

Digital Libraries and Education Reconsidered

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1 INTRODUCTION

In 2001 I published an article in D-Lib Magazine in which I tried to identify trends in education and the opportunities these trends might offer to libraries wishing to pursue a more active role in educational innovation [Roes, 2001]. This paper, to be presented at the 2005 International Ticer School, looks back at the 2001 D-Lib article and developments in the past four years, reconsidering the trends and opportunities in the light of what the booming literature in this area teaches us.

As in 2001, the analysis starts with the changing world of education. Main conclusion here is that, although developments are going at a much slower rate than expected, the changes in the world of education still call for strategic attention by librarians. The need for adapting to changes becomes even more apparent, when we look at major trends in the world of today's students, the Net Generation. Next the five strategic areas identified in the 2001 article are re-examined and brought up to date. The integration of digital libraries and digital learning environments has attracted a lot of interest in the past four years, but proves to be a difficult challenge. Digital portfolios have not taken off as expected in 2001. Information literacy has not diminished in importance. Working together with faculty and students in educational innovation is still a major challenge for many librarians. Learning spaces have gotten a lot of attention in the past four years, but libraries are now competing with other spaces on campus. The paper concludes with a recommendation to disintegrate the digital library and to integrate the library buildings more closely into campus life.

2 THE (SLOWLY) CHANGING WORLD OF EDUCATION

Based on an analysis by [Twigg and Miloff, 1998] learning environments of the future were, in the 2001 article, envisaged as

- student-centred,
- interactive and dynamic,
- enabling group work on real world problems,
- enabling students to determine their own learning routes,
- emphasizing competencies like information literacy to support lifelong learning.

Although this vision is certainly still valid, the mentioned elements recur in the literature on educational innovation and e-learning, one can now conclude that the educational innovation process is a slow going one.

Moreover, there is a growing critique of the role that information and communication technologies (ICT) are playing in education. [Cuban, 2001], for instance, is outright sceptical about the impact of ICT, when he states that: "When teachers adopt technological innovation, these changes typically maintain rather than alter existing classroom practices." If this sounds deadly, listen to [Oppenheimer, 2003] who goes way beyond Cuban when he argues that computers have done far more harm than good to education. In his words: "[In] the realm of education, technology is like a vine – it's gorgeous at first bloom, but quickly overgrows, gradually altering and choking its surroundings." One might say that the debate on the merits of e-learning and educational innovation has, in a sense, matured. I think that there is more to learn from reading critical works than from literature that only praises the new.

To be sure, there is hard evidence to be sceptical. There are a growing number of studies (for example a meta-study for medical schools [Chumley-Jones et al. 2002]) that research the effects of educational innovation like web-based learning, and find no evidence for a better outcome in terms of students' achievements. In the literature this lack of effect has been dubbed the "no significant difference" phenomenon. E-learning doesn't do a better or (fortunately) worse job than traditional education [Twigg, 2001]. The main explanation for this phenomenon seems to be that e-learning is added to otherwise traditional forms of education (cf. [Cuban, 2001]). Real effects seem to occur where there is a significant redesign of curricula [Twigg, 2003]. Twigg notes that, in the current model, teachers have a great deal of freedom in designing education, but the results are almost always standard products for students – read a book, make an assignment, do an assessment. What is needed, in Twigg's view, is a paradigm shift.

According to [Twigg, 2003] this paradigm shift in educational design, would imply that teachers' work is standardized in order to create a highly personalised experience for students. Not the teacher's expertise is put online, but the teacher's expertise is used to determine learning outcomes. Together with other experts, applications are then built that help students, in their own unique ways, to realise educational outcomes. An environment, rich with resources, is created in which students learn to find information in order to reach their learning goals. Rich learning environments do not just contain texts, but offer also interaction, games and simulations. Support is available on a 24 / 7 basis, and students are not limited to a traditional semester model in which unnecessary delays often lead to increasingly fragmented study programs. Furthermore, the learning-ware is constantly monitored and evaluated in order to constantly improve students' learning experiences. Because this is a true paradigm shift, it is no surprise that only a limited number of institutions have gone this way, yet. The institutions that have, and [Twigg, 2003] reports a number of cases, have made a significant difference in learning outcomes while delivering this new education in a cost-effective way.

The most important conclusion in this section is that while education is slowly changing, it certainly is changing. Moreover the changes in education are still going in the direction expected four years ago. Because the support of educational processes is a basic task of libraries, libraries need to keep on reflecting on these changes and need to find ways to adapt to changing circumstances.

3 LIBRARIES AND STUDENTS: GENERAL TRENDS

While education is slowly changing, there are other trends developing in the world of our students. Three trends listed by [Trendwatching.com] appear to be of particular interest when thinking about learning and libraries:

- “[D]emanding consumers are in a constant 'Ready To Go, READY-TO-KNOW' state of mind, expecting any information deemed relevant to be available instantly, at their own terms.”
- “[N]ew consumers, who create their own playgrounds, their own comfort zones, their own universe. It's the 'empowered' and 'better informed' and 'switched on' consumer combined into something profound, something [...] dubbed MASTER OF THE YOUNIVERSE.”
- “BEING SPACES: commercial living-room-like settings, where catering and entertainment aren't just the main attraction, but are there to facilitate small office/living room activities like watching a movie, reading a book, meeting friends and colleagues, or doing your admin.”

