities, and yet the perception of a house would remain unchanged. This gives it a unique ontological status.

Consider, for example, what would happen were we to attempt the same thing with the Great Wall of China. The Great Wall is composed of bricks. Were these bricks removed, and replaced with new bricks, we would no longer say that the Great Wall of China exists; rather, we would say that we have constructed a facsimile of the Great Wall, and that the real Great Wall is now a pile of rubble somewhere.

By contrast, consider the image of Richard Nixon on a television set. This image is composed of pixels. Were we to replace one or all of the pixels (as happens 72 times a second, more or less, depending on your screen refresh rate) we nonetheless say that we are seeing the same image of Richard Nixon. The image has a continued existence even though all of its physical components have been replaced.

Why do we say that one set of pixels and another set of pixels constitute the same image? It is clearly that the two sets of pixels are organized in a similar way. For example, both sets of pixels have two clusters of dark pixels near the mid-point of the image - what we would call Richard Nixon's eyes. We say that the two sets of pixels constitute a single image because the organizations of the two sets of pixels resemble each other. Take one of the sets of pixels, and organize them randomly, and we would say that we no longer have an image of Richard Nixon, ever were we to have exactly the same set of pixels.

Now it is tempting, when identify a similarity such as this, between sets of unrelated collections of physical entities, to say that some discrete physical entity must have caused this similarity to occur, that there is a real Richard Nixon that this image must be an image of. But of course the same reasoning would force us to agree that there is a real Donald Duck. Since Donald Duck is an animation, and does not exist except in the form of similarly organized pixels, it is evident that such reasoning is in error. But then we must ask, what is it that makes a collection of pixels into Richard Nixon or Donald Duck?

The being an image of Richard Nixon is not contained in any or all of the pixels. Nor may we assume that it is caused by an external entity. All external possibilities thus being exhausted, the explanation for the fact of an image being Richard Nixon must lie in the perceiver of the image. We say that the image on the screen is an image of Richard Nixon because we recognize it as such. This organization of pixels is familiar to us, so much so that we have associated it with a name, 'Richard Nixon', and even apparently unassociated utterances, such as 'I am not a crook.'

In a similar manner, entities such as knowledge, language and mathematics (as commonly conceived) exist only by virtue of the organization of their constituent parts. No particular instance of a fact, a word or a calculation is a necessary constituent of these. But something is called a piece of knowledge, mathematics or language only if it is recognized as such.

Most of our understanding in the world of what it is like to be embodied is so ubiquitous and action-oriented that there is every reason to doubt that it could be made explicit and entered into a database in a disembodied computer. We can attain explicit knowledge through our understanding with the world,

by virtue of having bodies. We can find answers to questions involving the body by using our body in the world.

There is a lot packed into the seemingly innocuous phrase, 'made explicit', and the phrase is sufficiently distracting as to throw us of our course of investigation.

Consider, again, the image of Richard Nixon. What would it be to 'make explicit' this perception? One suspects that it needs to be codified, cast into a language. Thus, we say that our perception of Richard Nixon is 'made explicit' when it is associated with the phrase 'Richard Nixon'. (Is there another sense of 'made explicit'? Does the discussant have some other process in mind?)

When the image of Richard Nixon is made explicit in this way, however, a great deal of information is lost. The original perception is abandoned - nothing remains of the organization of the pixels; the pixels, and the organization that characterized them, form no part of the phrase 'Richard Nixon'. Nor either is the act of recognition contained in this phrase. The association of the image of Richard Nixon with similar, previously experienced, phenomena, can no longer be accomplished.

What is important to recognize here is that the information has been lost, not because the original image was produced by our bodies, and that the phrase wasn't (an assertion which is, as an aside, patently false - where else did the phrase 'Richard Nixon' come from if not from our bodies?). It is because the image of Richard Nixon has been completely replaced by this new entity, which represents the original entity only through association, and not through resemblance. Only if, on being presented the phrase 'Richard Nixon', we could call to mind the original image (the original organization of pixels) would we be in the position to make the same set of associations as the original viewer.

If I am presented with 'A' I can immediately infer that 'A is for Apple'. But if I represent 'A' with 'B', then I no longer have the capacity to make that inference. There is nothing in 'B' that would lead me to say 'Apple' (and the expression 'B is for Apple' even seems absurd). Presented only with 'B', therefore, I am unable to equal the cognitive capacity of someone who has been presented with 'A'. It is not therefore surprising to see people say that the accomplishment of such cognitive capacity on the part of a system presented only with 'B' is impossible.

But it is not impossible. It is impossible only if it is impossible to present the system with an 'A' instead of a 'B'. It is impossible, for example, if the having of an experience of 'A' is something only the first sort of entity can have, and that the second sort of entity cannot have. And that comes down to this: is the stimulation of a neuron by a photon the sort of thing that only a human can have? Put that way, the question is absurd. We know that photons stimulate things other than human eyes; that's how solar power works.

Perhaps, then, recognition is the sort of thing that can only be accomplished by a human. Presented with the same organization of photonic stimuli, is it the case that only a human can recognize it as Richard Nixon, while a non-human system is restricted to, say, associating it with 'Richard Nixon'? Again, the answer to this seems to be no. While it is true that most computers today think and store information only in symbolic form, it is not reasonable to asert that they must. A computer can store an

image as an image, and given multiple images, nothing prevents a computer from performing the cybernetic equivalent of recognition, the realization that this is similar to that.

The question here is whether the perception of a given phenomenon - any phenomenon - dependent on the physical nature of that phenomenon, in such a way that the given instance of the perception could not be replaced with a similar instance without it becoming a different perception.

It is clear that the exact physical instantiation of the perception is not required. If I were to lose an eye, and were to have this eye replaced with a donor eye, such that the eye (and therefore any action of the eye) has a completely distinct physical constitution, it is not clear that I would no longer be able to see. Indeed, our intuitions and our research run in the other direction. We can replace eyes (and other body parts) without changing the perceptions that these body parts produce. Seeing with a donor eye is just like seeing with our original eye, or so much so that the difference is not worth remarking upon.

One asks, now, whether the physical constitution of the donor eye be the same as the physical constitution of the original. Is it necessary that the donor eye be a human eye. Were the donor eye to be instead an artificial eye, strikingly similar, or course, to the original eye, but nonetheless indisputably of non-human origin, is there anything inherent in the function of this new eye that would make it not capable of enabling the same perception as the original eye? It is true that today's artificial eyes produce only shadow-like vision. But this attests only to the fact that it is difficult to make eyes.

More significantly, would it be possible, with the replacement eye, to recognize an image of Richard Nixon as being an image of Richard Nixon? It seems manifest that it would. For, as observed above, what makes an image an image of Richard Nixon is not the physical constituent of the image, nor even the origin in an external cause of the pixels, but rather, the organization of the pixels and the recognition of this organization as being similar to other perceptions we have already had. And even were all of a person's perceptions obtained through this artificial eye, there seems to be nothing inherent in the physicality of the eye that would make this impossible.

As we more through the other organs of the senses, and as we move deeper into the cerebral cortext, we wonder, then, at which point this stops being the case. At what point do perception, recognition, and cognition, cease to be founded on the organization of the pixels, and start to be founded on the physical constitution of the pixels? At what point does it become necessary for a thought to be grounded in a human brain before it can be said to be a thought about Richard Nixon? The nature and function of the human eye is not different in kind from the nature and function of the deeper layers of the brain; what works with the eye would seem, in principle, to work with the deeper layers of the brain. So what is it about the human brain that makes it impossible for a computer to emulate.

If we think of computers as symbol processors, then the answer is evident. At some point, a translation from perception to symbol must occur, and at that point, so much information is lost that the processes behind that transformation are no longer capable of performing the same sort of inference a brain that does not make that transformation can perform. But is there anything inherent in computation that makes it necessary that all processing be symbolic? Is there any reason why a computer must store knowledge and concepts and ideas as strings of symbols and sentences? There is no doubt that today

this is a limitation of computers. But it is not an inherent limitation; it exists because designers stipulate that at some point in processing physical input will be converted into symbolic data.

Yet, already, in some instances this never happens. When I capture an image with a digital camera, and upload it into my computer, the image is not converted into symbols (and it would be absurd to do so). The original state of the pixels, as they were influenced by photons, is what is stored. Of course, this image is not intermingled with other images, as it would be in a human brain. It is stored separately as an 'image file' and displayed or transported as an entity when requested. Even so, this, at least, is an instance of non-symbolic data representation in a computer.

Suppose, instead, when an image were loaded to my computer, it were compared with every other image previously stored in by computer, and that the image displayed was not the original image, but rather, whatever image (or composite) was suggested by this presentation. Something like (exactly like) recognition will then have happened and the second stage necessary for perception will have occurred.

So long as we don't transform input into symbolic form, thereby stripping it of important information, there is no reason to assume that the cognitive capacity of a system handling that information is reduced. And if there is no reason to assume that the cognitive capacity is reduced, there is no reason to believe that the cognitive capacities of humans could be emulated by a computer.

Human beings respond only to the changes that are relevant given their bodies and their interests, so it should be no surprise that no one has been able to program a computer to respond to what is relevant. Bodies are important making sense with the world. Forms of life is organized by and for beings embodied like us. Our embodied concerns so pervade our world that we don't notice the way our body enables us to make sense of it. So, if we leave our embodied commonsense understanding of the world aside, as using computers forces us to do, then we have to do things the computer's way and try to locate relevant information replacing semantics. Prof. Dreyfus criticizes AI as the epistemological considerations concerning how human bodies work in intelligent behaviour.

It is evident that humans force computers to think symbolically, by virtue of such things as interface and operating system design. But do computers force humans to think symbolically?

The answer is no, and the reason for that answer is that humans are not symbol processers. Let me repeat that. A computer cannot force a human to reason symbolically because humans are not symbol processors.

Oh, sure, we have the capacity to understand and interpret symbols. But this is done in the same manner that we understand and interpret an image of Richard Nixon. The symbol is perceived, not as a symbol, but as an image (you have to *see* or *hear* the letter 'B'). The presentation of this symbol will call to your mind other perceptions with which it has become associated. And if you're lucky (most of us aren't, but that's another paper) the presentation of the associated 'A' will generate in you the capacity to draw the same associations as had you been presented an instance of 'A' in the first place, leading you to think, 'Apple'.

In other words, for humans, symbols are not what we use to think, but rather, what we use to communicate. We represent a mental state (a perception, say, of Richard Nixon) with a symbol (the phrase 'Richard Nixon') and send the symbol with the hope and expectation that the presentation of the symbol 'Richard Nixon' will generate in the receiver a mental state resembling your original mental state (a perception of Richard Nixon).

What is important to keep in mind here is that the information received from other people, by means of an encoded information transfer (ie., a sentence) does not become some kind of different and special *kind* of information in our brains. Information transferred to us as symbols does not remain exclusively as symbols in our brain, for the precise reason that the brain immediately wants to begin associating symbols with other types of perceptions.

The fact that we process symbols in the same way we process other types of information is what makes them work. Were we to process symbols differently, then they could not evoke other types of memories, and we would have two separate and distinct regions of thought, one for symbols, and one for images, and symbols could never be associated with images, and thus someone's utterance, expressed to us as a string of symbols, "Watch out!" would never translate into action.

To suggest that receiving information symbolically instead of receiving it directly causes us to assume a different moral, ontological, or inferential stance regarding this information is absurd. It is absurd, because it assumes that symbols never evoke other forms of perception, when it is manifest that the only reason symbols work at all is because they do.

Computers do not force us to leave our commonsense understanding of the world aside. Nothing could force us to do that. Not even one of Dreyfus's papers.

Five

Adam Gaffin wrote: *Sure! Now add another reason to register: Get e-mail at 4:45 p.m. every weekday advising you of any traffic problems you might encounter on the ride home (brought to you by Aamco or Midas ...)*

Now *that* is something I would sign up for (or would were I the sort of person who commutes in a large city). Send it directly to my car. Have the car advise me not to take my usual route home. Information about other parts of the city available on request.

I would sign up for it because I would understand that I cannot receive such information unless I tell the vendor where to send it. I may also be willing to provide demographic information (such as, where I work and where I live, more or less) because it is directly relevant to the information I am receiving.

I might tell you what kind of car I drive if the service also offered me information on things like service updates and recalls, gasoline prices and lineup lengths at service stations along my route, and related commuter information.

The very same service delivered to PDAs or information managers might concern bus routes or commuter trains. It would be a real value to know just how far away the next bus is from my stop (some bus services are offering this already - but are newspapers?)

I don't know whether you call this 'news' but that's irrelevant. I don't segment out 'news' as a special sort of information in my life. The fact that the information marketplace segments it that way is mostly an accident of history. What we have is a voluntary exchange of informational value for informational value. Nothing wrong with that.

Terry Steichen wrote: *I disagree, particularly from the providers' perspective. News publishers must keep some kind of a central news focus, or they risk losing their identity and their offering will degenerate into an informational hodge-podge. They'll end up competing with everyone and no one at the same time, trying to be all things to all people.*

Hm.

It didn't bother them when they added a sports section and assigned reporters to travel with the team, reporters who over time came to be seen as part of the team.

It didn't bother them when they added an entertainment section and began running glossy publication stills and prefab promos for upcoming releases.

It didn't bother them when they added a lifestyles section and began running recipes, horoscopes, Dear Abby and the daily comics.

It didn't bother them when they added a fashion section, draped scantily clad models with no underwear on their front page, and featured in-depth articles on the trouble with treacle.

It didn't bother them when they added 'Wheels', a section consisting of one page of text-based promo for a new car line and eleven pages of car ads.

It didn't bother them when they added the home and gardening section, featuring columns written by marketing representatives for city nurseries and planting advice offered by seed houses.

It didn't bother them when they added a travel section, running glossy images of idyllic beaches (shanties carefully concealed by shade trees) provided by travel agencies and travelogues written by employees of these travel agencies.

Why should it bother them now?

Epilogue

There is a tension between the producers of media, both online and traditional, and between the consumers of this media. Greater connectivity and greater capacity for content creation have given the consumers the capacity to produce their own media, and this poses what is deemed to be unacceptable competition to the consumers, who find that their traditional modes of production, business models and

distribution channels are threatened. In every domain, it seems, we hear the call for a closed network, whether it be in the form of bundled libraries, proprietary social networking sites, digital rights and authentication, learning design, or media formats. The developers of processes and standards for these multiple domains, heeding the demands of the producers, are complying with development that have the effect, if not the intent, of preserving a one-way flow of communication. Slowly, however, the consumers who create are developing their own technologies, standards and communication channels. This is a development that ought to embraced, not ignored or impeded. When we in education cease to heed the demands of traditional producers, and open ourselves wholeheartedly to the idea that content is created, distributed and owned by the consumer, only then will the promises of the network age be realized, and the era of online learning truely begun.

Moncton, July 29, 2004

Educational Blogging

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"I think it's the most beautiful tool of the world and it allows us the most magic thing..."

-Florence Dassylva-Simard, fifth-grade student

The bell rings, and the halls of Institut St-Joseph in Quebec City echo the clatter of the fifth- and sixth-graders. Some take their chairs in the more traditional classroom on the lower floor. Others attend to their projects in the large, open activity room upstairs, pausing perhaps to study one of the chess games hanging on the wall before meeting in groups to plan the current project. A third group steps up a half flight of stairs into the small narrow room at the front of the building, one wall lined with pictures and plastercine models of imagined aliens, the other with a bank of Apple computers.

This last group of students, eight or so at a time, fire up their browsers and log into their cyberportfolios, a publication space that Principal Mario Asselin calls a "virtual extension of the classroom."[97] This virtual space is composed of three sets of *weblogs,* or *blogs:* a classroom Web space, where announcements are displayed and work of common interested is posted; a public, personal communication zone, where students post the results of their work or reflection; and a private personal space, reserved for students' thoughts and teacher guidance.

Dominic Ouellet-Tremblay, a fifth-grade student at St-Joseph, writes: "The blogs give us a chance to communicate between us and motivate us to write more. When we publish on our blog, people from the entire world can respond by using the comments link. This way, they can ask questions or simply tell us what they like. We can then know if people like what we write and this indicate[s to] us what to do better. By reading these comments, we can know our weaknesses and our talents. Blogging is an opportunity to exchange our point of view with the rest of the world not just people in our immediate environment."[98]

The students at St-Joseph are reflective of a trend that is sweeping the world of online learning: the use of weblogs to support learning. And even though the world of fifth grade may seem remote to educators in the college and university system, these students, when they enter postsecondary education, may have had more experience writing online for an audience than writing with a pen and paper for a teacher. Such students will bring with them a new set of skills and attitudes.

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[97] Mario Asselin, "Weblogging at the Institut St-Joseph," Mario tout de go, September 1, 2003, http://carnets.ixmedia.com/mario/archives/002425.html.

[98] Visit the Institut St-Joseph public spaces online at http://cyberportfolio.ixmedia.com/carriere/ or http://cyberportfolio.ixmedia.com/.

Writes Asselin in his own blog, *Mario tout de go:* "The school administration's objective with this weblog initiative was to offer students and teachers a support tool to promote reflective analysis and the emergence of a learning community that goes beyond the school walls."[99] The blogs fit the bill perfectly. "I see more than 2,000 posts and nearly 3,000 comments," says Asselin. "Because of that, I am able to name what they do and see where it comes from. I can also figure out the directions they are taking and how they do it."[100]

Institut St-Joseph is an unassuming, yellow-brick school on a tree-lined road in the west side of Quebec City. The students inside may be early adopters, but they are far from alone in their use of blogs. The phenomenon known as blogging, or weblogging, is sweeping the Internet. A February 2004 report published by the Pew Internet & American Life Project noted that at least 3 million Americans have created blogs, with similar numbers being seen worldwide.[101] And schools have not been immune from this trend. While nobody can say for sure just how many students are blogging, inside the classroom or out, it seems clear that their numbers are equally impressive.

In his day job, Will Richardson is the supervisor of instructional technology at Hunterdon Central Regional High School in Flemington, New Jersey. But online, Richardson is known as one of the leading proponents of blogging in education and the maintainer of the *Weblogg-Ed* Web site. "More and more teachers and schools are starting to experiment with the technology as a way to communicate with students and parents," he writes. Blogs are used to "archive and publish student work, learn with far-flung collaborators, and 'manage' the knowledge that members of the school community create."[102]

And the number of educational bloggers is growing daily. The Educational Bloggers Network, sponsored by the Bay Area Writing Project and Weblogger.com, is a community of some 120 teachers and educators involved in blogging. The following announcement on the site, by San Diego State University's Bernie Dodge, is typical: "It's that time of semester again. Tonight I introduced blogging to my class of pre-service English and foreign language teachers." The result: twenty-eight new student blogs.[103] This same pattern is being repeated in schools and universities across the United States and around the world.

In my own case, blogging evolved from three major directions. First, the blog that began as Stephen's Web[104] and that eventually became *OLDaily* originated as a better means for me to store bookmarks. Second, the blog that became *NewsTrolls* originated as a series of posts by Pasty Drone. Called *Media*

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[99] Asselin, "Weblogging at the Institut St-Joseph."
[100] Mario Asselin, e-mail to the author, March 25, 2004.
[101] See Amanda Lenhart, John Horrigan, and Deborah Fallows, "Content Creation Online," Pew Internet & American Life Project, February 29, 2004, http://www.pewinternet.org/pdfs/PIP_Content_Creation_Report.pdf; and "Content Creation Online," Pew Internet & American Life Project press release, February 29, 2004, http://www.pewinternet.org/PPF/r/77/press_release.asp.
[102] Will Richardson, "Blogging and RSS-The 'What's It?' and 'How To' of Powerful New Web Tools for Educators," Information Today, January/February 2004, http://www.infotoday.com/MMSchools/jan04/richardson.shtml.
[103] Bernie Dodge, "Birth of 28 New Bloggers," One-Trick CyberPony, January 20, 2004, http://home.earthlink.net/~bdodge/blog/2004_01_18_archive.html#107466556022679878, cited in the Educational Bloggers Network: http://www.ebn.weblogger.com/.
[104] http://www.downes.ca/

Rant News Trolls, these were posted on the old Hotwired Threads. When eight of us, including Pasty and myself decided to leave the site in 1998, we adopted Pasty's format and name. And third, when I created *The Brandon Pages* site, about the city of Brandon, I created a blogging tool to announce new links and events.

Today, the weblog is frequently characterized (and criticized) as (only) a set of personal comments and observations. A look at the history of weblogging shows that this isn't the case. As Rebecca Blood observes: "The original weblogs were link-driven sites. Each was a mixture in unique proportions of links, commentary, and personal thoughts and essays." Bookmarks, rants and raves, news, events: all were fodder for the weblogger. Weblogs (so named in 1997 by Jorn Barger in his *Robot Wisdom* Web site) began to be recognized as such in 1999 when Jesse James Garrett, the editor of *infosift,* began compiling a list of "other sites like his." Garrett sent this list to *CamWorld*'s Cameron Barrett, who published it on his site. Soon after, Brigitte Eaton compiled a list of every weblog she knew about, creating the *Eatonweb Portal.*[105] There is no doubt that these early lists were incomplete; weblogging was springing up around the Web more quickly than anyone realized.

Many writers assert that blogs came into their own only after the events of September 11, 2001. As Charles Cooper writes, "If you were scouring the Internet for news and context during those first terrible hours, you could have done a lot worse than eavesdropping on the free-wheeling mini-universe of Web logs chockablock with first-hand info and spirited commentary about what was going on. . . . For my money, some of the best stuff was being served up in this most unlikely venue."[106]

I myself spent the two days following 9-11 updating *NewsTrolls.* Although we had covered and commented on the tech boom, world events, and a presidential election, the events of September 11 brought home to me the immediacy of blogging. We ran ongoing coverage, submitted via SMS to my e-mail, as one of our own made her way from the dust and debris of New York's financial district to her home on the west side. Blogging not only allowed us access to the event; it made us *part* of the event. And with that, the form had indeed finally come into its own.

Barger's original definition of a weblog reads as follows: "A weblog (sometimes called a blog or a newspage or a filter) is a webpage where a weblogger (sometimes called a blogger, or a pre-surfer) 'logs' all the other webpages she finds interesting. The format is normally to add the newest entry at the top of the page, so that repeat visitors can catch up by simply reading down the page until they reach a link they saw on their last visit."[107]

The personal journal, also widely popular in the late 1990s, actually developed independently of weblogs. Personal journals, or online diaries, were described by Simon Firth as "direct, personal, honest, almost painful to read and yet compelling too," but by the time Firth's article in *Salon* was written in July

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[105] This short history and the quotation come from Rebecca Blood, "Weblogs: A History and Perspective," Rebecca's Pocket, September 7, 2000, http://www.rebeccablood.net/essays/weblog_history.html.
[106] Charles Cooper, "When Blogging Came of Age," CNET News.com, September 21, 2001, http://news.com.com/2010-1071-281560.html?legacy=cnet&tag=bt_bh.
[107] Jorn Barger, "Weblog Resources FAQ," Robot Wisdom, September 1999, http://www.robotwisdom.com/weblogs/.

1998, personal journals were on the verge of extinction. "Many of the biggest journal 'fans' began online journals themselves, and soon everyone ended up mostly writing about each other. Some of them got famous, others got resentful."[108]

The confusion between these two distinct forms is evident in the observations of commentators such as Catherine Seipp. "In general, â˜blog' used to mean a personal online diary, typically concerned with boyfriend problems or techie news," she writes. "But after September 11, a slew of new or refocused media junkie/political sites reshaped the entire Internet media landscape. Blog now refers to a Web journal that comments on the news-often by criticizing the media and usually in rudely clever tones-with links to stories that back up the commentary with evidence."[109]

But this definition-which tries to characterize the blog by what it contains-seems to miss the point. Commenting on Seipp's statement, Meg Hourihan takes a different approach: "Whether you're a warblogger who works by day as a professional journalist or you're a teenage high school student worried about your final exams, you do the same thing: you use your blog to link to your friends and rivals and comment on what they're doing. Blog posts are short, informal, sometimes controversial, and sometimes deeply personal, no matter what topic they approach."[110] The definitions of blogging offered by bloggers, as opposed to those offered by external commentators, follow this theme. Blogging is something defined by *format* and *process,* not by content.

A blog, therefore, is and has always been more than the online equivalent of a personal journal. Though consisting of regular (and often dated) updates, the blog adds to the form of the diary by incorporating the best features of hypertext: the capacity to link to new and useful resources. But a blog is also characterized by its reflection of a personal style, and this style may be reflected in either the writing or the selection of links passed along to readers. Blogs are, in their purest form, the core of what has come to be called *personal publishing.*

In the hands of teachers and students, blogs become something more again. The Web is by now a familiar piece of the educational landscape, and for those sites where personal publishing or chronologically ordered content would be useful, blogs have stepped to the fore. *Crooked Timber*'s Henry Farrell identifies five major uses for blogs in education.[111]

First, teachers use blogs to replace the standard class Web page. Instructors post class times and rules, assignment notifications, suggested readings, and exercises. Aside from the ordering of material by date, students would find nothing unusual in this use of the blog. The instructor, however, finds that the use of blogging software makes this previously odious chore much simpler.

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[108] Simon Firth, "Baring Your Soul to the Web," Salon, July 3, 1998, http://archive.salon.com/21st/feature/1998/07/cov_03feature.html.
[109] Catherine Seipp, "Online Uprising," American Journalism Review, June 2002, http://www.ajr.org/Article.asp?id=2555.
[110] Meg Hourihan, "What We're Doing When We Blog," O'Reilly Web Devcenter, June 13, 2002, http://www.oreillynet.com/pub/a/javascript/2002/06/13/megnut.html.
[111] Henry Farrell, "The Street Finds Its Own Use for Things," Crooked Timber, September 15, 2003, http://www.crookedtimber.org/archives/000516.html.

Second, and often accompanying the first, instructors begin to link to Internet items that relate to their course. Mesa Community College's Rick Effland, for example, maintains a blog to pass along links and comments about topics in archaeology.[112] Though Mesa's archaeology Web pages have been around since 1995, blogging allows Effland to write what are in essence short essays directed specifically toward his students. Effland's entries are not mere annotations of interesting links. They effectively model his approach and interest in archaeology for his students.

Third, blogs are used to organize in-class discussions. At the State University of New York at Buffalo, for example, Alexander Halavais added a blog to his media law class of about 180 students. Course credit was awarded for online discussion, with topics ranging from the First Amendment to libel to Irish law reform. As the course wound down with a discussion of nude bikers, Halavais questioned whether he would continue the blog the following year because of the workload, but students were enthusiastic in their comments.[113]

Mireille Guay, an instructor at St-Joseph, notes: "The conversation possible on the weblog is also an amazing tool to develop our community of learners. The students get to know each other better by visiting and reading blogs from other students. They discover, in a non-threatening way, their similarities and differences. The student who usually talks very loud in the classroom and the student who is very timid have the same writing space to voice their opinion. It puts students in a situation of equity."[114]

Fourth, some instructors are using blogs to organize class seminars and to provide summaries of readings. Used in this way, the blogs become "group blogs"-that is, individual blogs authored by a group of people. Farrell notes: "It becomes much easier for the professor and students to access the readings for a particular week-and if you make sure that people are organized about how they do it, the summaries will effectively file themselves."[115]

Finally, fifth, students may be asked to write their own blogs as part of their course grade. Educational Technologist Lane Dunlop wrote about one class at Cornell College: "Each day the students read a chunk of a book and post two paragraphs of their thoughts on the reading." In another class, French 304, students were given a similar exercise. Using a French-language blogging service called Monblogue, Molly, a business student, posted a few paragraphs every day.[116]

What makes blogs so attractive, in both the educational community and the Internet at large, is their ease of use. A blog owner can edit or update a new entry without worrying about page formats or HTML syntax. Sebastian Fiedler, a media pedagogy specialist at the University of Augsburg in Germany, has been monitoring the rise of blogs for a number of years. "Many lightweight, cost-efficient systems and tools have emerged in the personal Webpublishing realm," he writes. "These tools offer a new and

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[112] Rick Effland, "The Treasure Fleet of Zheng He," Rick Effland Blog, April 4, 2004, http://apps.mc.maricopa.edu/blogs/asb222/reffland/archives/cat_something_to_share.html.
[113] Alexander Halavais, "Media Law" course website, February 17, 2004, http://alex.halavais.net/courses/law/.
[114] Mireille Guay, e-mail to the author, March 26, 2004.
[115] Farrell, "The Street Finds Its Own Uses."
[116] Lane Dunlop, comment, Crooked Timber, September 18, 2003, http://www.crookedtimber.org/archives/000516.html.

powerful toolkit for the support of collaborative and individual learning that adheres to the patterns of contemporary information-intensive work and learning outside of formal educational settings."[117]

The blogging tool is, at its heart, a form with two fields: title and entry-and the title field is optional. Learning Media Consultant Jay Cross captures the concept with his Bloggar tool. "Blog software comes with a personal Website for those who don't already have one. The software captures your words in dated entries, maintaining a chronological archive of prior entries. In the spirit of sharing inherent to Net culture, the software and the personal Websites are usually free."[118] What needs to be kept in mind here is that with respect to blogging tools, anything other than the entry field is a bell or whistle. Since the essence of the blog is found in individual, dated entries, the essence of the blogging tool is the entry field.

Blogging software breaks down into two major categories: hosting services and installed applications.

Hosting services. A hosting service is a Web site that will give you access to everything you need in order to create a blog. It will offer a form for you to input your entries, some tools that allow you to create a template for your blog, and access to some built-in accessories. Your blog is hosted on the hosting service (hence the name), and the URL will typically reflect the hosting service's URL. In a way, blogging hosting services are very similar to the services that allowed people to host their own Web sites (services such as GeoCities or Angelfire) or their own discussions (services such as Yahoo! Groups or ezboard).

The best-known (and one of the earliest) hosting service is Blogger[119], founded by Pyra Labs. When the company was bought by Google early in 2003, it reporting having about 1.1 million users.[120] The Blogger interface is not much more complicated than Jay Cross's Bloggar: the large field at the top allows you to submit an entry, while instructions and some options are provided in the lower pane (after you post, the help disappears, and you can view and edit your previous posts).

Another major hosting service is LiveJournal[121], a name that speaks to the side of blogging that began as an online diary. Far more so than any other service, LiveJournal attempts to foster a community of users, a strategy that used to be reflected in its terms of use: "LiveJournal relies on the community it creates to maintain an enjoyable journaling environment. In order to encourage healthy community growth, new free accounts must be sponsored by a present member of LiveJournal." LiveJournal reports more than 3 million accounts, with about half that in active status.

Other major blog hosting services include GrokSoup, Salon Blogs, and TypePad. Major international hosting services include FarsiBlogs, for Iranian writers, and BlogsCN, for Chinese contributors.

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[117] Sebastian Fiedler, symposium leader, "Introducing Disruptive Technologies for Learning: Personal Webpublishing and Weblogs," Ed-Media Meeting, June 24, 2004, http://static.cognitivearchitects.com/gems/Seblogging/EdMediaSymposium.pdf.
[118] Jay Cross, "Blogs," Learning Circuits, April 2002, http://www.learningcircuits.org/2002/apr2002/ttools.htm.
[119] http://www.blogger.com
[120] Dan Gillmor, "Google Buys Pyra: Blogging Goes Big-Time," SiliconValley.com, February 15, 2003, http://weblog.siliconvalley.com/column/dangillmor/archives/000802.shtml.
[121] http://www.livejournal.com

Installed Applications. A remotely installed application is a piece of software that you obtain from the provider and install on your own Web site. These systems are similar to Web-based applications such as ColdFusion or Hypermail. Because of this, the number of users is much lower, but those who do use them tend (arguably) to be more dedicated and more knowledgeable than those who use hosting services. Installed applications are also more suitable for institutional use, since access can be controlled.

Probably the best-known remotely installed application is Six Apart's *Movable Type*[122]. As shown in the screenshot from the Learning Circuits blog back-end (figure 1), Movable Type offers numerous options for the blog author, including extended entries. Most school blogs use Movable Type. "We used this product because it is free for use by educational institutions such as schools," says the National Research Council's Todd Bingham, who with Sebastien Paquet has just completed work with Le Centre d'Apprentissage du Haut-Madawaska, an elementary school in northern New Brunswick, providing Weblogs to all its students and teachers. "In addition to its semi–open source nature, Movable Type is written in Perl and can be back-ended by a MySQL database system," Bingham adds. "Both of these products are also open-source in nature. This allows us to customize some of the features, rather than having to write something from the ground up. We were also able to set up an additional security system using this interface by using Linux's default security features. A private blog, viewable only by the teacher and a singular student, can be set up this way. This allows the student and teacher to have a private means of feedback, as opposed to the public blog open to the public."[123]

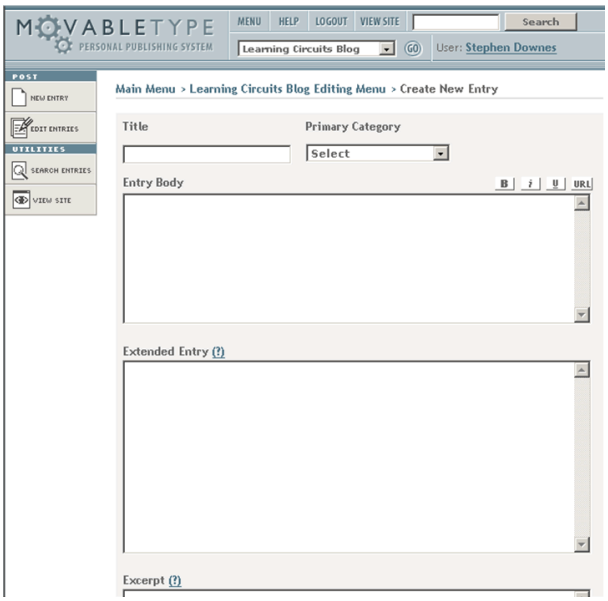

Figure 1

[122] http://www.moveabletype.org

[123] Todd Bingham, e-mail to the author, April 14, 2004. See also SÃ©bastien Paquet, "Weblogs Enter New Brunswick School," Seb's Open Research, April 16, 2004, <http://radio.weblogs.com/0110772/2004/04/16.html#a1539>.

In mid-May 2004, however, Six Apart changed its pricing strategy for Movable Type, dramatically increasing costs for sites with multiple blogs. This prompted a storm of protest from a blogging community fearful of even greater licensing changes, as typified by Mark Pilgrim's remarks: "Movable Type is a dead end. In the long run, the utility of all non-Free software approaches zero. All non-Free software is a dead end." And although Movable Type recanted[124], many bloggers moved to an open source blogging tool, WordPress.[125]

Another major installed application, and one of the earliest available, is UserLand's Radio. This is an updated version of more comprehensive site-management tools such as Frontier and Manila. Instead of running on a Web server, Radio runs on the user's desktop and displays through a Web browser; blog entries are then uploaded to a Web site. In addition, "Radio includes a powerful newsreader that allows you to subscribe to all of the sites you like. Radio will automatically go out onto the Web and find new updates to sites like the NYTimes, the BBC, and weblogs that you subscribe to every hour."[126] [127]

UserLand's software was used to launch a high-profile blogging experiment, Weblogs at Harvard Law, which was created when UserLand's founder, Dave Winer, became a Berkman Fellow. Arising from a conference in November 2002 called "What Is Harvard's Digital Identity?" it was intended, at least in part, to establish "intellectual community" among "the University' disparate schools and centers."[128] Launched in February 2003, it allows anyone with a harvard.edu e-mail address to create a weblog, and a hundred or so staff and students have done so, including Philip Greenspun, John Palfrey, and an anonymous blogger known only as "The Redhead."

Harvard's experience illustrates one of the pitfalls of hosting such free-ranging media. Though the university administration had intended not to interfere with blog content-sometimes a challenge, since staff and students can be openly critical-it was forced to step in when Derek Slater, a student, posted internal memos from Diebold Election Systems, an electronic voting-machine manufacturer, on his blog. The memos suggested that the machines faced numerous problems, and the company threatened legal action against Slater and Harvard University.[129]

Though the company retreated, the potential for conflict between a blog writer and an institution's administration remains. In addition to posting copyrighted or protected information, students can get into trouble for libelous content. For example, a Valley High School student in Nevada was reprimanded

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[124] Mena Trott, "It's About Time," Mena's Corner, May 13, 2004, Six Apart Web site, http://www.sixapart.com/corner/archives/2004/05/its_about_time.shtml#; Mark Pilgrim, "Freedom 0," Dive Into Mark, May 14, 2004, http://diveintomark.org/archives/2004/05/14/freedom-0; Mena Trott, "Announcing Pricing and Licensing Changes to Movable Type," Six Log, June 15, 2004, Six Apart Web site, http://www.sixapart.com/log/2004/06/announcing_pric.shtml.

[125] http://wordpress.org/

[126] http://radio.userland.com

[127] "Radio UserLand v8.0.8," PC World, July 6, 2004, http://www.pcworld.com/downloads/file_description/0,fid,22898,00.asp.

[128] Beth Potier, "Berkman Center Fellow Dave Winer Wants to Get Harvard Blogging," Harvard Gazette, April 17, 2003, http://www.news.harvard.edu/gazette/2003/04.17/13-blogging.html.

[129] John Harvard's Journal, "Creating Community, On-line and Off," Harvard Magazine, vol. 106, no. 3 (January-February 2004), http://www.harvard-magazine.com/on-line/010464.html.

for writing, "Kill Alaina!" (a classmate he found irritating) and for making a vulgar comment about a teacher. In another case, a student at St. Martin High School in Mississippi was suspended for three days after using her blog to call a teacher "perverted."[130]

Despite the risks, teachers and students alike feel the benefits make blogging well worthwhile, if for no other reason than that blogs encourage students to write. As Rosalie Brochu, a student at St-Joseph, observes: "The impact of the blogs on my day to day life is that I write a lot more and a lot longer than the previous years. I also pay more attention when I write in my blog (especially my spelling) since I know anybody can read my posts."[131]

In one sense, asking why anyone would write a weblog is like asking why anyone would write at all. But more specifically, the question is why anyone would write a weblog as opposed to, say, a book or a journal article. George Siemens, an instructor at Red River College in Winnipeg and a longtime advocate of educational blogging, offers a comprehensive list of motivating factors. In particular, he notes, weblogs break down barriers. They allow ideas to be based on merit, rather than origin, and ideas that are of quality filter across the Internet, "viral-like across the blogosphere." Blogs allow readers to hear the day-to-day thoughts of presidential candidates, software company executives, and magazine writers, who all, in turn, hear opinions of people they would never otherwise hear.[132]

The students at Institut St-Joseph learned about the communicative power of blogs firsthand. "In the beginning, students anticipated the audience in a restricted circle," notes Principal Asselin. "According to the comments about their work, they realized that a lot of people could react and be part of the conversation. Each student received more than ten comments related to their posts. They had not fully realized that the entire world could read them."[133] Imagine the young students' surprise when, some time after posting a review of a circus on their blog, someone from the circus read the review and wrote back!

But perhaps the most telling motivation for blogging was offered by Mark Pilgrim in his response to and elaboration on "The Weblog Manifesto": "*Writers will write because they can't not write.* Repeat that over and over to yourself until you get it. Do you know someone like that? Someone who does what they do, not for money or glory or love or God or country, but simply because it's who they are and you can't imagine them being any other way?"[134]

Pilgrim's moving declaration should be read as a cautionary note. The warning is not about bosses who don't want employees to write weblogs (though that danger exists), but this: *writing weblogs is not for*

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[130] Lisa Kim Bach, "Internet Diaries: School Discipline Questioned," Las Vegas Review-Journal, November 10, 2003, http://www.reviewjournal.com/lvrj_home/2003/Nov-10-Mon-2003/news/22546246.html; "Miss. School Suspends Student for Calling Teacher 'Perverted' in Online Journal," Student Press Law Center, January 29, 2004, http://www.splc.org/newsflash.asp?id=736&year.

[131] Mario Asselin, quoting the student, e-mail to the author, March 25, 2004.

[132] George Siemens, "The Art of Blogging-Part 1," elearnspace, December 1, 2002, http://www.elearnspace.org/Articles/blogging_part_1.htm.

[133] Mario Asselin, e-mail to the author, March 25, 2004.

[134] Mark Pilgrim, "Write," Dive Into Mark, October 1, 2001 (no longer extant); "The Weblog Manifesto," Talking Moose, September 29, 2001, http://talkingmoose.manilasites.com/2001/09/29.

everybody. In particular, if you feel no empathy, no twinge of recognition, on reading Pilgrim's words, then writing a weblog is probably not for you. This does not mean that you are not a part of the weblog world. It merely means that you participate in a different way.

And herein lies the dilemma for educators. What happens when a free-flowing medium such as blogging interacts with the more restrictive domains of the educational system? What happens when the necessary rules and boundaries of the system are imposed on students who are writing blogs, when grades are assigned in order to get students to write at all, and when posts are monitored to ensure that they don't say the wrong things?

After returning from a writing teachers' conference with sessions on blogging, Richard Long, a professor at St. Louis Community College, explained the issue this way: "I'm not convinced, however, the presenters who claimed to be blogging are actually blogging. They're using blogging software, their students use blogging software, but I'm not convinced that using the software is the same as blogging. For example, does posting writing prompts for students constitute blogging? Are students blogging when they use blogging software to write to those prompts?"[135]

After three years of experimentation with his *Weblogg-Ed* blog, Will Richardson also expressed his doubts: "By its very nature, assigned blogging in schools cannot be blogging. It's contrived. No matter how much we want to spout off about the wonders of audience and readership, students who are asked to blog are blogging for an audience of one, the teacher." When the semester ends, "students drop blogging like wet cement." Richardson wants to teach students to write with passion, but he notes: "I can't let them do it passionately due to the inherent censorship that a high school served Weblog carries with it."[136]

It seems clear that although blogging can and does have a significant and worthwhile educational impact, this impact does not come automatically and does not come without risks. As many writers have noted, writing a weblog appears in the first instance to be a form of publishing, but as time goes by, blogging resembles more and more a conversation. And for a conversation to be successful, it must be given a purpose and it must remain, for the most part, unconstrained.

One of the criticisms of blogs, and especially student blogs is that the students write about nothing but trivia. Examples can be seen all over the Internet. And how many students, when facing the blogging screen, feel like "Matt," who writes: "Now each time I warily approach writing a blog entry, or start writing it, or actually write it, I end up thinking â˜what is the point?'-and, after all, what is?" When given their own resources to draw on, bloggers, especially young bloggers, can become frustrated and may eventually report having "committed the ultimate blogging sin of losing interest in myself."[137]

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[135] Richard Long, "Back from San Antonio," 2River, March 28, 2004, http://www.2river.org/blog/archives/000077.html.

[136] Will Richardson, "The Blogging in Schools Question," Weblogg-Ed, April 13, 2004, http://www.weblogg-ed.com/2004/04/13#a1699.

[137] Matt, "Circle Limit II," Walky Talky, September 25, 2003, http://walkytalky.net/archives/000062.html.

As Richardson says, blogging as a genre of writing may have "great value in terms of developing all sorts of critical thinking skills, writing skills and information literacy among other things. We teach exposition and research and some other types of analytical writing already, I know. Blogging, however, offers students a chance to a) reflect on what they are writing and thinking as they write and think it, b) carry on writing about a topic over a sustained period of time, maybe a lifetime, and c) engage readers and audience in a sustained conversation that then leads to further writing and thinking."[138]

Good conversations begin with listening. Ken Smith, an English teacher at Indiana University, explains: "Maybe some folks write flat, empty posts or bad diary posts because they don't know any other genres (they just aren't readers, in one sense) *and* because [they] aren't responding to anything (that is, they aren't reading anything right now)." It's like arriving late to a party: the first act must be to listen, before venturing forth with an opinion. Smith suggests, "Instead of assigning students to go write, we should assign them to go read and then link to what interests them and write about why it does and what it means."[139]

The jury is still out, but as Richardson suggests, "It's becoming more clear just what the importance of blogging might be." As Smith writes, "It is through quality linking . . . that one first comes in contact with the essential acts of blogging: close reading and interpretation. Blogging, at base, is writing down what you think when you read others. If you keep at it, others will eventually write down what they think when they read you, and you'll enter a new realm of blogging, a new realm of human connection."[140]

But it is more than merely assigning topics to blog about. As Jeremy Hiebert, a Web designer and graduate student in Canada, comments, "I've seen evidence of this in courses with required e-portfolio or reflective journal elements. . . . As soon as these activities are put into the context of school, focused on topics the students are unlikely to care about much, they automatically lose a level of authenticity and engagement. These disengaged students (non-writers and writers alike) won't get the main benefits of true reflective learning no matter how good the instruction and tools are."[141]

Despite obvious appearances, blogging isn't really about writing at all; that's just the end point of the process, the outcome that occurs more or less naturally if everything else has been done right. Blogging is about, first, reading. But more important, it is about reading what is of interest to you: your culture, your community, your ideas. And it is about engaging with the content and with the authors of what you have read-reflecting, criticizing, questioning, reacting. If a student has nothing to blog about, it is not because he or she has nothing to write about or has a boring life. It is because the student has not yet stretched out to the larger world, has not yet learned to meaningfully engage in a community. For blogging in education to be a success, this first must be embraced and encouraged.

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[138] Will Richardson, "Metablognition," Weblogg-Ed, April 27, 2004, http://www.weblogg-ed.com/2004/04/27.
[139] Ken Smith, "CCCC Waves and Ripples," Weblogs in Higher Education, March 30, 2004, http://www.mchron.net/site/edublog_comments.php?id=P2636_0_13_0.
[140] Will Richardson, "Reading and Blogging," Weblogg-Ed, March 31, 2004, http://www.weblogg-ed.com/2004/03/31; Smith, "CCCC Waves and Ripples."
[141] Jeremy Hiebert, e-mail to the author, April 22, 2004.

From time to time, we read about the potential of online learning to bring learning into life, to engender workplace learning or lifelong learning. When Jay Cross and others say that 90 percent of our learning is informal, this is the sort of thing they mean: that the lessons we might expect to find in the classroom work their way, through alternative means, into our day-to-day activities.

Blogging can and should reverse this flow. The process of reading online, engaging a community, and reflecting it online is a process of bringing life into learning. As Richardson comments, "This [the blogging process] just seems to me to be closer to the way we learn outside of school, and I don't see those things happening anywhere in traditional education." And he asks: "Could blogging be the needle that sews together what is now a lot of learning in isolation with no real connection among the disciplines? I mean ultimately, aren't we trying to teach our kids how to learn, and isn't that [what] blogging is all about?"[142]

Notes

My thanks to the many educational bloggers who contributed to this article and without whom it could not have been completed: Will Richardson, Jeremy Hiebert, George Siemens, Todd Bingham, Rod Savoie, Mario Asselin, Mireille Guay, Dominic Ouellet-Tremblay, Florence Dassylva-Simard, Hugo De Larochelliere, Jean-Philippe L., and Rosalie Brochu, and to all the rest of my friends in the blogosphere- you know who you are.

Moncton, September 1, 2004

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[142] Will Richardson, e-mail to the author, April 27, 2004.

Granularity in Learning Objects With Analogies From Engineering and Language

Interesting talk by Jacques du Plessis drawing a comparison between how language uses basic objects, such as sounds and morphemes. Summary of his talk from ITI in Utah.

Forget about learning objects - think physical systems. What's the difference between blocks and geos - blocks rely on gravity, which creates limits in how you can join them. Consider Meccano – you can join them in more creative ways. Consider architecture - you can see cabling, etc. You have much more structure. Here's another physical system, DNA, with only four components, A,C,T and G.

So, why don't we build this room with Lego blocks. Then we could just change walls the way we wanted. Simple answer: cost. We ask the question: do we want to change this wall, really? It will cost $80,000 more. With a natural system, there is no such impediment.

Now we look at virtual systems. Digital. Language. We can draw from physical systems to see granularity, but in language we have many ways to see granularity: we have sounds, morphemes, semantics, syntax, inflection, pragmatics. In language, we have a limited set of sounds. We have more morphemes, but still a limited set. And in semantics, it keeps expanding. All these layers have to be handled naturally. And it becomes reusable. So language uses reusable objects.

Decontextualized sound - useless. Sound, morphemes, semantics, inflection - when these are in place, we have a deliverable. When words just stand independently, much is lost. The purpose of language is the whole that is delivered. That is the same objective with learning objects. There is a whole that has to be delivered, the learning that is to be done. Consider the many meanings of 'uh', given different inflection. But to interpret these, we (often) need to be given the meaning.

In language, we have sounds, in digital systems we have bits and bytes. In language, we have morphemes, and in digital systems, the corresponding entities are objects (such as vectors, bitmaps, characters, digital sounds). A sound doesn't have meaning, but morphemes begin to add meaning. Same with the digital objects. The meanings are added, layer by layer. In a digital object, the same is the case. Now, take these, add them together, and you get a digital movie. But is a movie a digital object? Of course.

What you need to do is establish your basic objects. With morphology, you establish an identity of meaning. In digital media, you need your objects. So in language, you have semantics. In digital media, you have index. You have simple systems, and you have complex systems. By 'index' - you've got to know what you've got.

There are two ways to do it. Wrap everything up in one bundle, call it a folder, and you just drag and drop the folder. It's pre-packaged. The other way to do it is that it's not prepackaged, it's just there. There is an index layer. And then it brings you to a way to programmatically manipulate what you've got there. Programs are to digital media what syntax is to language. With one, it's a package, signed, sealed and delivered. With the other, it's open. The conceptual way in which you deal with it in an instructional sense is open. In the prepackaged way, the decision has been made. In the open mode, I deal with it as it arises.

When we come down to deliverables, in a language system, the concept is 'pragmatics', which in a digital system, the context is 'program & objects & index'. [Good way of laying it out - SD].

Comment - what is most reusable is down at the asset level. Yes. The same with language - sounds are the most reusable. If I just have objects combined - is that an object? Indeed. But you have complex objects and simple objects.

Comment - one of the problems with reusability, as the contextualization goes up, value goes up. But reusability goes down. There's some useful level of granularity that allows us to maximize the functionality. I'm looking at the prepackaged environment versus the program environment. In language, we actually do it. As you take your stuff and you put it together, you can think of, say, a map as being useful in a lot of contexts. At that level it's pretty obvious that it's reusable. So it gets at the retrievability of the various objects.

Comment - language systems are limited, you approach the ineffable. And if you look at the deconstruction, you see that language if formed only by referentiality. There's no 'catness' about the word 'cat'. So that raises questions about reusability - how far we can push the system. Right. Look at machine translation. Everybody tries, but it creates very funny translations. But if you restrict translations to a very specific environment, like weather reports, it's very clear. So we stand at a very early stage.

Comment - we have the capacity to use syntax, but not program. I agree with that. That's why we look at machine translation. It's working out the sophistication of details, working all the variables. So I see us for now working with the prepackaged environments. But the broader we go, the more difficult it will become.

Comment - the notion of prepackaging is complex. Learning is prepackaging. You are talking about giving the people the materials, to be repackaged, or just giving them the package, and say, here, just consume it. There's a tension.

And it will always be there. You can never create your own package if you don't know it. But you learn by doing - you can be given a package, but still it was done, I didn't do it.

Comment - you can get too primitive, if you look just at the sounds it's too basic. That's why I focus on the morphemes, the first unit of meaning. You say, you stay within the digital system, you have little sound bites. But that's too primitive.

Comment - let's consider minerals, we take a rock, we melt it and get aluminum, and then we make a car. Its value goes up, its worth, but over time, there's a certain obselescence. So we might melt down the car. But we never go back to the rock. We wouldn't put it back together as a rock. Right. The analogy of the building. It's a question of cost. The cost factor of development forces us into a certain model. But in the long term, we shouldn't overlook the development of a dynamic system. We camn imagine a library, in which the dynamic creation of all these objects is possible.

Comment - the cost issue is a good one. We have a multimedia database. We are struggling with how to partition it. Do we separate those, do we bundle them? We face the same problems. For example, I can capture a movie of what you do on the screen with a voice over. Boom, all captured in one. Or, I can have an audio screen, and say 'go to slide two'. Then I can go back, shuffle things, because of the editability. But that is the cost problem, it's not worth it. It takes a lot of skill. It's like sword fighting versus a gun. A gun is simple.

Comment - I found a midi file on the internet. I listened to it on my laptop and it was OK. The point there is fidelity of the rendering that you get. But th point is to have the element in some standardized way. So standards have to be a part of this. To recreate the piece, the point is, the standard of midi says, ok, this instrument is on this track. There again is the issue of accessibility in a standard way. Yes. Same with vectors.

Tomorrow Jeremy Brown will be talking about MPEG 7. To render time-based video. This allows a hierarchical representation, where you have both, you have the high level film, but you have the multi-level version of the film, scenes, subscenes, utterances, based on their time codes. So it's an indexing scheme of the whole thing. So it's all in the context of the others. Kind of like what Lessig did this morning with Bush and Blair.

Comment - it seems like we're defining indexing as a layer that allows referencing. But the pros and cons - do you have a single source, it's changed, you change it everywhere, or do you have multiple sources. Do we toss out morphemes? It's a living system - we assume a fixed environment, do the index is really solid, but if you mess with the index... Also, we need to talk about how to index. Yes, that will be a massive work in the future. We had HTML, but content was not address, then we had XML.

My thoughts: To push the language analogy - you do not learn without speaking. But digital media is more like Chinese than English - the 'words' are not code, they are symbols. How can we work through this? How can we teach people to 'speak' in digital media?

Logan, Utah, September 1, 2004

Principles of Resource Sharing

This very enjoyable presentation looked at informal learning, as exemplified in places like Yahoo Groups, from the perspective of self-organizing systems. What results is some very useful documentation of the fact that learning, a lot of learning, does occur in these groups, and that it is managed without a central authority or even a school. This article is a summary of the presentation by Erin Brewer at the ITI conference in Logan, Utah.

A lot of learning goes on in online groups. I wanted to see if there were things going on in these groups that we could port to more formal instruction. So we ask, how do members of these groups provide peer to peer support for learning.

Some of the literature I looked at studied self-organizing systems in biology, self-organizing systems, small worlds networks (Duncan Watts) and social capital. I also looked at how resources are used to support learning.

Looking at symbiosis. Basically, it's about resource sharing. So maybe there were principles that could be brought into learning. Symbiosis is a continuum from parasitism to mutualism. Parasitic systems tend to move toward mutualistic systems over time - this is different from the typical Darwinian view of competition. It's like dining from the same table.

In order for there to be mutualistic relationships, the combined need needs to be smaller than their cumulative individual needs. Redundant functions can be eliminated and specialized functions developed. They work together and are able to do twice as much. Also, different resources can be utilized. There is a fungus, for example, that can break down resources and deliver them to the network where the network would not be able to access them. New resources can be created.

In an online group, one member may have a need, and another member may combine two resources together to meet that need. This sort of thing also happens in nature.

Self-organizing systems occur when local factors at the decision-making level form global systems. We look at them, and assume there must be a hierarchy - that the queen bee or the queen ant is making the decisions. But what is happening is that each member makes decisions independently, and information is shared. This also happens in physics, when there is a form shift, say, from liquid or solid. The 'decisions' are made at the molecular level, and once one molecule shifts, it quickly spreads to all the other molecules.

In online communities, individuals may feel they don't have that much influence, but one person making a decision may influence a much larger group.

There are lots of solutions to any given problem. We tend to assume there is one best solution, but - Herbert Simon - there are many solutions, depending on various factors, such as cost, for example.

Small world networks happen naturally. Watts again. It's a lot of individuals that are hooked together, and there are some hubs. This is the six degrees of separation concept. These networks are 'scale free' - they can grow essentially without limitation. They make resource sharing very effective.

If you look at online groups, because the membership is so high, there's a pretty good chance that people will have the resource that you want. It's basically 100% - if you have 100 people or more, if the resource exists, you can get it.

The idea of social capital - there are people who spend huge amounts of time finding, explaining and discussing resources. People do this (some say) in order to build social capital. There is also some research into the concept of mavenship, through marketing.

Finally, looking at resource use to support learning. If you look at learning, it's about using resources.

After the lit review, I came up with the concept of an Online Self Organizing Social System (OSOSS). They provide access to resources, transform resources, nurture members, provide access to multiple communities. There is no central authority, but they provide an effective system of communication.

Looking at some specific OSOOS - for my study, they had to be viable, they had to have high activity levels (certain numbers of posts), large membership, have public access, and have archives. I wanted a uniform infrastructure because the infrastructure could influence the outcome - so I chose Yahoo Groups. I avoided technology topics, because we had looked at that before. I wanted to make sure there was actually dialogue. And some groups - mostly about money and banking - had odd posts, solicitation, etc., and I didn't want to wade through all that.

To study the group, I read all the posts (for a year), followed up outside resources (books, websites), and did resource identification, via a rubric for types of resources. I did a summary of activities for the threads, developing a rubric as I went. Finally, I carried out the analysis. The groups selected for case studies were organic beekeepers, microbiology, vegetarian recipe exchange, and bathtub brewers.

Vegetarians - a number of unsolicited resources were offered that met an unstated need. They tended to post very specific needs. Most resources shared were personal experience, and there was a great deal of negotiation of resources - try this, have you ever tried this, etc. And people very frequently posted appreciation for resources.

Microbiology - requests for resources were asked to be sent directly to the poster (send it to my email, not the group) - this happened a lot, and a recommendation that I make is that if you're in a group, send it to the group. There was a great deal of mentoring. People were more likely to express decontextualized needs - people would simply ask - this tended to promote negotiation of need - "well what do you need that for?" Needs were usually questions of practice, and sometimes outrageously general requests. Threads tended to involve only two or three members.

Brewers - posts tended to related to community practices. There was a sense that there is this whole community of bathtub brewers, which really surprised me. There was mentoring to amazing detail in this - people would follow-up questions a month later. There were unsolicited resources posted, as in

the vegetarian group. The brewers loved to change the name of the thread - it seemed that every iteration created a name change - so I suggested that people keep thread names the same for a topic, because they're hard to follow otherwise.

Beekeepers - would keep the name of the thread long after it had transformed into another topic. The opposite extreme. Discussions were often about proper practice - what is organic beekeeping, for example. Relied heavily upon opinion and encouragement. Information was often presented as fact, even though it was opinion or based on personal experience. There was a lot of negotiation of need, and the request often changed. Quoted messages were used a lot, which made it really easy to follow. Extremely long threads - I thought, how do these people have the time to respond as they do - how did they find the time to produce the list of resources?

Major types of resources (taxonomy) included personal experience (anecdotes and stories), substantialities (copied materials), referrals, opinions, offers for future assistance, and encouragement (the brewers were great at that).

So the pedagogy of peer to peer process, we get the concept of 'regotiation' - is a term that captures this process of posting a need, responding to a need, posting a resource, etc., the iterative process that meets the need. Also, there was the issue of 'macro learning' - how do I learn to learn (in this environment) - how to post a question, etc. And then, finally, content learning - they were learning about how to make beer, keep bees, etc.

The principles I came up with:

- Resources are more easily accessible in an OSOSS - that's why they're part of the group. If they can get the need on their own, they probably won't post to the group. A plant that get everything it needs tends not to form symbiotic relationships.

- Resource transformation - one resource can be used multiple ways. People would report different ways of using them.

- Individuals often need the aid of others to identify the 'real' need. I think I need a car. But what I really need is an easier way to get to work.

- OSOOS is a structured place to give people a place to meet, identify needs, and to share and store resources.

- They don't need to be complicated - if you have email, forwarding, and attachments, that's enough.

- Resource sharing should take place within the network rather than offline or in private spaces. I noticed that groups that tended not to be as viable tended to encourage people to post resources in another spot. It discouraged people from contextualizing resources.

- The resources posted are useful both to the community members, but also to the broader internet community. Finding them through Google, for example. Sometimes the context is clear, other times its difficult.

- The more diverse the community, the more stable it tends to be. Boundary members are especially important - creates links with other groups. Before it blossoms into a large group, the initial members need to be more active. But once it's established, the workload drops dramatically.

A comment from earlier talked about pooled ignorance - I am glad to be able to say that wasn't the case.

I want to look in the future about why some OSOSS die. What made them fail? Also, I wasn't able to study interactions that took place outside the OSOSS. Also, the study looked at the how but not the why. I'm really interested in the role of the maven within the group. Groups seemed to have 'cheerleaders' - I want to look at that more. I want to understand why some needs get addressed and others don't. And I want to think about applying the results to structured, formal learning environments. (SD - why?)

Comment - on the second point - why not do research on the jerks? I know some groups, one guy, destroyed three or four gorups. People argue about whether to shut him down or call him names. It destroys the group. yeah, I only met this once, there was an animal rights activist, and there was an off-topic debate. But I'm not sure I'd want to be the one researching that.

(Asked for a URL - none available yet). SD - relation between openness and diversity, stability and usefulness? By diverse, I mean members coming from lots of different places. The stability of the group was helped by having diverse membership - it was a question of boundary membership - of someone has a need, I can go to another group and pass the question along. It's the strength of weak ties. People in your circle - they know what you know. Someone from, maybe, Georgia, or Indiana, or Zimbabwe, will have access to different resources, ways of thinking.

"We sometimes want to come up with a universal theory of instructional design, but we need to understand, certain things fork in different places."

Logan, Utah, September 2, 2004

Obstacles in the Path of a Blogging Initiative

Light look at some of the obstacles faced as a fictional history professor decides to start a blogging initiative for his class. Summary of a presentation by Trey Martindale at ITI in Logan, Utah.

I will be talking about the pitfalls of introducing blogging to your university course. All the names have been changed, all the bodies have been buried.

The question about blogs: who do you want to hear from, and who do you want to talk to? Are there people you know you would like to be in contact with, people you may find funny. The idea is having an audience and knowing who you want to write for.

What kind of blogs do you read? Me, I read the chronicle section. (Audience) I now use something called PubSub and do a keyword search and associated RSS feed. I access the NSF grants page. OLDaily. Journals, you should know when an issue comes out, but I forget, it would be nice to have them have an RSS feed.

Blog affordances: automatic archiving, time stamps, easy interface, auto-formatting, syndication, interaction via comments. Note - there is an issue with comment spamming.

Now for our melodrama...

Bill the history professor learns about blogging and decides it is useful. I'll start my first blog; I have a friend with a server that has Movable Type on it. So Bill starts blogging. And, he goes to his first faculty meeting - and his faculty members are not impressed. Bill has become a blog evangelist. The department chair murmurs, that's very interesting, but we have our hands full with online courses. You need to start teaching and stop wasting time with these toys.

Gary, the willing but busy server administrator, hears from Bill. "Do you think we could do something like that?" Gary says, "We have people looking into that (translation: I don't know what that is)." Bill says, I have heard of Movable Type. Gary looks into it and finds Movable Type, but Gary is a Cold Fusion expert, and sees things through a CF lens, and says he will install a blog, but it has to be CF based. So he installs an Italian-language CF blogging system.

Bill introduces the blogging to the students. Some students are eager, others are talked into it. So Bill assigns some readings and has students respond via their blogs. The students can't change the look of their blog, so they all look the same, and they can't get any support, but it generally works. The system produces RSS, so the professor subscribes to the student blogs. The posting averages 1 per week. The comments average that students make on each others' blogs totals 0 for the entire semester. The professor received exactly one comment from a student.

Gary eventually loses interest. Bill complains about the Italian CF software - Bill only knows Movable Type. Gary says he'll try Movable Type. May goes by, June, July. Gary writes, sorry, we're not going to do it. But meanwhile, Christina the instructional technologist drums up support, and Margaret the university programmer is assigned to this project. But the server environment is a completely Microsoft shop. Margaret tries to install Movable Type. It doesn't work. She tries to get help from Christina and Bill. They try to figure out licensing issues - how much do they have to pay? Bill then realizes he hasn't thought this through. What happens if CS pulls the plug? What happens if a student writes about his cat, and I'm requiring students to read it. Or what if the student posts something really offensive.

Bill, trying to be helpful, found a blog about how to install Movable Type. He passed it along, thinking it would be helpful. It wasn't. Bill has a friend named Francine, an English professor, who says I'm going to have all my students create accounts on Blogger.com - I can't wait for admin. But now the university doesn't own the blog, it can't control it. But suppose there's a rogue student who posts the most ridiculous things that have nothing to do with the course. It's nothing offensive, it's just boring. And trivial.

When you start a blog, you assume you have some kind of audience. In the case of a blog, it could be anyone. That's very exhilarating. "The power of positive narcissism." But as you're writing, it's hard not to let your words and thoughts be shaped by who they think is reading your blogs.

Logan, Utah, September 2, 2004

CORDRA: ADL's Federated Content Repository Model

Summary of the ADL Content Object Repository, Discovery and Registration (or Resolution) Architecture, to be demonstrated later this fall and launched early in the new year. The idea is to create a system whereby all learning resources can be given a name and a system where these names can be resolved into physical addresses on the network. Not included in this paper (because I was talking at the time) was the exchange I had with the presenter, Dan Rehak, about the management of the system, the question of whether it breaks the internet into pieces, whether it builds authentication into the network infrastructure, whether the use of handles is the best way to locate objects, and whether the proposed system is or is not the same as RDF. These are all serious issues (in my view, at least), and while Rehak says this is a work in progress, it is also true that it will be dropped on the community as an essential fait accompli early in the new year. I will have more on all this sometime in the future.

The project is about repositories. The first thing they did is thing of an acronym. Then they decided what it means (I'm the one responsible for changing the C in SCORM from 'course' to 'content').

SCORM specifies how to develop and deploy content objects that can be shared and contextualized to meet the needs of learners. ADL's mission was to try to save money and reuse content by working on interoperability standards. It's a collection of standards and specifications that says how to use these objects together to do some things. It talks about how to develop, share, contextualize, create metadata for, and especially how you create structured learning experiences. SCORM says nothing about how to find stuff and how to get it even if you know that it is there.

ADL's motivation: Department of Defense Instruction (DoDI) 1322.20 (sheesh).

Now there is this big issue, before you buy content, you have to make sure it doesn't exist, which means you have to find it, so there has to be a repository solution. The content has to be in SCORM, it has to be in an accessible searchable repository, and you have to actually use that repository.

What CORDRA aims to do is make published content available, persistent, discoverable, exchangeable, let it be managed, so different people can have different rights, and so that you can tailor this. You have to be able to build systems that fit their model, not force them to use your model.

We started out by saying, what are the requirements for repositories? What are the needs? Business rules? There will be one you know about, and one you don't know about, for security reasons. Even within the one you know about, there may be different access. Each organization will have their own different rules, and we need to write a system that combines these.

We don't want to build new technology, we don't want to build new standards. It's painful. We want to find applicable standards. SCORM does that as a reference model. CORDRA will be like that.

We need to understand how CORDRA works together into an overall framework of things. Diagram from the conference in Australia last month (was in OLDaily). What's the general structure for leaning technology?

How do we make this thing scale, scale technically in terms of infrastructure, in terms of size, so on. I heard people talk about 20 courses, a hundred courses. Our pilot is a thousand courses. When I talk about scale, I talk about a million learning objects, a billion identifiers, a million users.

The plan is to start with tech that we think works and is scalable. We built a prototype, that works (last week, it didn't). Because of the timing, a production version is planned for January, a public demo in December. You will see 'ADL Repository' - you will not se the word CORDRA - CORDRA is the generic erm, versus the ADL Repository, the instance of CORDRA within the US government.

Assumptions: content for reuse, content in context. How do we do for learning objects, what is the equivalent to PageRank[143]? We want the top ranked one not just based on keywords, but for your specific content. Assumption: we want precise results. Assumption: metadata is hard, most metadata pools are not very good (to be kind about them). In the big scheme of things, if people are paying for content, librarians are not expensive (so a metadata based system has a built-in bias for commercial content - SD) Assumption: flexibility and scale. Assumption: support local policies - allow each organization to define their own metadata, their own IPR rights, etc. Assumption: lots of unknowns. Design is based on (small-s) services. We have no idea what all the services and components are, but we know we don't know.

[Diagram of CORDRA] We have content, we have users, and in the middle we have common services, code that we don't want to have to right all the time. The two main pieces: an identifier system, a way to put a permanent identifier on everything. Even metadata - if a metadata tag is called 'general', 'general' will have a unique identifier. And second, what CORDRA does, is a catalogue of all content, a registry of all repositories, and a registry of all the stuff that describes everything, all the schemas, all the taxonomies. The idea is, if you have you have one unique identifier, and one password, you can find anything in the world.

CORDRA operations: register a content object, search the content catalogue, register a content repository, query the repository.

Create the content/. You have an application that creates content, a SCORM package for example, then I assign a unique identifier, then I tell the system I want to deposit ('publish') the content in a repository. How do I register the piece of content? I have to know I have the content, then I need to get its ID, then registering it tells the system that that piece of content is in the catalogue (doesn't move the content, just says it's there), then get the metadata for that content, then you put some metadata (not all, just enough) in the catalogue.

[143] http://www.webworkshop.net/pagerank.html

How do you search? You have search criteria, you pass them against the catalogue, the catalogue returns some identifiers and some data, that goes back to the application, then the application decides which one it wants, and that's the selected content.

How do I get something? I have a piece of content, by ID, then you go through a process of resolution, like a DNS, but a different system, like a handle system. You say, 'please resolve '100.xyx/cp' (100 is US gov't, 101 is UK gov't, we hope 102 will be Australian gov't). I use the repository registry to find out all about the access methods, everything I need to know about how to access the data. Then it's up to you to go and get it out of the repository.

Repository registration: get the metadata about the repository, assign that an ID, drop that into the registry of repositories. Query, similar principle.

The ID infrastructure is based on this thing that's called 'handle', created by Bob Kahn. It does things that DNS doesn't do, for example, multiple resolution - you don't just get one adderss back, you get multiple, and you sort out which one you want. here are local namespaces for each implementation. Everybody sets up their own subnaming system. The handle '0' is the global handle system - if you ask for '0.na' it describes the root of the handle system.

Behaviours, services, etc.: identification, authorization, authentication, digital rights, etc., all have to be worked out and all have to be defined in the system. Applications - people will be free to build whatever they want. Each system may build its own search, its own harvest, etc. CORDRA is layered model - each community gets its own implementation, can define it independently of whomever runs the infrastructure. The core model is defined to represent anything that describes other pieces. It describes how you describe roles, services, etc., it's one model that's used by everyone (we call this the '99' identifier).

This brings us to federated CORDRA - we have all kinds of instances out there, how do they talk to each other? The idea is that we Federate CORDRA. So if I create a top-level repository, I can register all the federations. Handle is a two-level structure, and CORDRA is designed is a two-level structure. You don't federate federations. You have to be a single federation, or you don't play. Single-level registration, and the top level that provides all the implementation details.

So, in summary: CORDRA is a reference model, not running code, an 'identifier system;, an architecture, with overall community implementations. The ADL prototype is operational and running, we are testing next week, the demo is scheduled for Orlando on December 7 or thereabout at a conference. The plan is to go live in January, maybe a CORDRA fest in February of 2005 in Australia.

More information: http://www.lsal.cmu.edu, http://lsal.org and http://cordra.org (coming soon)

Logan, Utah, September 2, 2004

Supporting Social Learning Around Collections of Open Educational Content: Open Learning Support

David Wiley and Brent Lanbert presented this overview of the Open learning Support system at the ITI conference in Logan, Utah. Essentially, the system is a mechanism for attaching discussions lists to learning resources, and in particular (to this point) the resources offered by the Open Courseware initiative. What's interesting is the degree to which they have focused on developing a simple and modular discussion system.

David: Learning should be social. But in learning, especially online learning, there are forces pushing against this. For example, teachers and tutors are expensive. How do you scale? People say, if we could just get more data down the pipeline. But the real bandwidth is teaching. How do we address this? We pull the teacher out. We create automatic quizzes. Teacher functions are automated. This is a broad movement - this is where all the learning object, SCORM and standards people are going, to automate learning.

But have you ever had a problem with tech support? If you get an automated system - how many people choose the automated response over a live support person? If you'd rather talk to a human rather than an automated system, why would you assume that other people wouldn't?

Another focus or push we see is on repositories or collections of learning materials. Open Courseware. It's a huge task, licensing issues, it. But by definition, for a repository, social interaction is out of scope. We looked at OCW, said it's a fabulous project, but it's really missing something. We need something more than a library. We have lots of libraries, but nobody goes to them. You just don't get anywhere by yourself, you get to page two.

Professor Stang, best lecturer they have, every lecture is videoed. But no matter how good he is, you will have a question - you will wish there was some person you could ask the question of. OCW is really good work, our project piggybacks on it, but a collection isn't enough. You want to be able to tuen to that person and say, "Did you understand what that person said?"

OLS is social software that integrates with existing collections, designed to facilitate effective learning and support interactions without the presence of an a priori authoritative voice. In this case, teacher bandwidth is actually zero. Instead of replacing the teacher with an automated system, can we replace the teacher with several thousand actual people? People learn pretty effectively that way. That's the criteria - lots of people, but no teacher, no tutor, just peers.

Now just having a room with tables and doughnuts does not make a group work effectively, it just creates the possibility. What can we do to create the right environment with the best possibilities?

Brent: how to grow a community? Haven't you even been in a web forum where you said, "If they just did such and such, it would be so much better. Exceptional features. Another thing we want to think about is advanced moderation. Third, we want a cutting edge recommender system. If we think about who is coming to an OLS system, we want to support them. But what happens when we put all this together is we have a disaster.

If you put too many features up front, it's too feature-heavy. We have to say, we're not growing communities, it's communities that are growing communities. So we went with an extensible architecture that has a modular design. It grows as the community grows. It allows us to put off advanced features until they are needed. Dave, for example, had a community using Slash code. But the moderation system is so extensive, it killed the community. It is important, though, that it is flexible enough to support rapid development. Finally, it needs to be adaptable to change.

Feature support, therefore - should be minimalistic in design. What is the minimum set of features that will do the job users want to do. It needs to be simple, basic and intuitive. It should not include complicated architecture that limits expansion. And it must fit the needs of the community. It's easy in an engineering group to say this feature would be really cool. But you have to be focused on the community.

It's really important that moderation not overburden the community. At first, moderation is not necessary. As it grows, it may need some, but it should be light and in the background. It has to related to the specific needs of the community. It must be acceptable to community members - some communities might find a post offensive, while another community would call the removal of the post a form of censorship.

The recommender system needs to provide adequate guidance. The community needs to communicate what it needs to know. It needs to suit the size and extent of the community. It's easy to get starry-eyed about features. It has to be appropriate to the social level - if we were in a small room holding drinks in groups of three and four, I would not stand in a corner and try to have a conversation with everybody in the room, but that's much more appropriate here. Of course, those needs are going to change over time.

So - what is the minimum amount of features that we can build that will support our community. Then, we allow the community to say what the next feature should be, and then try to support that.

David: think about the technologies that have been successful - blogs and instant messaging. Blogs are so much better than everything else because they are simple. Your Mom can run a blog. Same with instant messaging. They are massively, massively popular, not because they're feature rich, but because they are simple. Torvalds - don't think that you can design anything better than what could be produced by a massively parallel community.

We looked at OLS, we had a whole set of features - but we looked at things blowing up, and we realized we had to write something very small. We had to write something very small and wait for the research

team to look and say, 'the community is screaming for this feature'. It's a really different approach, it's not a Microsoft Word sort of approach.

Features:

- Forums - to facilitate educational discourse
- Logins - to provide stable identity
- Kudos - to facilitate community recognition and reputation development
- Fire alarm - to facilitate community policing

Growing the community:

- Feedback - email, etc., provides guidance for new feature sets. That's hy there's not just an engineering team.
- Forums
- Fire alarm

You ask yourself, why do people participate and provide answers. And the answer is - I don't know. I have some idea. It's a multifaceted things. Usenets, web boards, etc. - we can say, this behaviour is stable. So it doesn't matter why it happens - we can count on it.

For having launched in May, and running over the summer - there are 600 users registered, 173 posts (in linear algebra). The design was so simple, and it was implemented really well by the engineering team.

Next version of OLS - on the very front page we'll actually aggregate all the feeds from the conversations on the site. So we'll have a list of all the message threads or topics.

So far we only have one partner that we've integrated with so far, which is OCW. There are others coming - the Connexions project down at Rice. When they roll that out, all their learning objects will be enabled. May to August - 600 users. For being young and being summer, I think we're doing pretty well.

The platform on which OLS is built is Zope, with code in Python. It's all open source. We want to port it all to Plone. If you have a platform like us is you can have a tight integration. Or you can put a link on your site that links to OLS - it's not a tight integration. Any collection of open materials, you can integrate to them. We need to get a release on SourceForge. But the majority of the future direction is whatever the community says what it needs.

Comment - connection to resource base. We've tried to make the distinction between landmarks and port towns. Think about Mt Rushmore - how many times do you go? How do you build a community around it. I put a book online - they came, they saw, they left. As opposed to the port town, where there's new stuff constantly coming in. Slashdot - there's little tiny bits of content. The strategies are different - the content is stable versus the people are stable. The only kind of community development I understand is the port town, but MIT is the landmark.

Slashdot deals with content that is constantly changing. But linear algebra will be the same in five years. The set of possible questions and answers in a stable domain is finite. Because most of the questions have been answered. But if the content doesn't change, then the community can die. Absolutely. It's the port-town landmark metaphor changing. All the content that people will ask questions about are things that Stang has just talked about. The fact that people have just talked about doesn't mean there aren't any questions any more.

Side groups, private spaces. Won't work if the community is too small. We decided to implement only if the group gets large enough. We're about to the point where e see sub-groups happening.

SD - my comments - communities - as defined by the artifacts as opposed to being defined by the tool or environment. Also: support tools - there is no single instant messaging app, conferencing app. Finally, are threads learning objects?

Logan, Utah, September 2, 2004

How Social is Computer Supported Collaborative Learning: Do Off-task Interactions Exist?

Interaction and community does not occur, either in physical space or online, merely because a space is provided. Rather, what is created a set of affordances - possibilities for interaction - and these need to be understood within a social and cultural context. This social aspect of learning is as important as the cognitive, or content based, aspect, and interactions establishing a social or cultural connection - usually dismissed as off-topic - as as important as interactions having to do with content. This is a summary of Paul Kirschner's keynote address at the ITI conference in Logan, Utah.

There is a unique relationship between an artifact and an actor. These relationships are what we call 'affordances'. Gibson: how animals see things and how they react to them. Take a pond, for example. For a fly, it's a place to walk on. For a fish, it's a place to swim. For a mammal, it's a place to drink. It's not one of those things, it's all of those things - but only one for each animal.

Affordances describe possibilities for action, possibilities for reciprocal action, and possibilities for perception-action coupling. Take a forest. I may see a log and jump on it in a forest. Later, when I'm lost, I may see the same log again. Now it has a new relationship to me - I may sit on it, because I am tired. For a giraffe, it is neither of these things. If you are a kid, consider the following perception-action coupling: a peanut butter and jelly sandwich, and a video recorder. To a kid, these go together - the bread goes into the slot.

CSCL is a powerful 'treasure chest' for learning. It allows us to create collaboration. But it's only a possibility - no more than a room, chairs and a table create a strong group. We really don't have a good electronic pedagogy.

What is CSCL? It's 'learning', 'with others', 'supported by a computer network'. The first thing is learning, in collaboration, only supported by computer networks.

Premise 1: artifacts and our perception of them influence human behaviour (and not always in a conscious way). A window in a door will influence us to look through it. These physical things afford certain kinds of things. The same with electronic things. Email, discussion boards. But email and email aren't the same thing. Email on a fibre background, you can send large attachments, you can have near conversations. Email on copper wire - it's sporadic, it's slow, you can only send small attachments. Email in the first situation isn't email in the second situation.

As designers, we deal with perceived affordances, not real affordances. Constraints and inventions. People say, a screen affords clicking. But the only thing a screen affords is clicking. The screen doesn't do

anything. It deals with our perceptions of things. Our perception is governed by physical constraints - you can't click outside the screen - logical constraints - there must be a third answer, we scroll down - and cultural constraints and habits - we've been conditioned to see this screen this way. Take a Windows environment. We know what to do with the scroll bar. Adobe came up with a piece of software, and used a completely different convention, 'grabbing' to move the Window up and down. And when they changed the convention, they changed the icon - that's the cultural aspect. Consider the help icon used by the Open University. It's completely arbitrary - everyone is confounded.

Premise 2: behaviour is shaped by context. Belgium and the Netherlands are right beside each other, they speak the same language, but they are completely different cultures. There's also the material context. Chairs are for sitting down on. Plates are put on tables. But if you are in a fancy dining room you will act differently than in a country kitchen. "New technology seldom supports old practices with increased efficiency; it undermines existing practice." An escalator - we understand that we use an escalator the way we use stairs, but we move faster. But what happens is people stand on the escalator. People stand because new technology moves.

Premise 3: education is always a combination of technological, educational and social contexts. And that's the crux of the matter. There's an interaction when we're dealing with community or collaborative environments between the pedagogical (cognitive, educational) and the social-psychological. We obtain both learning performance and social performance, but learning performance is not based only on cognitive process, it is also based on social process and in the same way, the social performance will be influenced by the cognitive process and the social process. It's not only a linear relationship; it's also a crossing relationship. The problem is that these aspects, the cognitive and the social, tend to be swept under the rug. Think of emails in an educational situation. A certain number are on task, some are off-task. As if the social is off-task. Think coffee machine or water cooler conversations. Why do we have break times? So we can talk to each other. So we can say the Yankees lost 22-0. That's not off task, it builds trust, it teaches us about each other, so we can work together. That's not off-task. Coffee machine: it creates the opportunity - affordances - for meeting with each other. It doesn't make you meet with each other, but it gives you the possibility - we chat over coffee, all of a sudden we are working better together. If we ignore that, we get behavior that kills learning.

The social cues are there. Think of door handles. Because it doesn't work the way I thought, it doesn't make me not walk into my building. But think of the student, faced with things that don't work the way they expect them to. They're going to stop, especially in distance learning, online learning. There is a loss of capital, social capital, but also enjoyment.

Educational tasks should allow educational affordances: the relationship between the properties of the educational intervention and the characteristics of the learning. We look at these tasks at a very low level of granularity. Group size, for example: what's a large group and what's a small one. If we are trying to reach consensus, 3 or 4 is a large group. If we are trying to brainstorm, 8 or 9 may be a small group. What you should be looking at are things like ownership (who is responsible), control (the school (external) or the learner (internal)) and the task (authentic or constructed). (Good 3D diagram). Why? Look at three scenarios: cooperative, competitive and individualistic. In individualistic, there is no

interdependence, no interaction, no affordances, no activities, no emotional involvement (all like this lecture, for example). In the competitive situation, we see negative interdependence, oppositional interaction, affordances of rejection or distrust or disliking, no activities or misleading communication, and low emotional involvement. In the cooperative environment, there is positive interdependence, promotive interaction, affordances of acceptance or support or trust, exchange or influencing activities, and high emotional involvement. Imagine a learning scenario where, of a group, one person, the name drawn from a hat, will be tested, and the marks given to all students.

Sociability is the degree of promotion of a social space or a network. How these environments differ in their ability to facilitate the emergence of a social space. Look at two CSCL environments. Do these things promote social interaction, social space. What do you need? One thing is trust. No trust impedes cognitive processes. A second aspect is belonging. The willingness to give oneself up for the greater cause, the cause of the team. Lance Armstrong's team, for example. What you see is people giving themselves up for him. Lance Armstrong's tem members have never won a single race in the tour. The feeling of belonging: if Lance wins, we win. A third is temporal and physical proximity. We can do the same in CSCL learning. We can see who was where doing what when. You can see spatial-temporal proximity online. The exact same email - will have different meanings if we know what the other is doing or has done. Five stages of group formation. Forming, storming, norming, performing, and adjournment. He wrote a great article, about the Beatles, how they went through these stages. Finally, the last aspect is community: a shared element, a sense of collectivity. A block party for example.

We ask: how can CSCL be optimized by proper usage of technological, educational and social affordances. First, analyze the combination of educational, social and technological affordances for collaborative learning. Second, design CSCL ...(see slide, sorry). Example of leaning environment shown on screen. The main distinct thing (according to me) is the history bar - where they were online, where they were physically (in the library, e.g.).

Suppose we have a mathematician, graphic designer and programmer. So now we say the product should display a certain amount of elegance. Each of the three has a different idea of elegance. There has to be a negotiation process, from unshared knowledge to shared knowledge, which occurs through a shared formalism, in which you check new contributions. "Do you mean...?" "No, I meant..." Acceptance, rejection, choice of position.

CSCL - knowledge construction or shared ignorance. In education, students learn more. This means we need to afford such environments.

Q: do off-task interactions exist? No. So people passing notes in class... If you create an environment... if it's a class, the answer is no. If you are working in a project. But if it's a lecture hall of 900 people, and they're reading their email... It depends on the situation. But if you create a situation where there is self-organizing, there is no such thing as an off-task behaviour.

What about avoidance behaviour in cases of cognitive overload. Yes. But it might increase motivation or increase work, kick it up a notch. I wouldn't call it avoidance behaviour - deleterious cognitive

interactions in your head. If it's completely new, it will only stay in short-term memory - it will cause blockages.

Mathemathantic? (Richard Clark)? Between 1963-1966, Bell Laboratories - Mathemagenic - those activities that give birth to learning. Clarks problem with things that could kill learning. Mathemathantic. Catering to preferred learning styles. Clark says - the organized person will learn from organized materials, but not learn deeply. Give them disorganized materials. Give a disorganized person disorganized materials? But that person can't organize, and can't learning.

Logan, Utah, September 2, 2004

Reusable Media, Social Software and Openness in Education

Text of my keynote address to the Open Education Conference, Logan, Utah, September, 2004

Introduction

Well thank you, it's a pleasure to be here, and I'd just like to say before I begin my talk that I've found this to be an absolutely fabulous conference. The talks have been uniformly interesting and I've managed to get a lot of material to draw from, I've been able to draw from quite a bit of that material even for this presentation today, so I think all credit to David and the rest of the organizing committee for putting on just a wonderful conference. I've really enjoyed it.

I'm going to talk in broad strokes today. I'm going to make some sweeping generalizations, which I'm sure David would say is nothing unusual for me. I'm going to draw some issues in black and white and of course the issues aren't in black and white; there are much more nuances. I'm going to give you, if you will, an overview, and for those of you who read my newsletter or look at my website you might think of this as a field guide to my newsletter, a field guide to my website.

I was forced to provide an abstract for my talk some time ago and so that's the talk that I'm stuck with now. But the topic is 'reusable media, social software and openness in education' and the way I introduced this in my abstract was by talking about a dichotomy between the consumers and the producers of information or content and I'm going to draw from that a bit, because of course that's one of these black-white yin-yang things that aren't absolutes, because of course weren't producers and we aren't consumers, we're a little bit of both. So when I draw lines like that, I don't mean it just that way, I don't mean to divide the world into producers and consumers, I'm not saying that's the way the world is divided. But I'm going to pull a bunch of these things out.

I style myself, the career that I've chosen for myself if you will, is that of what William Gibson calls Idoru, and in the book of the same name Idoru is defined as 'intuitive perceiver of patterns of information'. And that's what this talk is about. This talk is about patterns. And broad strokes. Patterns in events, patterns in technology and software, patterns in cognition and the way we think and the way we create knowledge and the way we transfer knowledge.

Dichotomies

In May of 1995, and I still remember it well, which in a way is kind of sad because it dates me, but in a way is kind of nice because it gives me a context, the most amazing thing happened on the internet, and the amazing thing was that people who used to use information services like CompuServe and Prodigy and especially America Online joined the internet. Now from the point of view of those of us who were already on the internet it was like this flood of AOL Newbies and it was like, you take this room, and

imagine the same number of people, only children, all came flooding into the room and all sat at the front and started asking questions. It felt like that. It was the most wonderful thing.

Now the question is, what prompted that? Why did AOL decide in 95 to join the internet? Tim O'Reilly, who was with a company called Global Network Navigator that sold to AOL at the time, says, "Gradually people are becoming to realize that free means access, not price." AOL could not provide access; it was a closed, proprietary system and for AOL and the others to survive they had to become open.

But the story doesn't end there. (Just as an aside - I'm experimenting with timing on my slides - the first time I've ever done this. The slides will keep going relentlessly no matter what I say.) The story didn't end there because of course AOL went into this sort of only half-heartedly. Sort of, as O'Reilly said, "wishing the internet would go away and allow it to get back to its traditional business of providing a closed space," vertical media market, proprietary technology, control over the message, everybody goes to AOL, AOL is where the community is, AOL is where the content is. (No sometimes the slides are going to go too slowly.)

This difference between AOL and the internet can be characterized along a number of dimensions, and it's these dimensions that I want to use to highlight the distinction between what I believe is the coming picture of learning and the going-away picture of learning. The coming picture of learning, the one that we want to work toward, is open, where there is access for everybody, open in the sense of the internet, open in the sense that, if you can type in the URL, you can go to a web site. As compared to the closed spaces, such as AOL, or Prodigy, where you have to go, use their service, use their conditions and terms of service.

There's not just open and closed. Another dimension is the distinction between broadcast and conversation. In traditional media what we see is broadcast. They speak, you listen. If you go to your home, your hotel room, today, you turn on the television, in all probability, you will not be talking back to your television, or even if you are, because I do frequently, it turns out they do not listen. As contrasted with the model of communication on the internet where communication is two-way. As anyone who has published a blog understands, as soon as you put something out on the internet people start sending you stuff back. "This is great. This is awful. You should move to wherever."

A third dimension of this dichotomy is the distinction between institution and individual, and this is where a lot of my clashes with David lie. My perception - and I might be wrong, the way I sort of caricature it in my mind, which is what I do, little pictures, big noses - the old way is centered around the institution - government, corporation, Microsoft, broadcasting agency, AOL-Time Network - the new way is centered around the individual - the personal website, the blog, the email address.

The fourth dimension is the organization of this system, the organization not only of communication, the organization of business, the organization of learning. Now we contrast here between the hierarchy, where there is a directory or a president or a CEO at the top, and instruction and information diffuse from the top, and is sent to the peons, as compared to a network, where there is no one person in control.

A further dimension is between the concept of centralized and decentralized. And again we can go back to AOL and the internet. AOL is centralized. Everybody went to AOL. The internet is decentralized. You may go to a website here, you may go to a website from my home in Moncton, you may go to a website from Africa, or Iran, or wherever. The organization and the location of the material and where the decisions are made occurs in many places rather than in a central place.

What Lawrence Lessig talked about in the opening keynote to this conference, he talked a lot about remix. He didn't draw out the way I would have liked the contrast between remix, with remix, but the contrast with remix is what I might call 'product'. Remix is when you mess around with song files for yourself and create something. Product is when you go to HMV or something like that and buy a shrink-wrapped jewel case with a prepackaged CD-ROM with all the music already laid out in order for you and you do not change that. Remix is when you put your own photos and videos on the net; product is when you watch television and they plan the shows and you watch the shows as they were planned and delivered.

Which leads us to our next dimension, planned versus chaotic. Now I'll come back to chaotic quite a bit during the course of this talk - some people may say the talk itself is an instance of chaotic - but it's the idea that you can plan and organize everything up front versus the idea that things develop on their own in a natural way. The idea of putting things into a precise sequence versus the idea of each step being self-determining, each step following from the last but not necessarily depending on the last.

Static versus dynamic. Television shows are static. Once an episode of Cheers is made, it's made. It never changes. The web is dynamic. Once somebody creates a wiki page, who knows what it will be tomorrow? In the field of learning we have trouble with this because we have this vocabulary of learning objects, and 'learning objects' gives us a picture of something that is static, and we want to talk about it according to its properties. But learning objects are something that should be thought of as something dynamic. People ask me for the analogy that I like to use for learning and what e-learning is, and I say, e-learning is like electricity, not like Legos. It's something that flows, it's like the water system. It's something that should be available, in the wall, where it comes out, it changes, it's not concrete, it's not the same thing you got yesterday - that's what we're really happy about with water, we wouldn't want yesterday's water.

The distinction between push and pull. Broadcast media pushes. It tells you what you're going to see. As opposed to pull, which is the model of RSS, which I'll talk a little bit about, where you, the consumer, go out and get what you want, you pick what web page you're going to see, you pick what blog you're going to read.

Affordances

Now we have this set of dichotomies, and what made this happen - because we didn't have this set of dichotomies when I was growing up, at least, not really - what happened - and Lessig talked about this and many other people talked about this - is that when the internet arrived on the desktop it gave people a whole new set of capacities.

A lot of people have talked about the same sort of thing that happened when the printing press came out. I like to think about what happened when writing came out because when writing came out people had this capacity to express information in a way that they never did before. Imagine when writing was invented the possibility that writing would be everywhere. On this desk: "Evacuation procedure statement." On the walls when you need it. People can create writing by themselves. This is a fantastic development.

And the same thing has happened with the internet. We can create a new kind of content for ourselves. Wonderful tools. We have simple text editors. I use one called NoteTab?. Love it. Email clients, a way we can send, for ourselves, a message around the world. HTML to design things.

Also, the technology (this is, this is the slides pacing me, you know, otherwise this would be a four hour talk) the technology also gives us access to new markets. Before the internet, and I remember these days, my power of communication extended to the room that I was in, maybe a bit further if I shouted, and I did shout from time to time because I wanted to be heard, and that's it. But today, with the various technologies, I have a global reach. I have a global reach not just in terms of distance, I have a global reach in terms of audience. I can reach out beyond my own community, my own group. This is a capacity I never had.

Now the point I made in my abstract, and it's in this slide here because it's in my abstract and I'm stuck with it, because it's a bit of an overgeneralization, is that traditional media and traditional services view this new development, quite rightly, as a threat.

Think about the fax machine. Some of you may recall the introduction of the fax machine. I'm still wrapping my mind around the idea that there are people possibly in this room who have grown up and there's always been a fax machine, but before the fax machine what people did is that they would actually send physical messages from one place to another, and it sounds like an odd idea, but that's what we had at the time. When the fax machine was introduced the courier companies said, "This is great. We will offer an electronic messaging transfer service. You come to us, you give us this message, we'll make a digital copy of this message, and send it over the wires." Instead, the business was basically destroyed.

Or the television. Everybody still has a television, it's one of these things that's just beginning to pass its peak, but we're seeing in news articles and that these days, "The internet is past the television." And more importantly, the role of the television in our lives is changing. It is moving from becoming an up-front medium to a background medium. The way radio is now. A major change in the status of television.

Some of you will have heard of something called Skype. Skype, or something like that, will basically destroy long distance telephone service. Because Skype, basically, is internet long distance telephone. It's free. Now you need your internet connection, you load your program on, you call up your friend, if your friend has Skype you have a free high quality voice connection with them. So the call that used to cost you, I don't know, 90 dollars or whatever, to talk to Australia for an hour or so, that costs you nothing. Now, of course, you know, we're still in the early stages so there are cases where we have to

interface between Skype and the traditional telephone system, and that costs money, and of course there's talk about regulating it, and that costs money, but Skype replaces long distance telephony.

Blogging. I participate in online news mailing lists and the online journalists are, you know, in the one sense fascinated and in the other sense scared to death of blogging. Newspaper circulations have begun to drop and they've begun to drop most dramatically in the youngest demographic. As many people now get their news off the internet as they do reading the newspaper. Circulations are dropping. And what's happening, it's not simply that people are using a new medium, but people are getting their news from new sources. You find out about events in Russia or Georgia, not from the New York Times, but from Yosuf, who lives down the block from where it happened.

Now, in general, these new technologies evolve in two stages. The first stage, and this is pretty much where we're at in the world of digital media, it duplicates existing processes and services. Just like, when we got the internal combustion engine, the first thing we got was the horseless carriage. Just like when we got refrigeration we got ice boxes. In the second step, it obliterates them.

But - and part of the point of this talk - is, this is not a Hegelian sort of determinism here. This is a set of choices that we made. And this talk is about the choices that we make.

Traditional media understand this and they know that if they put in the right kind of systems and structures they can resist this change. And they look at the new technology and the new affordances - I was looking for a place to use 'affordances' - and new affordances that it offers and it sees itself being threatened in three areas.

One area is in the area of production. This is a business model change, this is not so much a technological change, although it's an effect of technology. In the old model, production was enabled by demand. "Work for us, produce what we want you to produce, or, through the mechanisms of finances and governmental structure, we will cause you to starve." That was the mechanism. The new mechanism is volunteer. You choose what you will contribute into society. The contrast is between Encyclopedia Britannica, where they hired a bunch of people to produce this massive 24-volume set which sells for two thousand, three thousand dollars, and Wikipedia, which was produced with a labour cost of, well, I guess, nothing.

Another tension is in business models. You may have read, heard, about this a great deal, the distinction between proprietary and commercial software, or products, because it's not just software, and free and open source. And the old way is the proprietary and commercial software - this is the model, this is the commercial business model that is under siege, because of new technology. New technology allows not just for the distribution of open software, as some of the people in this conference have talked about so far, it also allows for the creation of it in the first place, because we can organize ourselves into a programming entity that has as much capacity as a centralized system such as Microsoft.

And then finally, business models in traditional media are threatened in terms of distribution models. The music industry, which I'm sure you're all familiar with, the debate surrounding the music industry, is

on the verge of being destroyed by perr-to-peer content. I know they're fighting back and this fight will continue I'm sure. Until I retire. But if you look at sales and profits, they've peaked, they're declining.

The Empire Strikes Back

But again, and I want to emphasize, this is not historical determinism. Rory McGreal? likes to talk about, in the context of standards, how the Romans decided that roads would be one chariot-width wide, and this width has carried down over the years to determine the size of our rail tracks, and therefore the size of the boosters on the shuttlecraft, and so the size of the boosters on the shuttlecraft is determined by a decision made more than 2,000 years ago. So this is not inevitable.

So even as we are bringing our local forms of communication - conversation, sharing, community - the global forms - the broadcast, the centralized, the proprietary, the commercial - are bringing themselves into our home, into our lives. Things like copyright. Things like Air Miles and purchase points. When somebody complains to you, and this has happened to me, I use the word 'coke' or 'xerox' or something like that in a message, and somebody always writes, well, "You can't write that word without using a little (c) after it." Or "you shouldn't use that word to refer to a generic." This is the centralized model intruding itself right into my speech.

Lessig drew this out beautifully. "If technology means everything is a copy, and if copyright law covers copying, then copyright law covers everything." It's a major intrusion and a major change.

As I said, it has infiltrated not just our homes - people are putting controls, they want to put controls into our computers under the rubric of 'trusted computing' whereby, and this was actually raised in a case in, I believe it was Finland, where they said the person has trespassed, where had the person trespassed? because he cracked a CSS... a DVD scrambling system, he had trespassed on his own computer because he had broken into a piece of software on his own computer - so it's coming right into our homes. And right into our language, as I mentioned before.

So the message here is: the internet does make us more free, it gives us more capacity, but even as we are becoming more free the calls - and by calls I mean not just oration and agitation, I mean a wide variety of tactics and strategies that I'll talk about a wee bit - for a closed network are becoming more insistent and more pervasive. And for those of you who read my newsletter, this is why I get so strident, because they are persistent and they are pervasive, and in many cases, many cases, they're winning.

Now what sort of things? Well, look at bundles. Bundling. Read people like Shapiro and Varian, in their book Information Rules they talk about bundles and all of that, and bundles is the new marketing strategy. Bundles have been with us for a long time but we're seeing this more and more. Music albums. That's a bundle, all you wanted was one song but you bought fourteen. Preformatted radio is a bundle, right? You listen to that rap song because that other song that's on after it is the one you like. Journal bundles, things like that.

Closed spaces and markets. One of the big things to sweep the internet over the last year was social networks, but if you go to these social networks, go to Friendster or Orkut, they're closed. I don't mean

that they're closed in the sense that nobody can get in, well, Orkut is kind of that way, but they're closed in the sense of, the community exists only in the context of Friendster, or only in the context of Orkut. You can't communicate between Friendster or Orkut. You have these closed systems that you have to go into. Newspapers are becoming like that with registration; you have to register and go into this closed newspaper website, from which there are no links out.

Learning design. This is another place where I talk with David. The idea that learning is something that's prepackaged, structured, where you as a student are like an actor in a play, and the instructor or the designer will be like the director, and they will tell you how to play a role, what to say, what to do, versus the approach promoted by people like Seymour Papert and James Paul Gee of learning, or structure and design, as a game, open ended, where you can decide for yourself what you're going to do.

Media formats. Now you'd think: learning design, media formats, completely different issues, but it's the same issue. PDF, which pervades our lives and tells us how we are going to read something. Versus HTML, which is open and free-form. Real Media, or even worse, Windows Media Format, which sometimes doesn't even work on Windows, versus MP3, which is something that can be played by anyone anywhere.

Digital rights. I've been up to my ears in digital rights expression languages over the last couple of years because of my involvement with the eduSource project as the package manager for the DRM part of the project, and the presumption of digital rights expression going in is that anything that is not explicitly permitted is prohibited. Now imagine if you governed yourself in society that way. Unless there's a law that says you can walk on the sidewalk, you can't. There was a fascinating talk by Dan Rehak abour CORDRA, and he says, behaviours, services, identification, authorization, authentication, digital rights, all these have to be built into the system ahead of time in order for it to work. Do they? Did we do digital rights before we came up with blogs? Did we do digital rights and authentication before we came up with the web and home pages? Was I not able to send an email before I could attach an XML description of it detailing exactly how the receiver could use it?

Perceiver of patterns of perception, of information.

When we know what we're looking for we can see it everywhere. Now sometimes that's called paranoia. But it's like mathematics, once you understand, you can count things, you can count things all over the place.

Barriers

So I'll draw that out a bit and look at the types of barriers and impediments that characterize the centralized proprietary closed type of system that I've been talking about as opposed to the open type of system that I argue that we want to move toward.

One of these is obvious and I'm sure every one of you is familiar with it, and it's called 'lock-out'. It's like the lock on your front door. Only it's digital. It's a subscription fee to access certain stories at the

Chronicle of Higher Education, which seems to me to be ironic in the highest degree. It's registration forms to view the news. Again, ironic. It's network authentication. Now, again, it's not all black and white - sometimes we need this. I want a lock-out system to govern the management of the ATM system. But when you're talking about systems of knowledge, news, learning and information, that kind of lock-out is inappropriate.

Even more subversive, even more insidious, is the idea of 'lock-in', and again, if you read all this new economic stuff you read a lot about lock-in. It's proprietary content. Proprietary software. Everyone has to use Word because Word is the only software that understands a Word file. It's closed markets. Go to a grocery store and notice the trend that more and more of the products on the shelves of the grocery store are being replaced with generic store brands, because they know, when you go to a grocery store, they can determine the set of options available to you, and the more they can narrow that, the more they can determine what your purchasing patterns will be.

High-bar. That's talked a lot about by people who have to deal with things like educational technology standards. I remember when IMS first landed on my desk, and IMS landed on my desk as about a two-inch stack of paper, and actually made a thud when it hit. And I said, this is great, this is exactly what we want, and we need to implement this, because I was young and naive, and when I started showing it to the instructors they actually turned pale.

Flooding. That's something I talked to David a little bit about because... because we have this idea, and Lawrence Lessig talks about this idea, that you know if we just make Creative Commons and free and open content one of the options then people will be able to naturally go toward it, but that's not how it works in the marketplace, and if you look at the marketing strategies of companies like Starbucks, even if people offered free coffee on the corner people would still go to Starbucks because everywhere you turn there's a Starbucks. On the internet, that tactic is known as spam.

And then finally, the legal barriers that are thrown up against openness and sharing. It's fascinating that we live in a society where openness and sharing can actually be considered crimes. We have the attack on fair use, as Lessig mentioned, publishers don't even bother with fair use any more, it's like that right no longer exists because the threat of being sued outweighs any benefit they could gain from exercising their right.

Now, the reason why I get strident, and the reason why I come and do broad stroke generalization talks like this is because, as a community, in my perception, we are complying with the erection of these barriers and hurdles blocking open access. Look at IMS metadata. Again, we were young and naive. We welcomed IMS metadata. And it seemed like a good idea at the time. But if you look at it there's 87 or whatever fields to fill out. Metadata in fact creates a barrier, it's a high-bar barrier. Isn't it? If you wanted to produce free content, and you wanted it to be available through the SCORM network, you'd have to hire teams of librarians in order to complete this requirement.

And I wonder, and I ask now, and I have the benefit of hindsight, why didn't we use something like Dublin Core or even RSS, which has like three fields, in order to create our sharing networks?

SCORM. SCORM just is the old model. Centralization. Command and control. Broadcast. Why did we pick a model like that? Why did we adopt it so wholeheartedly, follow that lead, and I know that the U.S. government, ADL, threw a lot of money at this, and I know that money attracts people like lemmings, but if we saw the direction that we were headed we could have, could we not have, asked, is SCORM the way we want to go? Now we're doing it again with learning design. IMS has come up with learning design and of course it's being adopted and extended and so on, where we tell people what roles they will play, what things that they will do, the analogy of a directed play, versus the kind of learning that really works, which I characterize as improv. Now I actually asked that when Learning Design was presented, at a conference somewhere in Vancouver, "What about improv?" You can't do improv with learning design. It rules out self-directed independent action. Think about that.

Digital Repositories. I've spent the last two years of my life involved in a thing called the eduSource project and a good part of that has been arguing vehemently with people in small rooms about the nature and structure of our repository network, because the model that they wanted to go in with was a federated system, and with single sign-on user authentication such that a library such as CORBIS could be attached to the network, and you would not be able to find out, would not be able to find out what resources CORBIS had to offer unless you had already authenticated, already paid CORBIS, were already admitted into the system. That's the nature of a federated system, it's like a gated community of the internet.

And now we have CORDRA. Some of you were either the happy recipients or the hapless victims of the discussion that Dan Rehak and I had. The jury's still out on CORDRA because CORDRA's not done, although I will observe and I did observe in my newsletter yesterday that it was being presented to us as a package from On High, they'll actually tell us about it some time later this year, it'll actually be launched a month or two later. CORDRA is what you get from a centralized, top-down, hierarchal organization and I question - and I emphasize that it's still a question - how much of this authentication, command and control, is going to be built right into the backbone of the network. And again, open question still. And I hope, because I am that kind of agitator, that some of the wild-eyed conspiracy theories that I was launching from the floor of that conference room work their way back into the design of CORDRA because people understand that it has to be an open system. It can't control how the network works.

What Works?

And we ask ourselves, "What worked?" In the history of the internet? There's a lot of things that worked. The internet's a fantastic success. FTP - file transfer. Email - killer application. Usenet, which is now kind of by the wayside, but was huge in its time. The web iteself. Worked. Billions of pages. Blogs. RSS.

Well what were their properties. What nature did these successes have? And you can see the list (because the list advanced on me before I was ready for it). They were simple, and this is Dave Winer's genius. I disagree with lots of things about Dave Winer, but Dave Winer always emphasized the simplicity of RSS. Anyone can get it. They were decentralized. There was not a single place where you

got files on the internet, you got them where they were. It was open. You could go anywhere. Anyone could send an email, you didn't have to sign away your blood type and your mother's maiden name. And it was open. We could all play.

Now as I said, IMS quite literally landed on my desk in 1997. Give or take a year, I forget exactly when. You'd think I'd remember, but I don't. And that's seven years ago. And I have to ask and I do ask and I want to know, where is the 'Blogger' of e-learning? We've got Microsoft, Sun, Intel, Cisco - all of these companies - Department of Defense, government - everybody's been working on this for seven years and we have not been able to produce a nice application that everybody can use to create learning for themselves. Why not?

There's the view that the market will do it. Right? You get the standards out there, the standards are free and open, it doesn't matter if they're a little complicated, and then the market will provide the tools that we need in order to become producers and not just consumers of information. I do not share that faith. Because it's been seven years in our field.

And it's worth noting, you look at the list that I read earlier, FTP, email, so on and so forth, none of these, not one, was a commercial product. FTP? Not a commercial product. That only came later. Email? Not a commercial product. The web? Tim Berners-Lee gave it away. Blogs? Blogs existed for three or four years before Blogger came along. Photoblogs, which we're finally getting now - the commercialization comes later. People haven't created some kind of online internet marketplace where you pay per view for photoblogs. It hasn't happened. They're not commercial implementations.

David Wiley said, and Brent Weinburg said some smart things in the discussion of their conferencing system they're attaching to the Open Courseware product, Open Courseware project, and he says, and I think it was Brent said this, and it's a paraphrase, if you put too many features up front it's going to be feature-heavy. And he talked about Dave using Slash Code. Slash Code is very good code. But when he used Slash Code, which is the software used to run the Slashdot website, it has moderation and all kinds of features like that, the moderation features killed the community. And I contend that exactly the same thing is happening with learning. Where all the features and the complexity, not just of the standards and the production and the design, but even the use of learning - you know I mean, learning management systems, LCMSs, they cost hundreds of thousands of dollars to make these work, and you go in, and they're incredibly complex, and it's killing learning.

Think about the mode of production of this. Luc Chu, great talk, talked about translating Open Courseware into Chinese. If we used a commercial model in order to get this done the simple answer is that it wouldn't be done. Because the people who you would hire to do this, who are qualified to do this, simply would not take the job, because they are doctors and lawyers and that's what they do, they're not translators. The only way to get OCW translated into Chinese is a non-commercial model.

Why

Now the question is why. Why favour the open model? Because of course, you know, the closed demand-driven model, you know, it may take away some of our freedoms but at least it gets things done. (You can only make a one-word slide last so long.)

(I see I'm exercising some creative spelling there. It's limited minds that can only think of one way to spell a word.)

We want to think of - and I mean this very literally - think of new media, and I include in this learning content, learning objects, multimedia, audio, video, this talk, your cat pictures, as a new vocabulary, a new language. Now I mean that not as a metaphor. I mean this as being quite literally the case. This new media is now how we talk. Or at least, how we will talk.

Well right now the control, the mechanisms of the production of this new media, especially in the case of learning, is in the hands of the traditional content publishers. It's the broadcast model. And the reason why we need to move to the conversation model is because: nobody can learn only by listening, nobody can teach only by talking.

Jacques Duplessis captured this, he captured the parallel between language and learning objects beautifully and he draw the obvious next conclusion, he captured the idea that there are two ways, the one way where you wrap everything up in a bundle - it wasn't in my list earlier but I would have included Content Packaging as among those things that we don't like - Content Packaging, you put it all in a file, it's not a nice HTML file so you have to kind of interpret it, and then you zip it, which makes it completely inaccessible for any browser on Earth, and that's our model - Duplessis said, "Programs are to digital media what syntax is to language." With one, the package, it's signed sealed delivered, with the other, it's open. In language it's open. We have access to our syntax. We know how to speak in English. We do not have the capacity, we do not have the access yet to the syntax in order to speak digital. In the prepackaged mode, the decision has been made. There's only one speaker. But in the open model, we all get to speak.

And this is a phrase that comes not just from me, it's the opening of the Cluetrain Manifesto, we look at various theories of learning which I won't refer to, we need to have conversations. And Erin Brewer captured this, I'll give a nice picture later. Need negotiation, somebody goes on to Yahoo, they say, "I need to know how to, I don't know, raise a bee." And what happens is, the person at the other end who knows all about raising bees, doesn't come out and say, "well, here's how you raise a bee," what they come back with is, they say, "Well why do you need to know how to raise a bee?" And the person explains and that allows the person who knows all about bees to say, "Well you don't really need to know how to raise a bee, you just need to know how to convince a bee to get to a flower." Whatever. You can only push these metaphors so far.

We need to have diversity. And - and I've got thirty seconds on the slide to talk about this, but if there's only one way of thinking, that leads to bad results, it leads to bad results for more reasons than I can

talk about, from the stagnation of knowledge, of learning to even things like Rwanda, where people only had one channel of communication and this one channel was horribly abused.

We need to have symbiosis. Symbiosis. That allows us to share resources, and importantly - and this is what I believe I do with my newsletter - to take resources that are in one form and transform them into a resource of a new form so that people can use that resource. A lot of people, myself included, have difficulty with academic journal articles but they're pretty good with nice little summaries, so that process of transformation takes a resource that's hard to obtain and makes it a resource that's easy to obtain.

You have to have feedback. Or in the U.S., checks and balances (you can't say that in Canada). In the world of network theory, in neural networks, the concept is called 'back propagation'. It's how networks learn. The information in a network is not one-directional. You try something out. You burn your hand. That sends information back, "Don't do this again."

And we need to have emergence. This is the concept of the wisdom of crowds, and if you Google that phrase you'll find a book of the same name that explains this in detail. The idea that all of us, acting independently, but ensemble, en masse, can come up with something better than any individual in the group could by themselves. This is not a case of marching toward mediocrity, this is a case of the group simple being able to take into account more factors, more variables, than any given individual. The group being able to absorb more information than any individual. But for this to work, we have to have the open communication and access. We have to have the distributed non-centralized non-hierarchical model.

And here we have Erin Brewer talking about how learning, self organized learning, occurs in Yahoo groups, and she studied Yahoo groups. That's a good thing to study. And we have the process of renegotiation, and we have the need for diversity. And the idea that diversity creates more stable, more productive communities.

Filter, repurpose, remix, feed forward

Now again, I'm a great abstractor and I'm a great generalizer and I look at this model as described in Yahoo and elsewhere, and I pull out of this the mechanism, this basically the same mechanism that networks in the natural world use, it's the same mechanism that the neurons in our brains use. Filter - pick what you want. Repurpose - change it. Remix, and then most importantly, feed forward. The brain works, not as information channels - we don't have, you know, the 'eye channel' and the 'ear channel'. We do to a certain extent. But what happens is the information is processed through layers of filtering, repurposing, remixing, feed forward. This happens in a historical process - "I have stood on the shoulders of giants." Filter, repurpose, remix, feed forward. And it happens in the transmission of information through the internet.

And those of you who are looking at small worlds networks and things might observe that in the internet there is a directionality of links and that is something that people have been studying but there is also a directionality of content and information, that runs in the opposite direction - if the link goes one way,

the flow of information goes the other way. Instead of trying to organize e-learning, learning objects, metadata, we should be thinking about how this network can organize itself through the mechanism of filter, repurpose, remix, feed forward.

Now, we are at the point now, it is a turning point, and I actually wrote a little paper called 'The Turning Point', where we've pretty much replicated the non-digital environment, we have classrooms online, we have courses that have modules that have lessons online, and people are looking at this and scratching their head and they're saying, "Well what was the fuss?"

But the potential of the internet as a communications tool, as a learning tool, occurs only when we move to the second phase of this transition. When we begin to speak, and not just listen, and in the new language, not just the old language. When we gain access and control of the syntax, the semantics and the vocabulary of the new media. And this happens if, and only if, we have an open communications network.

Can you imagine how we could possibly have learned to read and write if only a certain class of people were allowed to use language to begin with?

We have to gain our voice. We have to speak for ourselves. To reclaim our language, reclaim our media, reclaim our culture. And as Brian Lamb would say, just a few minutes from now in the all-Canadian thread, "Go fast, go cheap, and let it go" - and this is hard for educators. "Let it go out of control." And people ask, what's the one sentence piece of advice you can give for people who want to be instructors in new media, and well I say it's a very short one, a two-word sentence: "Let go."

Just this morning Marie Jasinski, great little piece, I'll run it in my newsletter, on eduChaos. Marie gets it; Marie's an educator from Australia.

So we come to the three themes of my talk. At last. Hope it was worth the wait. Reusable media - we need a 'Blogger' of learning content. And we need it yesterday. Social software - we need a way to support conversations and not just content, and indeed I would take that even further, we need a way to support conversations with content. This ties into the 'Blogger' of e-media; we need a way to create our words, we need a way to send our words. And learning, again as Erin Brewer suggested, we need to first of all understand, and then leverage, the principles of self-organizing networks.

If you want slogans, we need to transform learning, like the fax machine, from something that we do for people, to something that they do for themselves. It is our job as educators in the field of e-learning to not only allow, not only give, but encourage people to have a voice.

And I thank you for your time and you can find more information on my website. Thank you very much.

Logan, Utah, September 7, 2004

The Buntine Oration: Learning Networks

Text of the Buntine Oration, delivered to the at the Australian College of Educators and the Australian Council of Educational Leaders conference in Perth, Australia. MS Word version. MP3 Audio Recording.

00:00 Introduction

Thank you. It is an honour and a privilege to be able to address you here today. On behalf of the National Research Council and the people of Canada, greetings.

I am by vocation a learning technologist, a researcher, a sometime programmer, a speaker and writer, and a passionate believer in the value and importance of education. I am by education a writer and philosopher, a student as much of Wittgenstein as of Piaget, as much of Descartes as of Dewey. I am indeed lucky that by this time in my life my pleasures have become my pursuits; I often tell people that I do for a living what I would do for fun in my free time, if I had any.

As I prepared for this talk in my mind - because nothing would translate into writing - I prepared for this talk by giving a series of other talks across Australia, traveling from the Top End to Tassie, from the Red Centre to the Barrier Reef. I talked about leaning standards and learning object metadata, learning management systems, content management systems, the new student and old traditions, the affordances of technology, barriers to learning, open source and open access, knowledge management, knowledge generation, language, literature and new media.

I wasn't so much speaking as listening, not so much showing as searching. I am a student of learning technology, but learning technology is for me becoming increasingly empty.

I don't know if I found what I was looking for. But I did find this, nailed to the wall of a wooden building on the west coast of Tasmania:

"If we can revise our attitudes towards the land under our feet, if we can accept a role of steward, and depart from the role of conqueror, if we can accept the view than man and nature are inseparable parts of the unified whole - then Tasmania can be a shining beacon in a dull, uniform, and largely artificial world." Olegas Truchanas, 1971.

In 1971 I was in grade seven, in a dull, uniform and largely artificial world, and possibly at the very time these words were written, organizing my fellow students as we stood in a line to enter our class to put our hands on our heads and make clanking sounds like chains, the condemned. I do not regret my stint in the Principal's office for what was, after all, a political crime. But as I stood before this building in the wind and the rain in Strahan, waiting for my bus, I realized, that we have been and are doing the same thing to ourselves as we have to the trees and the forests, and that the same thing that will save Tasmania, will save me.

03:00 Learning Objects

In 1995 or so I found myself working for Assiniboine Community College in Brandon, Manitoba, a small city of 40,000 people on the wheat fields of western Canada, working, on the one hand, to prepare college materials for distance delivery, and on the other hand, to prepare the college and the community for the advantages the internet would offer the world of learning.

At Assiniboine I built a learning management system, something we called OLe, short for `Online Learning Environment', a computer program designed for the World Wide Web that would be like an online learning manual, but better. And I had the idea that units of learning, what we called `modules', could be designed in such a way as to be reused in one course or another. Unknown to me, another Canadian, Wayne Hodgins, had had the same idea, and instead of calling them `modules' he called them `learning objects'.

Hodgins explained,

> "My journey into this world of learning objects started with an 'epiphany moment' watching my children play with LEGO blocks many years ago... I began what has been more than ten years of refining a dream of a world where all "content" exists at just the right and lowest possible size, much like the individual blocks that make up LEGO systems." (Hodgins, 2002)

This early vision has undergone numerous changes since its inception, though the concept has remained the same. Learning objects are small bits of reusable digital content that can be used to support learning. How they fit together became terribly important, and so there was much debate about the correct analogy to use. Learning objects were thus more like atoms, for example. Or there should be things like data objects and knowledge objects, which would instead be combined to form sharable courseware objects. Hodgins himself abandoned the Lego metaphor, recommending instead what he called a multi level content taxonomy. (Hodgins, 2002)

The idea caught the attention of the educational community, and so while I was still at Assiniboine the first draft of the influential IMS Meta-Data Specification (IMS, 1999), describing the concept of the learning object in exquisite detail, landed on my desk with a thud. I printed it out and enthusiastically showed it to my colleagues and said, "This, this is what the next version of OLe will have to conform to." They looked at the inch-thick document and said something I will loosely translate as, "You've got to be kidding."

Despite their initial skepticism I was convinced and while I never did program an IMS compatible version of OLe, the idea, it seemed to me, was sound, and when a few years later at the University of Alberta I wrote the paper `Learning Objects' I had in my mind already well rehearsed the argument in favour of reusable digital learning content. It made no sense, I argued, to produce the same module in trigonometry or Shakespeare over and over again; the principles of mathematics and the language of literature were quite unlikely to change one year to the next.

06:00 Two Visions of Online Learning

For a while there I was completely in synch with the rest of the world. My paper was at the top of the Google listings for `learning objects'. And it had become apparent not only to myself but to the rest of the education technology community that learning objects would have wide applicability not only in distance learning but learning in general. And it became apparent not only to myself but to the community as a whole that the use of web based materials would change the nature of teaching itself, that teachers would, as the old saying goes, become a guide by the side instead of a sage on the stage.

I had this vision, you see, that the use of learning objects would, in effect, make learning content seamlessly and effortlessly available not only to all students, but to all people in the world who wished to learn, and that the portability and reusability of learning objects meant that we could develop an educational environment where students were not marched in lockstep through a predefined curriculum but instead could have the freedom and capacity to explore the world of learning according to their own interests and their own whims. Learning, genuinely free and accessible learning, could be produced and shared by all.

I may have been in synch with the rest of the world, but it would not last long. While I was thinking of what the educational system could become, the network of publishers and software developers and educational institutions that developed around the concept of learning objects had a very different idea.

Here's what it would be. Learning resources would be authored by instructors or (more likely) publishing companies, organized using sequencing or learning design, assigned digital rights and licenses, packaged, compressed, encrypted and stored in an institutional repository. They would be searched for, located, and retrieved through something called a federated search system, retrieved, and stored locally in something called a learning content management system. When needed, they would then be unpacked and displayed to the student, a student who, using a learning management system, would follow the directions set out by the learning designer, work his or her way through the material, maybe do a quiz, maybe participate in a course-based online discussion.

That's the picture. That's the brave new world of online learning. And honestly, it seems to me that at every point where they could have got it wrong, they did. And though I don't have a lot of time, I'm going to linger here a bit and draw out a few features of today's online learning. Not just to show in detail why I think they are wrong - through there is a certain pleasure in this - but to analyze why I think they went wrong, and therefore, where I think we ought to go instead.

I don't have the time in today's short talk to look at everything, but a look at three aspects of the new system should be enough to prove the point: content packaging, federated search, and learning design.

09:00 Content Packaging

Educational content has long been the domain of the publication industry, and while perhaps some professors felt that the new technology might result in a new type of publication, it is equally true that existing publishers believed they had discovered new markets. It is no coincidence that one of the

earliest entrants into the field (and still an important player today), NetG, which introduced `NetG Learning Objects', is owned by Thomson publishing. Learning object metadata has been formalized as IEEE as 1484.12.1 Learning Object Metadata, and adapted by the U.S. military as a requirement for all providers as a standard called SCORM, or the Sharable Courseware Object Reference Model.

In order to satisfy the needs of the publishing industry, the second specification undertaken by IMS was something called `content packaging'. The analogy between the digital package and, say, a book or a magazine, is obvious and deliberate. In this model, groups of learning objects are assembled to form courseware; this courseware is packed and compressed (or `zipped') and then sold as a bundle to an educational institution. The bundle is then delivered, either on a CD-ROM or via the internet, where it is loaded into a Learning Content Management System, to be routed for delivery to the student on a learning management system.

From my perspective, this model is about as far from the model of the internet as one could get and still be in the realm of digital content. It resembles much more a school library or a CD collection than it does the world wide web. It also resembles the way publishing companies view the sale of digital journal subscriptions and e-books, as prepackaged content, the use of which is tightly controlled, or of software, complete with encryption and registration, that has to be licensed in order to be used, and requires an installation process and close interaction with an operating system, in this case the LMS. And, of course, without an LMS, the learning content is effectively useless. You can't just view it on your web browser.

From my perspective, if online learning held the promise of reducing the cost of learning materials and opening access to all, this model effectively took it away. Even for educational institutions, the cost of entry is the purchase of an LMS and an LCMS. Although content could in theory be authored by school or college staff, the requirements of metadata, packaging and compressing entail the use of expensive authoring tools. There is moreover no effective way to share learning content with other institutions, no such thing as a web of learning objects, no such thing as a Google to help instructors find them. It is, quite literally, a separate internet, one which is likely to become more separate still.

12:00 Federated Search

Because learning objects are invisible to Google, there have been several projects designed to make them discoverable; for the last two years I have been involved in one of them, the eduSource project, based in Canada, which has as its objective the linking of collections of learning objects, known as repositories, to support what is called a federated search. In the e-learning world in general this has been the next new thing; IMS has released a Digital Repositories specification, and instead of Google operators of learning content management systems are intended to access these federated searches.

Without lingering on this for too long, let me say that a federated search is everything that Google isn't. With Google, information about every website in the world is collected in one place; the user accesses the Google interface and searches it all at once. In a federated search, the information - in this case, the learning object metadata - stays where it is, in individual repositories. When a person conducts a search, this search is sent to each repository in the network individually. Thus, if there are ten repositories in a

federated search network, the search is conducted ten times, once on each repository, and the results are sent back to the searcher.

If this process seems odd and cumbersome, it is. In practice, the federated search over even a small number of repositories is significantly slower than Google. It is also exclusive; in order to be a member of the federated search network, it is necessary that a repository be able to support an instance of each and every search. It's like requiring that every website have the capacity of Google. But most importantly, it exercises control over the search results. Because metadata originates only from the source repository at the time of the search, access to the metadata can be blocked if, for example, the searcher does not have the appropriate license. Moreover, the only information about a learning resource to be had is that information provided by the vendor.

What Google has, that a federated search system by definition cannot have, is what I call third party metadata and what Google calls PageRank. In order to order search results, what Google does, essentially, is collect information about what other people think of the resource, and to incorporate that into its search. For example, Google counts the links from other sites to the resource in question, and if many people link to the resource, it is ranked higher. No such ranking is available to searchers in a federated search network; the only ranking possible is that provided by the vendor, and that is rather more likely to have to do with the vendor's business model than any third party information about quality, classification, usability or suitability.

15:00 Learning Design

In a learning management system, learning objects must be displayed to the student. In the world of learning objects the IMS way, learning is completely contained within the content package. The manner in which these objects are presented to the student is called Learning Design, and is the subject of yet another IMS specification.

Learning design follows from an earlier IMS specification called `Simple Sequencing', and the name of the former suggests the direction of the latter. Learning design has its roots in computer based training, and is essentially the definition of a set of interactions and activities that present materials to students based on their responses to things like tests or quizzes. The analogy employed by the designers of the Learning Design is that of the play, where learners take on various roles, and where the learning design document itself acts as a script, the learning management system as the director.

In other words, the model has become such that learning objects, insofar as they support learning, must necessarily come with specific learning objectives, in order to fit into the learning design. Indeed, the more explicit a learning objective is, the better a learning object is, because it can be used explicitly in this or that learning design. But as Wiley argues in his paper `The Reusability Paradox', the more specifically defined the learning objective of a learning object, the less reusable it becomes, until you get to the point where a learning object may be used by one, and only one, learning design.

Indeed, learning design and learning objects essentially amount to the same thing, because the paradox works in the other direction as well. In order for Learning Design, the specification, to work as

advertised, it must control the selection and display of learning objects. But in order to do this, you have to know what objects you are going to select and display. A script has to have lines; it's not improv. So someone must select the set of learning objects to use in a given learning design, and to put this list in the learning design itself. This means that a new learning design must be authored for each unique learning objective.

Learning Design is, in my opinion, very much a dead end. A dead end not because it results in e-learning that is linear, predictable and boring, though it is that. A dead end not because it reduces interaction to a state of semi-literate yes-no, true-false multiple choice questions, though it is that. It is a dead end because it is no advantage over the old system - it doesn't take advantage of the online environment at all; it just becomes an electronic way to standardize traditional class planning. It's not cheaper, it's not more flexible, and it's not more accessible.

18:00 What Went Wrong

So what went wrong? I mean, it's easy to say that the systems are too expensive, the learning too boring, the search too cumbersome, the reusable objects too not reusable. What matters here is that I be able to explain why the existing model is inadequate, and how it differs from the model that is worth emulating, the one that I have suggested, and now say explicitly, is the model instantiated by the World Wide Web itself.

It has been observed many times that a new technology evolves in two stages. In the first stage, it emulates previous practice. Thus, for example, when movies were first introduced, they were essentially recordings of stage plays, with a single camera located in the position of the audience. Only later did we get multiple camera angles, zooms and fades. Similarly, the refrigerator began as the ice box, and only later did we get air conditioning, ice-cube makers, and an ice rink resurfacer known as the Zamboni. Early automobiles were known explicitly as horseless carriages, and only later did we get motor coaches, transports and interstate highways.

Online learning has evolved in very much the same way. The learning management system was designed explicitly to emulate traditional practice. The basic unit and structure of instruction remained the course; the basic unit of person remained the class, and for the most part, albeit with new technology, the time-honoured techniques of instructional delivery, interaction and testing were emulated in this new environment. If learning management systems imported anything new to traditional learning, they did so though migration from existing practice in distance learning.

We talked about the discussion of a metaphor for learning objects. But the idea of the learning object has drifted far from the idea of learning objects as atoms, or even of learning objects as Lego blocks. Indeed, on observation, it could be said that if any metaphor applies to learning objects, it would be that of the word in a sentence, the line in a play. The use of the learning object has become, in practice, not the combining of individual entities, but the arrangement of them, learning object metadata forming a vocabulary, learning design creating a syntax, content packaging assembling them into a book, federated search acting as a bookstore or (at best) interlibrary loan.

And if language is the metaphor, then language itself is the problem. For everything that language is - static, linear, structured, ordered, hierarchal - the internet isn't. We are locked in language. We are locked into the structure of language, the ordered, neat idea that language represents, the management, the organization, language as plan, language as structure, language as order, the world made neat, and tidy - the world made dull, uniform, and largely artificial. We must leave language behind, and forge our way toward something new.

21:00 Leaving Language

When I say that we must leave language behind, I mean it quite literally. Language must be replaced, is in the process of being replaced, by a mélange of multimedia, of a chaotic mixture of text and symbols, audio and video, of words and images, topics and theses, concepts and criticisms, not neatly stacked into rows and distributed through an orderly process of content management, but blasted aimlessly into the environment, a wall of sound and sensation, not written but presented, not read but perceived.

The idea is as audacious as it is breathtaking. But it is happening today. You have probably heard of the concept of the digital immigrant and the digital native. The idea that the digital native, one who was born with today's electronic technology, one who got his or her first mobile phone before his or her first pencil (if they got a pencil at all), one who is part of, as some characterize it, the "MTV generation." The digital native, we are told, operates at "twitch speed," multitasks, and - quite literally - thinks not in an orderly progression of thought but in multiple parallel threads, associating seemingly at random, communicating not so much through sentences and paragraphs as through a barrage of images and (something like) text.

It is difficult for us to imagine - but think for a moment of the cave paintings found on aboriginal lands here in Australia and in similar dwellings around the world. Why didn't they just write on the wall, "Don't eat the yellow part?" It is, of course, to a significant degree because these cultures were pre-linguistic. If they had a language, it wasn't the sort of thing that was functionally useful, not the sort of thing they could scrawl on a wall. Written language was invented, and the complex structures and characteristics that followed invented as well, and it began from a sense-based, pictoral representation of the world. And if we think about how such people must have thought their thoughts, it must have been quite literally in pictures, the linguistic capacity of speaking to oneself that cognitive theorists are so fond of talking about today either not used or not existing.

It is almost incomprehensible, but it is not beyond comprehension. We can, if we wish, learn to at least understand the language of the digital native, even if we are not able to speak it fluently. We can, as we understand the prehistoric, understand the future, by reading the artifacts. What unfolds is not only a new way of understanding the future, but a new way of understanding the world itself, and for us, as educators, a means of doing what we must, of preserving and propagating the knowledge and values of the past (and we have to do it right - we only get one chance).

24:00 The Blog

Our first artifact is the blog and the world of blogging.

Jorn Barger's original definition of a `weblog' reads as follows:

"A weblog is a webpage where a weblogger 'logs' all the other webpages she finds interesting. The format is normally to add the newest entry at the top of the page, so that repeat visitors can catch up by simply reading down the page..."

The weblog format simmered for a few years, growing in popularity but escaping widespread notice until the arrival of a weblogging service called Blogger. Consisting of little more than a title field and a text field, Blogger was simple enough for everyone to use, free, and popular. Thus empowered, the format grew to the point where there are some four million blogs published today.

If the format is what defines a blog, the author is what defines blogging. The thing about personal publishing is that it is irreducibly personal. What makes blogging work is not only its simplicity but also its almost complete lack of restraint on the authors. Bloggers are variously wildly opinionated or incisive and informed, long and rambling or short to the point of beyond terse, left wing, right wing, anarchist, corporate, or even collective. Blogs are, if nothing else, the voices of the authors; any order beyond that is coincidence.

Blogs today are written in text, but as access improves and better tools are placed into people's hands, we will see more multimedia. Already there are audio blogs and photo blogs. And similarly, blogs are written on the computer today, but this too will change. Already people can send SMS messages or emails to their blogs. They can ring up a number on their mobile phone and dictate to their blogs. Any thought worth recording - and many that are not - are being stored in blogs, in whatever format is available at the time.

To the post-linguistic, each of these blog entries can be thought of as being like a word in the new language. They are the basic units of thought. They are reflective of a vocabulary that is rich and expressive, subtle and nuanced. They are not ordered in sentences but are strewn wildly across the internet; viewed in the aggregate, they appear random, like static, like noise.

To return to learning for just a moment, when we think of learning objects we should be thinking of two things: that learning objects ought most properly to be thought of as though they were blog posts, and that the primary authors (or speakers) of blog posts will be, must be, the bloggers themselves. We can, and should, join in the conversation. But we cannot control it. Learning objects may be constrained, learning design preordered, their authoring cumbersome and their distribution controlled. Blogs are the opposite of all this, and that's what makes them work.

27:00 RSS

If I am going to commit myself to the thesis that blog posts are like the words in the new language, then it is reasonable to ask about the grammar of this new language. And the answer to that question is, in my opinion, found in the underlying structure provided by a type of XML called RSS.

Rich Site Summary, or RSS, was a technology created by Netscape. The idea of RSS was that a content provider - such as a newspaper or magazine - could list the new items on its website in a machine readable XML format so that Netscape's own program could retrieve that listing - a process called `harvesting' - and use it to design personalized pages on its NetCenter website. Users would create a NetCenter account, and then subscribe to those content providers they wished to read, and in so doing, design their own personal NetCenter page.

NetCenter did not, as Netscape had hoped, save the company, and they removed the NetCenter page, and even removed the RSS specification from its website. But by then a group of devotees - including myself - had taken hold of the idea, and RSS was reborn as an unsanctioned, unsponsored, unfunded and (for the most part) unused branch of XML, living on only in discussion lists that eventually became the `Syndication' and `RSS-Dev' groups at Yahoo Groups.

It was to this technology I referred explicitly when I wrote my paper `Content Syndication and Online Learning', promoting the idea that RSS could be used to syndicate learning resources into an online learning environment. Based on this idea, I built such an environment in a site called MuniMall. Designed as a knowledge, learning and information resource for the municipal sector in Alberta, MuniMall was not a course, was not structured, was not ordered. It was - and is, since it is now an indispensable part of that community - an open-ended learning environment, and is probably more like the future of online learning than anything we'll see in a learning management system.

RSS is the semantic web. It is not the official semantic web - as I said, it is not sanctioned by any standards body or organization whatsoever. But RSS is what has emerged as the de facto description of online content, used by more than four million sites already worldwide, used to describe not only resources, but people, places, objects, calendar entries, and in my way of thinking, learning resources and learning objects.

What makes RSS work is that it approaches search a lot more like Google and a lot less like the Federated search described above. Metadata moves freely about the internet, is aggregated not by one but by many sources, is recombined, and fed forward. RSS is now used to describe the content of blogs, and when aggregated, is the combining of blog posts into new and novel forms. Sites like Technorati and Bloglines, Popdex and Blog Digger are just exploring this potential. RSS is the new syntax, and the people using it have found a voice.

30:00 Edu_RSS

With this in mind, my own work in recent years has involved the development of semantic networks within the blogging and RSS networks. More specifically, what this means is that I have been using the

existing network in order to collect, organize, and redistribute information. In a certain sense, what I have been building is the equivalent of an airport hub or freeway interchange, a place where many strands of the network come together, are reorganized, and redistributed.

What I have built is a system called Edu_RSS, a software program that harvests the RSS feeds from two or three hundred educational technology blogs, stores the links in a searchable database, and then, sorts the links into topics and redistributes the results as a set of topic-specific RSS feeds. Thus, for example, I have on my website a page called `learning objects' that represents, in real time, the collective contributions of several hundred authors, and yet is specific enough that it represents a very concentrated - and manageable - stream of information for the average reader.

Essentially, what Edu_RSS has become is a specialized content filter. It filters content in two ways. First, it filters content by selectivity. Our of the four million or so RSS feeds available, I have selected only a small number, only those relevant to my particular interests, from sources I think are reliable. Second, it filters by content. Each item is subjected to a semantical test - in my case, by matching it with a regular expression. Only items that match the expression are forwarded through the feed.

Edu_RSS also interprets data as it comes in. The world of RSS is unstructured - there are no fewer than nine types of RSS, numerous modifications and extensions, syntactic variations, and more. From this hodge-podge Edu_RSS extracts only the information it needs. If information is missing it supplies its own data. Part of Edu_RSS, a routine that analyzes mailing lists and creates specialized mailing list RSS feeds, actually constructs part of the RSS file by examining other data.

But for all that, the key to Edu_RSS is specialization. For all its power, it only tries to do this work for a small part of the internet. It is no Google; it is nothing more than a single node in a very complex network. What should happen, what is already happening, is that a large network of sites like Edu_RSS should emerge, forming in essence a second layer in the network. The result of this second layer is that the internet will self-organize, that information generated in a thousand or a million places will cluster, become composite, interpreted, specialized, and produce highly targeted, highly specific resource feeds at the output end.

Already the output feed for learning objects produced by Edu_RSS, even with a very incomplete input network, is probably the most authoritative news source in the world on the subject. No journal, no writer, no editor or formal publication, can match what Edu_RSS does, and yet it does it simply by drawing very naturally on the properties of the network. Academics, researchers and students who wish to keep up to date on the topic of learning objects turn to Edu_RSS first.

33:00 Order Out of Chaos

It should not be surprising that order emerges from a network of disorganized and disparate sources. Order emerges out of networks. This is how networks work, and that's why this is the grammar of the new language.

Order emerges out of networks because networks are not static and organized but instead are dynamic and growing. A network consists of a set of entities - called, variously, units or neurons, but which can be in fact anything from crickets to blog posts to bloggers. In a network, these entities operate autonomously and are only tenuously connected - as the slogan goes, small pieces loosely joined. They receive input from other entities to which they are connected, organize that input, and then pass it on - or as the slogan goes, `aggregate, remix, repurpose, feed forward'.

As I said, networks are dynamic. Connections come, connections go. A connection may be used a lot, and grow stronger. It may be unused, and grow weaker. Connections form for a variety of reasons - one way, one of the simplest, is Canadian psychologist Donald Hebb's principle of association. Two entities activated at the same time will tend to form connections with each other. Like attracts like. Clusters form, concepts emerge, and small worlds are created.

The type of network I described just now, the network of connected educational blogs created by Edu_RSS, is a type of network called a neural network. As the name suggests, it is a network designed to emulate thought processes. Whether the brain is itself a type of neural network remains subject to some debate, but as Edu_RSS illustrates, such a network can be developed to quite automatically obtain very specific results from very disorganized data. It is, quite literally, order out of chaos.

So where does this position us with respect to learning and learning objects?

The short answer is this: alongside Edu_RSS I have built a parallel system, the Distributed Learning Object Repository Network, or DLORN. It does exactly what Edu_RSS does, except that, instead of harvesting RSS feeds from educational technology blogs, it harvests learning object metadata from digital repositories. It is, in essence, an end-run around the federated search system, a way of collecting, recombining, and forwarding information about learning objects from a wide variety of sources.

DLORN is much less developed than Edu_RSS. Most information about learning objects is locked away. We need a blogger of learning objects, a simple and useful authoring system that lets staff, and eventually students, create their own learning resources to contribute to the common pool. And we need to rethink our definitions of learning objects, to move beyond static concepts, and to start thinking about learning objects as resources generally, not just textbooks and tests.

36:00 Learning Networks

The long answer involves rethinking what it is when we think about offering learning online. Instead of offering classes and courses, learning online ought to be structured along the model of environments, games or simulations. Writers like Seymour Papert and James Paul Gee talked about this, so I need not review their part of the argument. What I do offer to the discussion are the means and mechanisms for importing learning specifically into such environments.

Think of a learning environment as a space. If it is a space, then it can be thought of as a layer. It is, ultimately, the output layer of the learning network. Corresponding to points in this space, like stars in the sky, are the highly specific outputs of the learning network. Students are inhabitants who occupy

this space. These outputs appear as features in their environment. Learning isn't something they go to, something they `do'. Learning is simply `there', a feature of the environment, to be used as needed.

Think further of the learning environment as a space, and it becomes clear that any space can become a learning environment. As access to the internet become ubiquitous, as our internet connection follows us, is available at home, in the community, on the job, it becomes clear that these output points may be located anywhere in the environment, whether that environment is Microsoft Word, a process control system, a grader or a fishing rod.

If, as I suggested above, we describe learning objects using the metaphor of language, text, sentences and books, then the metaphor to describe the learning network as I've just described it is the ecosystem, a collection of different entities related in a single environment that interact with each other in a complex network of affordances and dependencies, an environment where the individual entities are not joined or sequenced or packaged in any way, but rather, live, if you will, free, their nature defined as much by their interactions with each other as by any inherent property in themselves.

We don't present these learning objects, ordered, in a sequence, we present randomly, unordered. We don't present them in classrooms and schools, we present them to the environment, to where students find themselves, in their homes and in their workplaces. We don't present them at all, we contribute them to the conversation, we become part of the conversation. They are not just text and tests, they are ourselves, our blog posts, our publications and speeches, our thoughts in real-time conversation. Sigmund Freud leaning on the lamp post, just when we need him.

And if our words are worth hearing, they will become part of the common lingua franca, our culture and our knowledge, carried on in a new form through successive generations. We don't manage learning and control learning; we can't. We are but stewards.

39:00 Coda

You may not have seen some of the things I've talked about in this paper, things like learning objects, learning management systems, content packaging, federated search and learning design, but if you haven't, you will. Soon.

And you'll probably hear about them from a sales representative or network administrator or supervisor (if you hear from your students, it will be about blogs and RSS, iPods and online games, or if they're honest, file sharing networks).

And if the sales representative comes to you and tries to sell you an LMS or (worse) an LCMS, ask them why you have to pay them so much money for something the web and web browsers do for free.

If the sales representative tries to sell you online course and lessons, ask them whether it supports random access so students can use it when they want, even if they're not at school, or ask them where you can access the dynamic feed with daily updated content, or how easy it is to place images from the course content in your blog.

If the sales representative tries to sell you learning design, ask for the open ended improv version, the game outliner, the simulation editor. When he shows you the software, ask him where the student content goes in, ask him to show you the blog aggregator.

If you are asked to join a federated search network, ask the providers why are they afraid of the market place, what content are they keeping out, where the third party metadata is.

And when they speak of your students as human resources, knowledge workers, consumers or target markets, ask the sales representative if he remembers when he was a child, his mind a little network, small and fragile, but open and free, an ecosystem ready and wanting to support a jungle of diversity and growth.

Ask, above all, that our children be free.

Perth, Australia, October 8, 2004

Persistent Identification and Public Policy

Note: this article is a response to the discussions held at the Persistent Identifiers Seminar[144] at University College Cork, Ireland, last June. The summary to which I refer is not yet available on the internet. When (and if) it is made available, I will link to it here. Presentations are available on the conference website.

Despite what the name implies, as has been widely observed, a persistent identifier (PI) does not guarantee that an object will be available - my observation is that a significant cause of broken URLs is that the resource has ceased to exist or has been removed from public access. I don't expect this to change in a post-PI world - one might recall that when the U.S. government changed hands four years ago many resources were removed from public access by the incoming government as being no longer current.

From my perspective, the ability of a PI system to associate multiple locations with a resource is a major asset (and, as the author noted, a significant weakness of the widely used Purl system). But the choice of multiple URLs must be resolved either by the address server or by the browser. If the former, there may be concerns regarding the opacity of the process; such a system could be used, for example, by governments or service providers to hinder access to information, to redirect to similar information offered by 'content partners', and more. But if the latter, then browsers themselves must resolve the choice of location to attempt to access. Browsers do not have this capacity - hence the discussion and concern about the need for a plug-in. It would be well worth observing how the Mozilla developers (who have released Firefox) approach this issue.

There was in addition discussion of the idea that a PI system should provide metadata about the resource in addition to location information. On the face of it this is a good idea, as metadata can be used to facilitate searching and to customize display. To date, while browsers have the capacity to display metadata (via CSS or XSLT, with limitations) they do not have the capacity to use metadata to alter the display. Moreover, the major use of metadata in searching is as a filtering mechanism; it allows users to select by language, for example, or select by format. However, to date the only location where such filtering could occur is in the address server, which then assumes the functions of a search engine. This would result in a fracturing of the search system, as no address server will serve locations for all resources (a problem exaggerated by the different types of address servers proposed).

The PI system therefore assumes a federated search system, in which a search is propagated to other (strategically allied) address servers, with the retrieval of search results depending on authentication. This raises numerous issues - such searches are significantly slower, result in a combinatorial explosion of search processes, and impose a burden on content providers. An alternative is to allow services such as Google to harvest metadata from address servers, which separates the search from the address

[144] http://www.erpanet.org/events/2004/cork/index.php

resolution. This results in a much faster and more open search process. However, although it was only touched upon in this paper, content providers expect to maintain control over metadata, making it available only to authenticated searchers. As it will not be possible to bar centralized search services (who will, after all, be indistinguishable from authenticated users), it will be necessary to create a legislative environment protecting metadata, or assume that some metadata - such as the location of a resource - is in the public domain, like street addresses or telephone numbers. It is not a stretch to imagine a Napster-like dispute arising over the ownership of resource locations, and legislators should be advised in advance to expect such an event.

This becomes a particularly pointed issue when the opinions of third parties with respect to resources comes to bear. While now if I conduct a search for a resource, say, a particular journal article, I may obtain not only the article but also commentary on the article in my search result. However, if search is metadata driven, and if the only source of metadata is the publisher of the article, then my search results will not include commentary and criticism (or, for that matter, third party classifications, ratings, or even alternative sales points). I have discussed the need for third party metadata elsewhere.[145] For now, it is sufficient merely to argue that if metadata about a resource is made a part of persistent identifiers, that it is important that this metadata be collected from numerous sources.

It is worth noting that a major driver behind authenticated access to metadata is that personal information may be used to drive business rules. This is one of the major reasons why commercial publishers, such as newspapers, are increasingly requiring reader registration. In addition to obvious applications, such as signing bulletin board comments and personalizing news selection, authentication allows advertisers not only to understand reader demographics and tailor advertising. Authentication will almost certainly be used to drive pricing differentiation - Lawrence Lessig recently commented[146] on this.

While it was only briefly mentioned in the paper, the use of an address server that distributes metadata may (and probably will) be used to refer to non-digital resources. One person mentioned the use of such a system to identify people. There has already been progress in this area, following a hub-and-spoke model similar to the Handle System, is a system calle SxIP[147] (Simple eXensible Indenticifation Protocol). In the SxIP system, users maintain ownership and control over personal information metadata, which they may distribute on request to various websites. All other things being equal, such a system has wide potential for personal identification with respect to government services, such as (for example) a single health care record. SxIP has not announced publicly any intent to enable third party enquires based on SxIP identifiers, but this is a natural, and in my mind inevitable, consequence of such a system.

The paper commented that "persistent identification and resolving is fundamentally a social problem." I believe that this is true, but believe that it would be a mistake to say that this can be addressed by "philosophical changes within an organisation". The concept of persistent identification, particularly when extended to include reference to humans and other non-digital entities, is not limited by the

[145] http://www.downes.ca/files/resource_profiles.htm
[146] http://www.lessig.org/blog/archives/002267.shtml#002267
[147] http://sxip.net/

bounds of organizations. Without recognition that persistent identification is a social good, and not merely an organizational good, it will be limited to piecemeal application and inconsistent implementation, creating Byzantine arrangement of competing protocols and standards, disputes over ownership and sharing of metadata, disrupted access to resources, and fragmentation of the internet as a whole.

For example, it is well worth considering a question that did not arise in the seminar summary - the persistence of metadata. It is possible that this is not seen as an issue because the presumption is that there will be a sole source of metadata for any given resource. However, for numerous reasons, this presumption should be challenged. If it is successfully challenged, then there will be metadata extant beyond the immediate control of the resource publisher. Should this be the case, then any change in metadata - an author changes her name, for example, or the price of a popular resource is increased - will result in a duplication of the persistence issue at the metadata level. Indeed, in any case where string data is today used as a metadata value, there exists the possibility that metadata will change.

We see this issue today addressed by the requirement of taxonomies and canonical vocabularies for metadata contents. Consistency of reference is essential if metadata is to be reliable. There must be agreement on whether a resource is, for example, a 'picture', an 'image', a 'photograph' or a 'snapshot'. In my view, however, it is unlikely that there will be concord among such vocabularies (and that there will be a constant need for verification and enforcement), if only because the granularity of such description shifts across discipline. For educators, for example, it is sufficient to know that a resource is a JPEG file. For a digital artist, however, the JPEG compression ration provides an additional level of granularity necessary in content selection. It seems clear therefore that the contents of metadata should, where possible, point to other resources rather than to strings - this is the purpose of ontologies. But we need to understand that, for persistence of metadata to exist, this concept needs to extend to such entities as publishers, departments, and individuals.

In order to achieve genuine persistence, therefore, it is important that we consider the persistence of identification of documents not in isolation, but as a part of a more comprehensive strategy of persistent of resources in general, and consider the need for, and mechanisms for, the identification and delivery of metadata not only about documents but about other non-digital entities. And in order for such a system to be viable, there is a need for there to be a certain mobility of metadata - if metadata about a resource points to metadata describing an author, then the (current) name of the author must be accessible by the searcher at the time of the search. And just as in the case of document metadata, it is likely, and even desired, that some metadata about the author be owned by the author, and distributed only by the express permission of the author.

In other words, the question of persistence, viewed this way, is going to involve a question of balance. For any resource, whether a document or a person, there will be a certain amount of metadata that ought to be private and a certain amount that ought to be public. Just as numerous public services, such as mail, taxis and fire response and police, cannot function without open access to street addresses, so also numerous internet functions cannot operate without open access to document addresses. But in

the same way, access to some information about documents - and in some cases, the documents themselves - must be controlled, just as is the case for information about people.

I argue for consistency. I argue that the same principles underlying the right to share information about documents ought to be applied to information about people. For example, if it is permissible for individual companies to share the names and addresses of people, then it ought in the same way be permissible for people to share the names and addresses of resources. Or for example, if it is not permissible for a third party in the know to share information about the economic health of a company (for example, under insider trading regulations), so also it ought not be permissible for a third party in the know to share information about the health of a person. Just as access to information about a person conveys an advantage to a publisher, access to information about a publication conveys an advantage to a person. These advantages ought to be balanced, to ensure that the one does not enjoy an unfair advantage over the other.

Finally, given the argument above, I would like to touch briefly on the idea of there being a right to an identity. Numerous public and private services require that a person provide a persistent identity before access to services is granted. This identity is manifest in numerous, and not always reliable, modes. For example, the Social Insurance Number creates an identity for a person with respect to access to government services. A driver's license is required to enter public drinking establishments (and to serve on juries). A credit card is required to rent a car or book a hotel room. But none of these is sufficient, not simply because they do not guarantee identity, but because they are not universally distributed. Visitors and children do not have SINs or driver's licenses, people with poor credit do not have credit cards.

In a similar manner, under a system of persistent identification, large bodies of documents may be similarly disadvantaged. The paper discussed concerns about the financial overhead inherent in the Handle system and Digital Object identifiers. These are genuine concerns, because they limit the capacity to assign an identity to a person or organization of sufficient means, and they therefore serve as a disincentive to the persistent identification of free or open source content. Just as there ought to be balance between the personal and the corporate, so also out there to be balance between the commercial and non-commercial. And just as one redress to this imbalance is the guarantee that any person may have an identity, so also must there be a concordant guarantee that any document may have an identity.

It seems to me that while discussion, even within government, of persistent identity has assumed an organizational scope, in order to ensure that the application of persistent identity does not result in a skewed information environment, this discussion must be conducted, especially within government, within a society-wide scope. While the selection of a mechanism for persistent identification may appear to be of implication only within government departments, it will in fact have an impact on the information environment adopted by society as a whole, especially insofar as individuals will by necessity adopt whatever scheme is endorsed by the government in order to access government information. Not only should the government take into account the access needs of individuals, it must take into account the needs of those individuals to create and distribute their own information.

It may be a bit early to say this, but it should not now be beyond consideration the idea of persistent identification as a public service, with every citizen granted the right (but not the obligation) to establish a personal identity, company identities and document entities (to name a few) without charge and which will be recognized without hindrance or prejudice by the information exchange network of the future. The deployment of such mechanisms ought additionally to be accompanied with a legislative environment specifying the various rights to use and protect information accessible within this system, with enforcement provisions applying equally to government, industry and private citizens. The development and deployment of a governmental informational system, and in particular, a system of persistent identification of resources, ought not proceed in the absence of these social and informational frameworks.

That said, the establishment of a society-wide persistent identification framework has the inherent advantage of addressing the social factors that need to be addressed before we will see widespread adoption. Granting individuals and corporations membership in such a system and ownership over their own part of it provides the necessary incentive to contribute (as compared, for example, to the incentive provided to an employee cataloguing a document in which they have little or no interest). Providing a permanent record of a person's contributions to society generates in itself an incentive to contribute to that record - this is, indeed, part of the thinking behind the concept of e-portfolios, which has been much-discussed recently. And it fosters in individuals the attitude that a resource, any resource, is documented and processed in a certain way, making the task of document management within a corporate or institutional environment nothing over and above the obligations of daily life.

Moncton, November 9, 2004

What is a Learning Context?

I would question this statement: "But, what is a learning context? We define a context (for learning objects) as “the ability for a learning object to interconnect various, similar events or statements.” This would be as Ackoff might have defined it.

I do not believe, for various reasons, that a 'context' is a property of an object, and 'the ability to connect...' is a property of an object. If pressed to define 'context' (and IMHO definitions by their very nature are imprecise) I would say something like 'the set of objects, including their functions and relations, that could be detected or accessed by an object'. Please note the counterfactual nature of this definition: if an object is blind and dumb, it does not follow that it does not exist within a context, only that the context is inaccessible to the object.

Contexts are typically defined (reasonably, but still IMHO) from the perspective of the user, or in our case, the learner. I sometimes talk of the context as being the learner's environment, and online, the digital environment. If we want to be complete, we can talk about three major environments: the learner's external environment (classroom, working space, in-person coaches, etc.), internal environment (previous beliefs, thoughts, hopes, etc.) and digital environment.

But this is all a bit throw-away, just a taxonomy. What is correct in the initial statement is the focus on the capacity to interact, whether that interaction occurs directly (object to object) or indirectly (object to learner to object). This context has the properties of an environment, a space, a room, and may be treated as an object in its own right. Objects in a context are 'placed' in a context, that is, by one means or another, they stand in the relation of being 'contained in' the space ('contained in' is a virtual relation - the objects themselves may be physically remote, not visible, nor not in any real sense 'contained' by the context; their being 'contained' is made so by their being declared to be so, and requires only that they be (potentially) accessible from within the space.

An image http://www.downes.ca/photos/Australia04/uluru2.jpg is 'contained in' a space defined by 'http://www.downes.ca by virtue of the IMG HTML declaration. Also in this space is a Javascript feed, http://www.downes.ca/cgi-bin/clist/clist.cgi?current=js in this space by virtue of the JAVASCRIPT HTML tag. Therefore the Javascript feed is part of the context of the image, even though there is no interaction or connection between the image and the feed. Analogy: in this image

http://www.downes.ca/photos/sunshine/2tmb.jpg the horse and the palm tree are in the same space. The palm tree, therefore, is part of the context of the horse, and vice versa, and the entire seen is (from the point of view of the learner, the photographer) the 'context' (the visual context, the image context, whatever).

'Object oriented', in this context, means that the horse and the palm tree have properties in common, derived from ('inherited') by virtue of their being certain types of objects, such that interaction with both the palm tree and the horse can be accomplished in the same way ('look at', for example, or 'speak to'). Such interaction will (typically) reveal the properties of the object ('you see: a horse') or invoke functions in the objects. This capacity, importantly, is enjoyed by objects among each other; the horse (potentially) can 'see' the tree, or 'speak to' the tree, and hence, the objects interact with their context.

In the world of learning objects, the 'inherited' properties of an object (if they could be called that) are distinct from the object; they form a 'shell' around the object. Hence, a learning object may be an HTML page, and the 'inherited' properties the Javascript shell that communicates with the learning management system. This shall, as defined by SCORM, is of limited functionality: 'start', 'stop', 'error'. Objects do not interact; their presentation and action in an environment is typically sequential, and what they can learn of their context is strictly at the pleasure of the environment (ie., the learning management system). The core of the object may share no properties or common methods whatsoever with other objects; from an environmental point of view, they are inert. They are lumps of text; they only thing you can do with them is string them together.

"We need a new metaphor, which we suggest as “organic, ecological ‘legos,’ capable of inter-communication amongst themselves [c.f. 10], capable of receiving (validated) inputs from the producers

of knowledge and understanding, and which any instructor, educator, learner, or any other informer can employ to convey a message that enhances the learner's ability to achieve outcomes and immerse him/her self into a culture or cultures." Exactly. But delete the word 'legos' - think more of the horse and the palm.

"More importantly, we insist that the formal language related to object engineering, and, an extension of this language be always, somewhere part of the record."

Well - yes - but how? We don't even have a common means of creating what you would call 'elemental objects', much less embodying common properties. I think that a common XML definition of 'learning resources' is an important first step - not the metadata, but the resources themselves. From this common framework we can begin to embed logical constructs that allow objects to inherit functionality from base models (I don't like the word 'class' - inheritance and inherited functionality has to be technology neutral, expressed in XML and not (say) Java).

Moncton, November 11, 2004

Cascades and Connectivity

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Michael Feldstein gave us a nice description of the cascade problem in networks in his last opinion column. In cases of serial decision-making-one person decides to adopt Plan A, then another, and so on-people tend to rely on the decisions of those made before. Thus the result is that every person in a network has decided to adopt Plan A, based on the opinions of their predecessors, even though Plan B may be the optimum plan.

There are numerous instances where a cascade phenomenon is undesirable, and not simply in cases where Plan A is not the best plan. In many instances, following the leader is not the most viable strategy, for example, in cases when being the leader confers significant advantages. By being ahead of the pack, Amazon.com was able to create a sustainable business. But businesses that followed faced a problem Amazon did not-competition from the established leader in the field.

According to Feldstein, the problem of cascades in networks is caused by the nature of the network itself. Because a person relies on the opinions of someone else, their own knowledge is not taken into account, thus causing an "information loss." Communication from other people in the network overwhelms the information that a person might rely upon on his or her own, and that information therefore never informs the group as a whole.

Not surprisingly, Feldstein's response is to limit the information flow. "You can do that by simply not giving the participants the chance to hear other people's answers before they respond to a question." This prevents one person's opinion from influencing another, and hence forces the other to rely on local information, thus ensuring that it is entered into the network in the form of a decision to adopt Plan B.

Though Feldstein's solution would certainly solve the cascade problem, it does so at the cost of adding substantial overhead. "Informational cascades can be prevented but generally only with deliberate and specific intervention," he writes. But the cost of such intervention impairs the functioning of the network. For example, Feldstein suggests the employment of "active moderators who have the authority to direct the group's information-sharing activities." People would be, for example, stepped through a polling process such that they would decide simultaneously whether to adopt Plan A or Plan B, thus ensuring that no person is influenced by the choice of another.

The problem of coordination this raises is staggering. Suppose four people are ready to choose a plan but the fifth is not. Are the first four retarded in their progress, or is a hasty decision forced on the fifth? Moreover, it is not even clear that communications between the people can be managed in such a way-what prevents their use of backchannels (such as telephone calls or after-hours meetings) to circumvent the limitations imposed in the communications network? Further still, some activities are inherently serial. How could we conduct an ongoing activity such as stock-market purchases were all transactions required to be conducted at the same time?

There is a tendency when a network produces less-than-desirable results to want to suggest that the solution may be found in imposing some sort of control or organization over the network as a whole. The presumption is that a centralized authority will be able to manage what are perceived to be coordination problems within the network, such as the timing of decisions made by individuals in the network. But beyond a very simple network, the difficulties involved in controlling the network become greater than the problems being addressed by the network. The likelihood of error is thus increased to the point where the benefits of the network are completely negated.

Though cascade phenomena are usually represented as ‘groupthink' or ‘herd mind' (decisions made by individuals based on the influence of other individuals), cascade phenomena are generally better represented as the likelihood of the majority of entities in a network entering into a certain state. Cascade phenomena in electricity networks, for example, have nothing to do with decisions or opinions-they are simply the case where one power station entering an "overload" state as a result of connected stations being in overload. Epidemics of disease are also cascade phenomena, where the cascade is defined as the majority of the entities in the network entering the state of ‘being diseased' as a result of contact with another, contagious, diseased entity.

When viewed in this manner, the futility of central-state administration becomes apparent. It is simply not possible to direct all power stations to decide to go into overload (or not) at the same time. It is unreasonable to require that all people be exposed to a disease (or not) at the same time. No amount of central control can dictate the cost of wheat, the flow of power, the spread of disease-were it possible it would have been accomplished long ago (certainly, we have had enough authoritarian regimes that have tried, as they say, to make the trains run on time).

Ironically, the employment of a centralized management function exaggerates this, because it decreases the degree of connectedness between the members. Communication between the members is magnified, reinforced, made more direct. The existence of a centralized and controlling agent makes a cascade phenomenon more likely, because any intervention by the central authority is immediately broadcast to every entity and has a disproportionate influence on that entity. If the mechanism deployed in any way favors Plan A over Plan B, it becomes indistinguishable from a directive that Plan A, rather than Plan B, be employed. The presumption is that the central agent is neutral in such matters; such a presumption assumes a complete separation between mechanism and output that is impossible to attain.

If you have no friends, your choices will not be influenced by your friends. But if you have one friend then your friend will have a disproportionate influence on you (the centralized authority model). If you have 100 friends, however, the influence of one friend is once again reduced to the point where that one opinion, by itself, is unlikely to sway your decision. Cascade phenomena, therefore, are caused not simply because a network of connections exists, but because the network that exists is not connected enough.

As Duncan Watts said in "A simple model of global cascades on random networks," says, "When the network of interpersonal influences is sufficiently sparse, the propagation of cascades is limited by the

global connectivity of the network; and when it is sufficiently dense, cascade propagation is limited by the stability of the individual nodes." Cascade phenomena occur, if you will, in a "sweet spot" where there is enough connectivity to permit influence and the propagation of an idea, but not enough connectivity to provide the stabilizing influence of dissenting opinions.

To return to the practical example set out by Feldstein, let's look at the case of various managers opting for Plan A or Plan B. In the example, where there is a small number of managers, the problem isn't simply that one manager is being influenced by the other, the problem is that the influence of the one has a disproportionate influence on the other. But instead of cutting off communication with the other manager-Feldstein's solution-a more robust response would be to increase the number of managers with whom the first interacts. Thus, when one manager opts for Plan A, it will not automatically cause the other manager to opt for Plan A; the other managers' inertia (or varied choices) counsels caution, and this allows for the influence of local knowledge to be felt.

When we look at phenomena like the Kerry nomination, we see that the structure of the communication network that conveyed voter intentions was more like the manager model and less like a densely connected network. Voters did not typically obtain information from each other; they obtained information from centralized sources, such as broadcast agencies. These broadcasters, themselves sharply limited in the number of sources of information they could receive (and receiving it mostly from each other) were very quick to exhibit cascade properties, and when transmitted to the population at large, exhibited a disproportionate influence. Were the broadcasters removed from the picture, however, and were voters made aware of each others' intentions directly, through bilateral rather than mediated communications, the influence of any one voice on the eventual vote would be minimized.

In a similar manner, when people complain about reading the same item over and over on the Web, it is because of the disproportionate influence of a small group of writers who, in essence, propagate ideas that are then replicated on numerous other sites. These influential bloggers are riding the top of what is called the "power curve" of connectivity; they are in the same position as the manager who opted for Plan A. By virtue of being first into the market they attracted the most readers, and their position of having the most readers only made it more likely that other people (all other things being equal) would read them. [All other things are not equal, of course-a power blogger can vault into this position by bringing reputation from other spheres, such as television (Wil Wheaton) or journalism (Andrew Sullivan) or connections (Ann Marie Cox).

Networks that develop dynamically tend to evolve into this formation naturally; power laws are typically limited only by physical constraints. Thus, although the hub airports of the United States have benefited from the tendency of flights to gravitate toward airports already used by other flights, the physical limitations of airport management have ensured that there is an upper limit to airline growth. Similarly, though some proteins exhibit hub behavior in the function of a cell, physical constraints create an upper limit on the number of interactions a protein molecule can undertake. To a certain degree, no such limits exist on the Web; hence a hub like Google exists that is connected to every other Web site, and blogs like Instapundit can have massive numbers of readers. Thus, while the connected nature of the

web demonstrates a lesser tendency to cascade phenomena than the centralized model of mass media, the power law ultimately prevails even in this environment.

In my view, this will remain the case so long as access to content on the web is organized by Web site authors. Because of this, it remains difficult to find content on a particular topic, and readers will gravitate to a few sites that tend to cover topics in which they are interested rather than expend the time and effort to find items more precisely matching their interests. By drawing content from a wide variety of sites and organizing these contents into customized content feeds, the range of sites made available to a reader is much greater, decreasing the power law and reducing the probability of cascade phenomena. The shift from Web sites to blogs was, in effect, this sort of transition; the development of specialized RSS feeds will be a significant move in this direction.

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Moncton, November 29, 2004

Understanding PISA

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Introduction

The headline was dramatic enough to cause a ripple in the reading public. "Students who use computers a lot at school have worse maths and reading performance," noted the BBC news article[148], citing a 2004 study by Ludger Woessmann and Thomas Fuchs[149].

It was not long before the blogosphere took notice. Taking the theme and running with it, Alice and Bill[150] ask, "Computers Make School Kids Dumber?" They theorize, "If you track the admitted decline of education, you'll probably notice that it follows along with the increase of technology in the classroom."

In a similar vein, James Bartholomew asks[151], "Do you think that the government will turn down the volume of its boasting about how it has spent billions introducing computers in schools (while keeping down the pay of teachers so much that there are shortages)? Do you think it will stop sending governors of state schools glossy pamphlets about insisting that computers are used in their schools as much as possible?"

Compounding the matter was the BBC's inclusion of statements by Prince Charles on computers and learning. "I simply do not believe that passion for subject or skill, combined with inspiring teaching, can be replaced by computer-driven modules, which seem to occupy a disproportionate amount of current practice."

While computers stole the headline, the Woessmann and Fuchs report contained numerous other bombshells for the educational sector. Small class sizes have no impact on educational outcome, they argued. Private schools have a positive impact. So do standardized exams.

Additionally, school autonomy (hiring of teachers, textbook choice and budget allocations) is related to superior student performance. And students in public schools perform worse than students in private schools. Better equipment with instructional material and better-educated teachers also improve student performance (See also the Subtext[152] summary).

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[148] BBC News. Doubts about school computer use. November 24, 2004. http://news.bbc.co.uk/1/hi/education/4032737.stm

[149] Woessmann, Ludger and Fuchs, Thomas. September, 2004. What Accounts for International Differences in Student Performance? A Re-Examination Using PISA Data. IZA Discussion Paper No. 1287; CESifo Working Paper Series No. 1235. http://ideas.repec.org/p/ces/ceswps/_1235.html

[150] http://www.aliceandbill.com/2004/11/computers-make-school-kids-dumber.html

[151] Bartholomew, James. November 22, 2004. Computers in schools damage student attainment. http://www.tg-enterprises.com/bartholomew/2004/11/computers-in-schools-damage-student.html

[152] http://www.educationforum.org.nz/documents/e_newsletter/10_04/Oct04_Pisa.htm

The PISA Process

The Woessmann and Fuchs report[153], along with many others by these and other authors, was derived from a set of data obtained by the by the Organisation for Economic Co-operation and Development (OECD) Programme for International Student Assessment (PISA), conducted in 2000.

PISA was not the first such study. It follows previous work such as IAEP, TIMSS and TIMSS-Repeat. However, the PISA study diverges from the previous work in several respects.

First, in addition to the study of achievements in mathematics and science, PISA adds a major focus on literacy. Two thirds of the test was based on literacy, and more students were tested on literacy - 174,227 in literacy, 96,855 in math and 96,758 in science. (Woessmann and Fuchs, 2004) The sample consisted of 15-year-olds in 32 countries (28 OECD countries), countries - the focus on age rather than grade "it captures students of the very same age in each country independent of the structure of national school systems." (Woessmann and Fuchs, 2004)

More importantly, the outcomes test is not based on curriculum objectives. "PISA aims to define each domain not merely in terms of mastery of the school curriculum, but in terms of important knowledge and skills needed in adult life (OECD 2000, p. 8). That is, rather than being curriculum-based as the previous studies, PISA looked at young people s ability to use their knowledge and skills in order to meet real-life challenges (OECD 2001, p. 16)" (Woessmann and Fuchs, 2004).

PISA also looked well beyond educational attainment. It also included school demographics, such as whether it was a public or private school, had large or small classes, or had access or not to technological resources. It also measured student information - their family background, access to books and computers and parental support.

Analysing the Results

One might wonder why it would take four years for Woessmann and Fuchs to produce their report. The student results were available almost immediately, and as the authors point out, they created a stir in the press. "The Times (Dec. 6, 2001) in England titled, Are we not such dunces after all? , and Le Monde (Dec. 5, 2001) in France titled, France, the mediocre student of the OECD class . In Germany, the PISA results made headlines in all leading newspapers for several weeks (e.g., Abysmal marks for German students in the Frankfurter Allgemeine Zeitung, Dec. 4, 2001).

But such simple analysis, argue the authors, is misleading. For one thing, they consisted typically of comparisons between one country and another - hence Britain's joy and Germany's disappointment. And they are typically bivariate, that is, "presenting the simple correlation between student performance and a single potential determinant, such as educational spending."

In fact, note the authors, the various variables impact on each other, skewing the results. This sort of dispute has come up in other studies as well. For example, a study may show that charter schools

[153] Woessmann, Ludger and Fuchs, Thomas. September, 2004.

produce poorer outcomes. However, it might be argued that charter schools attract students of a disadvantaged demographic, and when this disadvantage is taken into account, it may result that charter schools are better value for the investment.

That's what Woessmann and Fuchs do. Speaking very loosely - they estimate the weight of each measured variable on student performance. Then when assessing another variable, they subtract that weight from the results where that variable is present. For example, if parental influence is worth 0.4, then if they are measuring for the impact of computers, then for each student who has access to computers they subtract 0.4 if they are also benefiting from parental support. Thus, the impact of the computers, independent of parental support, is measured (please note that this is a gloss; readers should consult the actual paper for the precise model).

Thus we see the authors argue as follows: "once family background is controlled for, the relationship between student achievement and their having one or more computers at home turns around to be statistically significantly negative. That is, the bivariate positive correlation between computers and performance seems to capture other positive family-background effects that are not related to computers... Holding the other family-background characteristics constant, students perform significantly worse if they have computers at home."[154]

The Economic Model

It is worth noting at this juncture that Woessmann and Fuchs are economists and that their methodology is informed by (what they believe to be) principles of their discipline. Indeed, it is clear from the report that to a large degree they approach the subject from the standpoint of what "economic theory says" (a phrase oft-repeated in the paper) and their intent is to a large degree to compare the results of the study to what economics says should be the case.

In approaching the study in this way, one assumes a stance very different than one that might be taken by an educator or a member of the public. For example, economists assume (as a matter of process, not prejudice) that economic theory applies to education. Thus, for example, is is taken for granted that "students choose their learning effort to maximize their net benefits, while the government chooses educational spending to maximize its net benefits."[155]

The economic point of view, moreover, favours a depiction of the educational institution as a dominant influence in the production of educational outputs. "Economic theory suggests that one important set of determinants of educational performance are the institutions of the education system, because these set the incentives for the actors in the education process."[156]

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[154] Woessmann, Ludger and Fuchs, Thomas. September, 2004.

[155] Bishop, John H. and Woessmann, Ludger. 2002. Institutional Effects in a Simple Model of Educational Production. IZA Discussion Paper No. 484.
http://www.iza.org/index_html?lang=en&mainframe=http%3A//www.iza.org/iza/en/webcontent/personnel/photos/index_html%3Fkey%3D621&topSelect=personnel

[156] Woessmann, Ludger and Fuchs, Thomas. September, 2004.

Setting incentives is tantamount, on this view, with marketplace interference. "One reason why the institutional system plays such a crucial role especially in educational production may be that public schools dominate the production of basic education all over the world. As the Economist (1999, p. 21) put it, "[i]n most countries the business of running schools is as firmly in the grip of the state as was the economy of Brezhnev's Russia."[157] This depiction[158] puts the educational system at odds with marketplace theory, and thus the expectation (from economists, at least) is that a more efficient production will be obtained *via* more marketplace ideas.

Hence, the authors have a prior disposition to a market analysis of educational production. "It is argued that central examinations favor students' educational performance by increasing the rewards for learning, decreasing peer pressure against learning, and improving the monitoring of the education process." (Bishop and Woessmann, 2002) This disposition informs the manner in which data collected by OECD are assessed.

The Questions

Without attributing motive to the designers, it is nonetheless plausible to assert that similar considerations led to the design and implementation of the PISA study. Certainly, there is room for criticism of the methodology, and therefore, for questioning the results obtained.

As noted above, the PISA survey departs from previous surveys in disregarding the stated curricula of the schools being measured. As Prais[159] notes, "the stated focus was ostensibly distinct from details of the school curriculum, and was intended to elucidate how pupils might cope in real life with the help of what they have learnt." It is not clear, however, that the resulting set of questions is any more or less 'real life' than the school curricula. Moreover, the selection of an arbitrary set of "international" questions biased the results against countries which pursued different curricular objectives.

British students did well on the PISA tests. By contrast, in previous tests, which involved (for example) basic subtraction, they performed poorly. Prais argues (reasonably), "the kind of mathematics questions asked in PISA were deliberately different from those in earlier surveys, and were ostensibly not intended to test mastery of the school curriculum." And he suggests that the tests measured common sense rather than mathematical skill.

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[157] Bishop, John H. and Woessmann, Ludger. 2002.

[158] http://www.iza.org/index_html?lang=en&mainframe=http%3A//www.iza.org/iza/en/webcontent/personnel/photos/index_html%3Fkey%3D621&topSelect=personnel

[159] Prais, S.J. 2003. Cautions on OECD S Recent Educational Survey (PISA). Oxford Review of Education, Vol. 29, No. 2, 2003. http://www.pisa.oecd.org/Docs/Download/prais.pdf
Subtext. Octover, 2004. What works in education - PISA revisited.
http://www.educationforum.org.nz/documents/e_newsletter/10_04/Oct04_Pisa.htm

Despite the assertions of Prais along with Woessmann and Fuchs, it may be that the PISA test did not test "real life" applications at all. Adams[160], for example, argues, "It is also quite explicitly stated that authentic settings are not primarily focused on day-to-day (everyday) applications of mathematics. Instead, the primary focus of PISA is on the ability to apply mathematical knowledge and thinking to a whole variety of situations." That would explain the question about seals. But the main criticism remains intact: insofar as the test ignores stated curricula, it ignores the intended output of the educational system, and can hard thereby be said to be a measure of it.

The Sample

As mentioned previously, the sample surveyed students at a particular age, rather than students at a given grade level. Woessmann and Fuchs see this as a benefit. "It captures students of the very same age in each country independent of the structure of national school systems. By contrast, the somewhat artificial grade-related focus of other studies may be distorted by differing entry ages and grade-repetition rules in different countries."

Equally plausibly, however, it is a sample with a built-in bias. For one thing, as Prais notes, it impacted response rates. Where classes were tightly bound to age, such as in Britain, a larger percentage of students participated, as it resulted in less disruption of classes. Not so in Germany. "For countries where the date of entry is flexibly dependent on a child s maturity, etc., there is a clear difference between the population of pupils intended to be covered."

In addition to skewing participation rates, the measurement by age rather than grade also skews results. Again, the sampling methodology is independent of the intended product of the educational system, so much so that, according to Prais, it creates "a kind of optical illusion without any underlying real change in pupils educational attainments."

The increased age of the sample population (previous samples were taken at ages 14 and younger) may also skew results. In some nations, weaker students have dropped out of school by age 15. "Full coverage of academically weaker pupils is important if any reliance is to be placed on calculations of average attainments and of the proportion of under achieving pupils," observes Prais, and it's hard to disagree.

Finally, there was an inconsistency in the school populations sampled. In Britain, students from 'special schools' were excluded. But in Germany, they were included. Adams suggests that Prais assumes without evidence that such students were "lower attaining" - one wonders, however, what else they could be when their own administrators decline the test on the ground that it would be "too challenging".

[160] Adams, Raymond J. 2003. Response to 'Cautions on OECD s Recent Educational Survey (PISA)'. Oxford Review of Education, Vol. 29, No. 3, September 2003. http://www.pisa.oecd.org/Docs/Download/adams_response_prais.pdf

Small Classes and Computers

One of the surprising contentions of the (Woessmann and Fuchs) study was that small classes did not improve performance. This runs contrary to the assertions of numerous educational groups. For example, Achilles[161] observes, "4th graders in smaller-than-average classes are about half a year ahead of 4th graders in larger-than-average classes." This oft-cited Tennessee study notwithstanding, there is nonetheless considerable disagreement about the impact of small classes, with studies cited by people such as Kirk Johnson[162] from the Heritage Foundation arguing that "class size has little or no effect on academic achievement."

The problem with class size is that it is itself subject to numerous determinates. As Woessmann and Fuchs observe, parents with lower achieving children may move to districts where smaller classes prevail. Moreover, not all small classes are the same: a class may or may not benefit from additional school resources. The influence of external activities may come to bear; Lindahl[163] compensates for the effect of summer vacation to show that class sizes *do* have a positive impact.

A similar sort of effect is present with respect to the use of computers. As mentioned above, Woessmann and Fuchs argue that, "Holding the other family-background characteristics constant, students perform significantly worse if they have computers at home." But let's examine this.

The major variable eliminated in the normalization of the data is parent influence. Of course, this is the major variable - the one variable, it seems, common across all the studies - that is most predictive of outcome. The better off parents are, the more resources a student will have, the more encouragement and support the students will have, and the better the schools students will go to.

The provision of a computer for student use at home is, therefore, *part and parcel* of a supportive parental environment. Indeed, one wonders about the nature of, and the number of, students with access to numerous computers in poor non-supportive households (one suspects the number of instances is low enough to itself introduce a large degree of error).

That said, eliminating parental influence from the equation is tantamount to measuring the impact of a computer in households with non-supportive parents. No wonder they show no positive impact! Even Woessmann and Fuchs (2004) are willing to concede some ground here: "computers can be used for other aims than learning." Indeed, there appears to have been no effort made to distinguish between educational uses of computing (as in, "computers may not be the most efficient way of learning") and the non-educational use of learning. Given that the authors found a positive correlation between doing one's homework and positive outcomes, one would expect that playing Doom instead of doing one's

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[161] Achilles, Charles M. October, 1997. Small Classes, Big Possibilities. The School Administrator: American Association of School Administrators. http://www.aasa.org/publications/sa/1997_10/achilles.htm

[162] Johnson, Kirk A. June 9, 2000. Do Small Classes Influence Academic Achievement? What the National Assessment of Educational Progress Shows. Center for Data Analysis Report #00-07. The Heritage Foundation. http://new.heritage.org/Research/Education/CDA00-07.cfm

[163] Lindahl, Mikael. 2001. Home versus School Learning: A New Approach to Estimating the Effect of Class Size on Achievement. IZA Discussion paper number 261. http://netec.mcc.ac.uk/WoPEc/data/Papers/izaizadpsdp261.html

homework - exactly what we would expect in an unsupportive environment - would have a detrimental impact on performance.

Indeed, in Fuchs and Woessmann[164] they observe, "At home, the negative relationship of student performance with computer availability contrasts with positive relationships with the use of computers for emailing, webpage access and the use of educational software. Thus, the mere availability of computers at home seems to distract students from learning, presumably mainly serving as devices for playing computer games. Only by using computers in constructive ways can the negative effect of computer provision on student learning be partly compensated for."

What of the assertion that increased computer use at school decreases performance. Once again, we see the same sort of elimination of variables occurring. "Computerized instruction induces reallocations, substituting alternative, possibly more effective forms of instruction. Given a constant overall instruction time, this may decrease student achievement."

Given the apparent result, Fuchs and Woessmann offer two hypotheses. First, computer usage may be determined by an ability deficit: teachers assign computers to the better students; this would explain why students who never use computers perform worse. But also, they suggest, "computerized instruction may substitute alternative, more effective forms of instruction, and it may also harm the creativity of children s learning."

But there is a third, equally plausible explanation. Remember, we are treating school resources as a constant. We are also compensating for student ability, such that good students and poor students are considered to be on a par academically prior to calculating the impact of computers in the classroom. Then, we note, that by comparison the students using computers progress less than the students not using computers.

How could this be? Not because students using computers are performing worse - before all the data compensation they appeared actually to be doing better. It must be because *giving computers to some students - the good ones - helps the other students - the poor ones - perform better*! The use of computers constitutes a reallocation of resources in a class, allowing teachers to concentrate more on the poor students, thus improving their performance substantially.

Only an economist would see this as a net loss. Which gets me to the point of this article.

Economics Presumptions

It is important, when reading studies such as the one cited here, that education and economics are different disciplines. There are risks inherent in imposing the principles of one onto the other.

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[164] Fuchs, Thomas, and Woessmann, Ludger. 2004. Computers and Student Learning: Bivariate and Multivariate Evidence on the availability and use of computers at home and at school. CESIFO Working Paper number 1321. http://www.ifo.de/pls/ifo_app/research_output.abstract?p_id=9359&p_base=DLCI

For example, one might act why the OECD study focused on literacy, science and math, and why Fuchs and Woessmann (2004) would limit their enquiry to the impact of computers on outcomes in these areas.

One need not wonder; the authors explain: "the ability to effectively use a computer has no substantial impact on wages. At the same time, they show that math and writing abilities do yield significant returns on the labor market. Thus, they suggest that math and writing can be regarded as basic productive skills, while computer skills cannot."[165]

There is not space in this article to review this new data, save to suggest that it is in its own way highly suspect. Neither Wayne Gretzky nor Paris Hilton required a computer education to obtain their substantial incomes, but it would be inappropriate to thereby conclude that computer literacy is not necessary (for the rest of us) in order to achieve a higher income.

More to the point, it is not clear that the maximization of income through work is the ultimate objective of an education, and it is clear (and has been stated above) that satisfaction of OECD's 'real life' competencies is not the stated purpose of various national education systems.

But the assumption of the economics stance produces an even deeper dissonance. The employment of the mathematical interpretation of statistics, as demonstrated in the Fuchs and Woessmann work, produces conclusions that are counterintuitive and in some instances factually incorrect.

To a large degree, economics functions as a science by smoothing differences that are assumed to (according to the principles of economics) make no difference. Discounting the non-economic motivations of an educational policy is but one example of this. Ignoring the stated objectives of the educational system is another. So is the process of compensating for extraneous variables.

But in the evaluation of educational policy, these differences *do* make a difference. And they do so not merely because education begins from different presumptions than economics, but because the nature of the entities being studied is also different.

Put simply: it is not possible to merely eliminate the influence of one variable or another from the calculation. The presence or absence of one variable has an impact on the nature and effect of the others. Having access to a computer is part and parcel that of parental support. Allowing students to use computers is the same things as freeing teacher time for other work.

It's like trying to describe the relation between the Moon and the Sun by factoring out the influence of the Earth. After the variations of the Moon's orbit around the Earth are smoothed, the parth of the Moon appears to be a simple line around the Sun. Economists would conclude that the Moon orbits the Sun. But of course this is simply not so; it orbits the Earth - something that cannot even be considered when the earth is removed from the equation.

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[165] Fuchs, Thomas, and Woessmann, Ludger. 2004.

Some Final Remarks

So what can we conclude from the study?

Probably this: that a computer, all by itself, considered independently of any parental or teacher support, considered without reference to the software running on it, considered without reference to student attitudes and interests, does not positively impact an education.

Stated thus, the conclusion is not surprising, nor even wrong. It is like saying that, without the Earth, the Moon orbits the Sun. But it ignores the much more complex reality.

Unfortunately, such fine distinctions are missed in the reporing of results. Hence we read, "computers don't help people learn" and "computers make people dumb." even flawed and skewed as it is, the study reaches no such conclusion; and when the biases are taken into account, it is hard to draw any conclusions at all from the study.

The population as a whole - let alone legislators - is ill served by such studies and such reporting. It is indeed hard not to conclude that the conduct of such research is intended, not to assist, but to skew public understanding of such complex subjects. Insofar as it is the purpose of the press to correct misunderstandings in the public mind (and one wonders these days) a more thorough and critical analysis of such work would be strongly recommended.

Moncton, November 30, 2004

2004 In The Rear View Mirror

Astrologers, I think, should be required to review the predictions they made yesterday before being allowed to cast a forecast for today. This very reasonable test of credibility would, unfortunately, lead to there being very few astrologers. But at least we could count on the remainder as being either very good or very lucky.

The same, more seriously, should be required of those pundits who presume to predict the future. This time of year, the predictions are set out for all to read. I have not traditionally provided a year-over-year forecast, as the long-term trends I observe are subject to a wide variety of local phenomena. Predicting the widespread emphasis on security was pretty easy at the start of 2002; less so at the start of 2001. But despite the pervasiveness of this trend, it is an eddy - it seems to consume all, but is irrelevant to the eventual flow of the river.

Even so, something piqued me last year and I came out with 2004: The Turning Point[166], a foolhardy foray into short-term prediction. One unforeseen consequence has been the requests for another this year. I cannot say whether I will be moved to prognosticate at length some time between now and the same date next month; readers may have to be satisfied with the (edited) words I send to eLearn Magazine[167].

Be that as it may, I am not thereby released from the obligation to provide some accounting for the predictions last year (and indeed, another unforeseen consequence of this past year was the number of people writing to me demanding that I admit to my errors and perform some public act of atonement (critics who, in the main, did not write back when I asked for details)). Like it or not, though, they had a point: I say a lot of things, and some of them might not be true. And people rely on my projections, perhaps not so much as they rely on astrologers, but enough all the same.

So how did I do? Let's look at the article.

I wrote,

> One way or another, the deluge of spam will be resolved in the near future. The most likely outcome is that the email protocol will be replaced with a more restrictive system in which the sender's address, if not identity, will be authenticated. Kill one spam message and all subsequent email from that sender will be blocked.

Well, I do see fewer spam messages in my inbox, and I get the sense that this is true of many other people as well, not because of some system of authentication but because of the increasing use of spam filters in corporate and ISP mail services. There was a concerted effort[168] to create the authentication

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[166] http://www.downes.ca/cgi-bin/website/view.cgi?dbs=Article&key=1072826566
[167] http://www.elearnmag.org/
[168] http://news.com.com/2100-1032_3-5215381.html?tag=nefd.hed

system I projected, however it fell apart[169] at the eleventh hour over licensing issues. We also saw the launch of services like SxIP[170]. Not sure if I get a cigar for this one; I expect that the prediction will come true eventually, but that many lawyers will get rich in the interim.

I also wrote,

> In the interim, much heat (and little light) will be generated surrounding anti-spam legislation. It will become apparent that the legislation passed has been, in essence, the legalization of spam.

Full points for this one; the complaints[171] began ringing out within weeks of the legislation coming into force, and the phrase "legalization of spam" now results in more than 10,000 hits on Google[172].

More:

> Based on this, it will not be surprising to see marketing agencies take to the courts to block the deployment of authenticated email, on the grounds that it makes their now legal mass mailings unprofitable.

There were court cases against anti-spam legislation[173], which is basically what I meant by that comment. But hey, I don't need to settle for 'close' here. I nailed it[174] dead on.

From spam I shifted my attention to community:

> The evolution of email will have as an unexpected consequence a resurgence in the widespread search for community on the internet. Historically, the most popular applications have always been those where people could share their thoughts in groups. Usenet dominated the early days of the net, email and mailing lists the nineties, web based discussion boards the last decade. Because community forums have been so corrupted by commercial content, people have found themselves cut off from their communities.

This phenomenon has emerged largely unremarked (I haven't seen a reference anywhere). But I have a sense that people, if they think about it, will discover that they haven't been reading their email so diligently nor visiting the online discussions so frequently.

I still can't find any quotes - but this is my own observation. Traffic on the mailing lists seems lighter - not so much in volume, because places like DEOS and others have become a haven for conference announcements, calls for papers, and other assorted palaver. Subscriptions to my newsletter via RSS on

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[169] http://www.macuser.co.uk/macuser/news/63756/email-authentication-project-founders-on-a-microsoft-dispute.html
[170] http://www.sxip.com/
[171] http://www.spamhaus.org/news.lasso?article=12
[172] http://www.google.ca/search?q=legalization+of+spam&sourceid=mozilla-search&start=0&start=0&ie=utf-8&oe=utf-8&client=firefox-a&rls=org.mozilla:en-US:official
[173] http://www.nctimes.com/articles/2004/12/16/special_reports/science_technology/18_17_2012_14_04.txt
[174] http://www.pcworld.com/news/article/0,aid,110400,00.asp

Bloglines[175] have gone from none to 300 in the last year. But you'll have to make this call yourself - is email as compelling as it was this time last year?

I think I was right about the community aspect - people have been abandoning email as their means of expression. But they have turned to their blogs, and blogs have become much more of a community phenomenon that I would have reported this time last year.

I continued,

> One answer, of course, is the blog. The rise of half a million personal journals in just a couple of years shows, if nothing else, a yearning to communicate. But blogging has already peaked, and over the next year we will see more signs of its regression. Despite blogrolls, comment forms, trackbacks and more (all of which are showing early signs of spam pollution), blogging is essentially an individual activity, not a participation in a group.

Peaked? At half a million? With Technorati and others reporting more than four million blogs, with 2004 being widely regarded as the year of the blog, I think maybe I called a peak before it happened.

But I still think there is an important sense in which I was right - for the early adopters. Will Richardson, for example, expressing angst I reported in my paper Educational Blogging[176]. The slowing down and in some cases cessation of certain blogs altogether. What I failed to do is look beyond my own community. All else being equal, there's no reason to expect blogging to collapse in 2005. But all else, of course, is rarely equal. It's *hard* to maintain a blog. There will be a peak.

More:

> This mass of people will be cast adrift once again, searching for a way to form a group. There won't be a single magic bullet application that meets this need. But a suite of tools, ensuring bloggers not only the capacity to write, but also the chance to be heard, will begin to evolve through the new year. Part of this will have to do with the email redux, which will allow readers to select their sources. The other part will have to do with effective personalization.

The mass of people were, indeed, cast adrift. Orkut[177] was a hit - for a couple of months. Flickr[178] - about which, more below - became a phenomenon. RSS hit the mainstream hard. The wiki[179] attracted mainstream attention, with Wikipedia[180] making headline news. But though desperate for community, people never really found it.

There was personalization - in Orkut, in Bloglines - but nothing people really wanted. The best, and only, place to express yourself is your blog.

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[175] http://www.pcworld.com/news/article/0,aid,110400,00.asp
[176] http://www.educause.edu/pub/er/erm04/erm0450.asp
[177] http://www.orkut.com/
[178] http://www.flickr.com/
[179] http://www.educause.edu/pub/er/erm04/erm0452.asp
[180] http://www.publicradio.org/columns/futuretense/2004/12/06.shtml

We haven't seen the end of this story. Change is so slow sometimes.

So what else then?

One tenth of one percent of the people write publicly. Well, OK, I can't validate this figure, but it has been a rule of thumb for me for about a decade. If you have a thousand readers on your website, one person will post regularly to the discussion board. If you have a thousand mailing list subscribers, one person will post the bulk of the messages. If you have a thousand internet users, one person will create (and maintain) a blog (people may observe that two percent of internet users currently blog, but I see this as an indication of the scale of the coming shrinkage of the blog community).

A billion people on the web means a million blogs. I still think it will stabilize around that number. Within an order of magnitude, anyway.

Most people, therefore, will not write, thus robbing the internet community of a valuable resource. The views and opinions of these people constitute font of information. We have only been able to capture that information indirectly: we track the number of hits on a web page, we track individual browsers with cookies and web bugs. Tools like the Google bar and Alexa try to capture and report personal internet usage.

Right now, spyware has a bad reputation, and deservedly so, as the results disappear into some corporate vault, only to later haunt you in the form of vaguely targeted spam. But if the results didn't disappear? What if you could control these results, wearing different profiles for different browsing routines, clicking on an evaluation as you read, adding a comment or annotation if you felt like it, capturing and collecting your own personal library as you went along? Not a blog, because a blog is about writing, but a way of communicating what you think is important.

Or Blogdex[181] or Daypop[182]. There were some 'rate as you go' services launched that flew mostly below the radar. Scott Mitchell's content rater[183], for example. And a few others. Also, sites like Furl[184] and Delicious[185] continue to evidence this trend. This prediction was correct - it just didn't make the front pages. Stay tuned.

The early indications are already out there, and in the next twelve months we should be watching for some form of non-blog blogging to emerge.

I suppose if I had said the word 'podcast' here i would have been seen as a genius. Failure of imagination. But see, how tantalizingly close I was?

I'm not sure I even want to read the section on personalization...

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[181] http://www.blogdex.net/
[182] http://www.daypop.com/blogrank/
[183] http://aspnet.4guysfromrolla.com/articles/042104-1.aspx
[184] http://www.furl.com/
[185] http://www.del.icio.us/

> 2004 could be the year personalization of the web finally succeeds (it will definitely make a mark, but it could be a few years before it reaches the mainstream). By combining the information provided by non-blog blogging with tailored feeds drawing resources from hundreds or thousands of sources, readers will be able to be presented exactly what they want. Into this same environment will be piped whatever replaces email, so that all a person's essential web reading (and very little non-essential web reading) will be available through a single application.

Well, you have to look to find this. But it's there, in nascent form, in services like Blogdigger[186]. Personally, 2004 was the year people took notice of Edu_RSS[187]. But - still no single appliance, still no mass personalization.

This isn't, of course, personalization the way it was pushed in the late 90s, where the idea was that advertisers would be able to push exactly the content you wanted - or they wanted (this was never clear). It's something very different, and commercialization will be a greater challenge - but offer, when it finally succeeds, much greater payoff.

I still think this is true. We might be only weeks away - or maybe years.

Now onto learning objects...

> Much has been made, in some circles at least, of the potential of learning objects. Vast sums of money have been spent on learning management systems that emulate the functionality of those great (and now extinct) e-commerce systems of the nineties. The next result has been e-learning largely regarded as irrelevant and boring, and while it may be true that students in an authoritarian environment may be forced to learn this way, there is no great enthusiasm, at least, not after the initial pleasure of escaping even more boring lectures has worn off.

For all that, learning objects will come to the fore in 2004 or shortly thereafter, but not as cogs in a centrally packaged learning design. Learning objects - or, as some will start calling them, learning resources - will begin to reach their potential outside the mainstream. When people who use informal learning - as much as 90 percent of learning, according to some estimates - the demand, and therefore the production, of learning objects will increase dramatically.

Just as I said, outside the mainstream. They're there, but you have to know where to look. EdNA Online passes 1.6M milestone[188]. Oracle and Microsoft have about a million tagged objects[189], Cisco 1.4 million. This is the tip of the iceberg - and with informal learning hitting its stride - see here[190] and here[191] it seems as though there is definitely something afoot. I'm calling this one a hit.

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[186] http://www.blogdigger.com/
[187] http://www.downes.ca/xml/edu_rss.htm
[188] http://www.edna.edu.au/edna/go/cache/offonce/pid/3715;jsessionid=396D62177A1D367092BD9B0C57ECB6EE
[189] http://standards.edna.edu.au/idea/dan_rehak.pdf
[190] http://www.lsda.org.uk/files/pdf/1685.pdf

> Much to the displeasure of those who invested in such content technologies, the vast majority of learning resources will be free...

This could be true, but I sure couldn't prove it. One thing for sure: there's a lot of commercial content out there (or 'in there' because it's mostly locked from view). The alternative? Well, we need many more repositories like this[192] - and they're out there too, but scattered.

> ...and the internet will be an increasingly viable alternative to a traditional education.

Pretty easy prediction, and pretty correct.

> Good thing, because funding patterns for traditional education will not change: tuitions will rise, classes will be cut, and the minute independent certification becomes widespread (could be 2004, but probably later) the educational system will enter a full scale crisis from which it will not recover.

Funding patterns did not change[193], things got a bit tighter, and independent certification didn't happen.

My prediction for the next hype was simulations. I may have been too early:

> Simulations, therefore, will be hyped like crazy for the next couple of years - just long enough to the aforementioned 16 year old to get his hands on sophisticated simulation authoring tools and, with his enthusiasm, imagination and lack of restraint, put the content publishers to shame.

There was some good stuff on simulation out there this year - things like the Virtual Trader[194] and Aldrich's six criteria[195], some other examples[196] - all the ingredients are there for a hyper-meme, it just hasn't hit yet. It will. I've got another year on this one.

I then turned my attention to open content, calling it the defining issue of 2004. Was it? If not, close.

> The defining issue of 2004 will be open content, and more importantly, the launch of the most aggressive attacks yet on the emergence of open content. The real threat facing the content industry (and this includes music, video, text, software and education) is not content piracy, it is the availability of high quality free content being distributed in competition with the commercial product.

This prediction was dead on. Stupid lawsuits continued unabated.[197] [198] Microsoft claimed ownership of key internet protocols[199]. And claimed that open source violates more than 200 patents[200]. Real Media

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[191] http://www.infed.org/archives/e-texts/colley_informal_learning.htm
[192] http://flickr.com/creativecommons/
[193] http://www.economist.co.uk/world/europe/displayStory.cfm?story_id=2388831
[194] http://www.economist.co.uk/world/europe/displayStory.cfm?story_id=2388831
[195] http://www.listserv.uga.edu/cgi-bin/wa?A2=ind0410&L=itforum&P=R16172
[196] http://itdl.org/Journal/Oct_04/article02.htm
[197] http://news.com.com/Amazon+sued+over+book+recommendations/2100-1030_3-5439238.html?part=rss&tag=5439238&subj=news.1030.5

and Apple fought over music formats[201]. Swap-blocking systems became pervasive[202]. The ContentGuard[203] saga continued. Even open WiFi took a hit[204].

I continued:

> The best evidence of this is in the news media, mostly because newspapers offer the most technically low-end product. Even newspapers that are not being pirated on the web (and that's most of them) are suffering from the impact of online competition. MIT's Open CourseWare project instantly vaporized dozens of business plans. Wikipedia has more readers - and, these days, more clout - than Britannica. Linux is being seen more widely as an alternative to Windows. Open access journals are forcing publishers to retrench. The list goes on.

And probably the best example of this is Firefox, which pushed Internet Explorer below 90 percent in years and amassed more than 10 million downloads[205] in its first month. Thunderbird, the open source email client, hit one million downloads today[206]. The saga of Encyclopedia Britannia is self-evident[207]. In the news media, columnist Dan Gillmor had a big hit with his book We the Media[208] - written online in a wiki and about the rise of citizen journalism - and then quit the newspaper[209] to start a venture-backed citizen journalism project.

> The attack on open content is intended to drive it from the marketplace. Part of this is legislative - with a widening copyright and patent regime, some open content is simply being declared illegal (which is why we see corporate support for even the most absurd patents). Part of this is promotional - a system-wide advertising campaign aimed at executives is stressing the risks of open content, both in terms of legality and reliability. And part of this is strategic - corporate alliances are forming to create closed content markets on the desktop, for example.

We saw examples of all three types of attack in 2004 - and I expect the intensity to increase in 2005.

> This is a last desperate gasp before the bottom falls out of the content industry completely. Wise investors are already noting the acquisitions of publishers and music labels. Content is well

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[198] http://news.com.com/Kodak+wins+Java+patent+suit/2100-1014_3-5394765.html?part=rss&tag=5394765&subj=news.1014.5
[199] http://www.eweek.com/article2/0,1759,1714680,00.asp
[200] http://www.eweek.com/print_article2/0,2533,a=139669,00.asp
[201] http://news.com.com/2100-1025_3-5177914.html?tag=nefd_top
[202] http://news.com.com/Swap-blockers+graduate+to+high+schools/2100-1027_3-5233272.html?part=rss&tag=5233272&subj=news.1027.5
[203] http://www.dmeurope.com/default.asp?ArticleID=4577
[204] http://news.com.com/College+backs+off+Wi-Fi+ban/2100-7351_3-5369921.html?part=rss&tag=5369921&subj=news.7351.5
[205] http://www.spreadfirefox.com/
[206] http://www.spreadfirefox.com/?q=node/view/8864
[207] http://radio.weblogs.com/0110772/2004/12/17.html#a1668
[208] http://wethemedia.oreilly.com/
[209] http://english.ohmynews.com/ArticleView/article_view.asp?menu=A11100&no=201088&rel_no=1&back_url=

> on its way to being a value-add, something that you might attach to a product, but not something that is the product. Apple uses music to sell iPods, not iPods to sell music.

I covered a variety of instances of this over the year - content being used to sell hamburgers[210], for example. The rise of non-commercial internet radio is just beginning. Stay tuned to this one.

Finally, I thought IP communications would be big.

> Finally, a little out of left field, comes another revolution sweeping the web: IP communications. This may sound odd, as the internet just is IP (Internet Protocol) communication, but in fact we have been using alternative systems - such as the telephone, television, and even the post office - much more frequently. That's all about to change.

The biggest fuss will be made about voice over IP (VOIP), but this is just one aspect of the consolidation of communications technologies. Television - especially live television, such as sports coverage - is on the verge of being replaced (and just in time, too, as systems like TiVo kill the advertising market). 2004 is the hype year for this technology - 2005 is the year consumers rebel, as they realize they are bing charged analog prices for digital technologies, and that cheaper (or free) alternatives are available.

There was hype[211], and more hype[212], though not as much as I thought. There was adoption. The next couple of years will be big. I also noticed that this year I did more live online presentations than in years past. Net*Working 2004 was almost entirely in the form of live online presentations - which didn't really work for me.

> The dark horse in all of this is the resurgence of videoconferencing. The old, unreliable (and expensive) systems will be phased out over the next few years in favour of IP videoconferencing. Combine this with large flat screen displays (still too expensive to justify the hype they will get, but looming large in the corporate market) and you have a much more compelling experience than you can imagine.

Well, it's still a dark horse. But if you look a little bit below the radar - it's there[213].

So to wrap up...

> 2004 will be looked on as the year in which everything changed, but nothing changed. We will cross some significant barriers in 2004, but the changes that emerge from this turbulent, uncertain year will take several more years to mature. When we look back, we will see that 2004 was a lot like, say, 1996 - the new infrastructure will be in place, but the massive discovery will not yet have taken hold, and the sceptics more often than not will appear to be holding the ground. Don't be fooled by this.

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[210] http://news.com.com/2100-1023_3-5177324.html
[211] http://www2.vnunet.com/Specials/1155880
[212] http://www2.vnunet.com/News/1159600
[213] it's there

So, was it? In a word - yes.

So many barriers were crossed - alternatives to email, the rise of online community, personalized services, the attack on open source, and at the same time, the movement's first real inroads, massive production of learning resources, simulations, voice over the internet... there were significant advances in each of these areas, and while from the outside everything still looks pretty much the same, the foundations have shifted. 2004 was indeed a turning point.

And my predictions? Well I missed the mark here and there, mostly in terms of quantity rather than trend. But more importantly, I think, I had my finger on all the areas where the action was in 2004. Even if things came out a little bit differently than I thought, it seems pretty clear to me that I was looking in the right place, and calling pretty much the right trends. So, yeah, I feel pretty vindicated by 2004. And - if I may be bolder still - 2005 will show just how right some of these predictions were.

Moncton, December 18, 2004

The Fate of eduSource

Scott Leslie writes of the PLANET Digital Repository[214]: On the surface just another repository project, but of interest to me because it is a current project from outside of Canada that seems to have picked up the Edusource Communications Layer (ECL)[215] developed by Marek Hatala and others as part of the Edusource project. This is the second piece of information I've had in as many weeks that Edusource isn't maybe as moribund as its original website would lead one to believe[216]. I guess some of the action has moved on to this eRIB site[217] and to this eduSource[218] Registry of Services, but still, it seems pretty unclear to me what in fact is still going on. Would love to know, though."

When funding for eduSource ended, it sort of devolved to the institutions that were a part of it. But four of the major partners (Netera Alliance, New Media Innovation Centre, TéléEducation NB and Télé-Université) were closed, cut back or merged with other institutions. Waterloo was always more interested in CLOE[219] and MERLOT[220]. Waterloo's Tom Carey and Doug MacLeod have somehow become the sole representatives to discussions surrounding a nascent project called GLOBE[221], which is intended to be an international federated search network and is having meetings in Japan. Three of the partners, along with some other universities (Télé-université, the University of Waterloo and Simon Fraser University (which is where New Media Innovation Centre ended up)), obtained a $7.5 million NSERC grant[222] to create LORNet.[223] This has allowed Télé-université (which is being merged with UQAM) to maintain the eduSource software site.

Various individual projects continue, the most notable of these being the Campus Alberta Repository of Educational Objects (CAREO[224])- follow this project by reading D'Arcy Norman[225] at Calgary's Learning Commons. CanCore[226] continues under the steady hand of Norm Friesen at Athabasca University. Here on the east coast, Moncton's IDITAE[227] continues development of some eduSource related projects

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[214] http://ants.etse.urv.es/planetdr/
[215] http://209.87.57.212/technical/ecl/index.html
[216] http://www.edusource.ca/english/home_eng.html
[217] http://edusource.licef.teluq.uquebec.ca/ese/en/index.jsp
[218] http://edusource.licef.teluq.uquebec.ca/ers/en/index.jsp
[219] http://cloe.on.ca/
[220] http://www.merlot.org/
[221] http://rubens.cs.kuleuven.ac.be:8989/mt/blogs/ErikLog/archives/000665.html
[222] http://www.nserc.ca/news/2003/p031016.htm
[223] http://www.lornet.org/eng/themes.htm
[224] http://www.downes.ca/post/15
[225] http://www.darcynorman.net/
[226] http://www.cancore.ca/
[227] http://eformation.umoncton.ca/templates/eformation/accueil.cfm?CFID=41077&CFTOKEN=19756826&user_id=832&page=24961&template=125&resultat=0&order_num=&mot_recherche=&write=0&student_id=0&debut=0&curr_page=1

while at the NRC work on the digital rights management[228] component continues (I hold out no real hope though that it will ever be a part of eduSource proper, since the model is for a distributed system while eduSource - despite much verbiage to the contrary - became a centralized federated system). DLORN[229] was also supposed to be part of the eduSource network, and would allow the harvesting model to be a part of the model, but it was never added - and thus you see the inherent weakness of the federated model, where the network itself becomes a means of control.

I suppose I am still involved with eduSource, but as it is being pushed more and more toward the closed, commercial, exclusive and centralized federated model I have less and less use for it. Who cares if a few universities exchange learning content among themselves (not that this really happens a lot anyway)? What's this doing for the people who actually pay for these projects? Why do the same people get funded over and over again to produce essentially the same network, a network that never seems to extend beyond their own offices? Why is Industry Canada supporting ELF[230], which looks like another instance of the same phenomenon?

My time with eduSource was essentially a two-year long series of arguments where I pushed for an open, distributed and accessible system of learning resources. Time and time I heard arguments about how commercial providers required this, how a proprietary piece of software requires that. Many people in these organizations who are genuinely working for an open system. But I don't see eduSource - or GLOBE, or ELF, or LORNET - as working toward that. There is this general and incessant pressure from above to work toward the closed commercial model - I would have buried the last of our work on eduSource long ago were I able to. But I have no interest in this model, and for all practical purposes, have put eduSource behind me.

[228] http://www.downes.ca/dwiki/?id=DDRM
[229] http://www.downes.ca/cgi-bin/dlorn/dlorn.cgi
[230] http://www.jisc.ac.uk/index.cfm?name=elearning_framework