These three trends together mean that students are always on the look out for information, albeit in a way that might differ from what libraries have to offer. They are also looking for highly personalised experiences, which might be different from the more standard services that libraries have to offer. Finally, there is a need for space which is far more flexible than the traditional library building has to offer.

Libraries are trying to accommodate to a new generation of students, sometimes called Net Generation or, short, Net Gen. How well libraries are doing this is not clear, and obviously some are doing a better job at it than others. Based on [Lippincott, 2004] a comparison can be made of characteristics of Net Gen students and the library environment:

Net Gen students	Library environment
accustomed to multimedia environments	text-based
figuring things out for themselves	learning the system from experts
working in groups	constructed for individual use
multitasking	work progresses in logical, linear fashion

This is, of course, an exaggeration. Libraries are not just text-based, look for instance at the e-learning projects of the British library based on (sometimes large) digitization projects. Materials included are not just text, but sound and (still and moving) images as well. These resources are than organised and presented to support resource based e-learning at many educational levels. Take a look at www.bl.uk/learning [Brindley, 2005].

Another example of libraries moving towards multimedia is the JISC Digital Libraries in the Classroom Programme, a program jointly with the US NSF, which runs from 2003 to 2008. The title is not what you might expect. In fact, all the five projects aim at developing new digital collections – audio, ethnographies, geographical information systems and design engineering [JISC, undated]. All of these projects are concerned with materials not present in what librarians usually call digital libraries, which still concentrate mostly on substitution of

journals, and, to a lesser extent, books. The recently announced projects by Google and a European consortium of national libraries might change the situation with respect to books, although there are some difficult intellectual property right issues to be expected.

Also, as we will see below, libraries are successfully creating new spaces to accommodate student group work.

Although not everything is as black and white as in Lippincott's comparison of Net Gen students and libraries, her main message is clear though. There is a gap between libraries and Net Gen students that should be a cause for concern for librarians.

Back to [Lippincott, 2004] who goes on to speak of major disconnects between libraries and Net Gen students.

- Students depend on Google rather than consulting library web pages, catalogues, databases.
- Digital library resources often reside outside the environment that is the digital home of student's coursework (the digital learning environment).
- Library services are often presented in the library organization context rather than in a user-centred mode.
- Libraries emphasize access to information but do not support student creation of new information products.

These are all valid points in my opinion. There seems to be a growing awareness in the library world of these disconnects. For instance OCLC noted that “[t]he content “behaviours” of young people—both students and faculty—have changed a great deal, and the institutions supporting their research and learning for the most part have not changed to accommodate the newer members of this community. Some have.” [OCLC, 2004]. Perhaps [Chudnov et. al., 2005] put it most concisely:

“A wide gap remains [...] between ‘cool’ new applications (photo sharing, link logging, web logging) and library services.”

So while there is recognition of a gap between libraries and young people, we might conclude that this gap is not anywhere near closing. The main point here is that the library is, more often than not, simply not present in the digital world inhabited by Net Gen students. In this world they switch seamlessly between services like Google, Amazon, iTunes, chat, blogs, learning environments, etcetera, and devices, computers wherever they can have access, mobile phones and PDAs. The library and its system (or rather multiple, loosely integrated systems, as we will see) are very peripheral to this world.

Now that is a challenge for libraries and librarians, and the challenge seems to have become more profound since 2001. At the same time, one can conclude that the number of publications in this area has risen, so there is now definitely more attention for the role libraries can play in educational innovation.

4 FIVE STRATEGIC AREAS REVISITED

In 2001, I identified five strategic areas to offer a framework for libraries wanting to be more responsive to changes in education. These five areas were

- digital libraries and digital learning environments,
- digital portfolios,
- information literacy,
- collaborative course design, and
- relation between physical and virtual learning environments.

I still think this grouping of issues is relevant, although my analysis in 2001 of the opportunities these five areas offer for developing library strategies might, in hindsight, have been a bit simplistic. Also, some areas have shown more activity and analysis in the literature than others. Let's walk by the five areas and see what has happened over the past four years.

4.1 DIGITAL LIBRARIES AND DIGITAL LEARNING ENVIRONMENTS

The integration of DLs and DLEs, natural complements I called them, has proven to be much, much more difficult than I envisaged in my analysis in 2001. A good deal of work has been done on collection level – ever more resources are becoming available electronically, the pace even seems to accelerate. At the same time, libraries have put great efforts in making collections of Internet resources searchable and accessible, either on a national level (like RDN, UK's Resource Discovery Network - <http://www.rdn.ac.uk/> - which catalogues a wealth of internet resources), or on a course level, by putting links to library resources in the DLE. The problem is much deeper though, as can be seen from practical work in the UK and conceptual work in the USA and Australia.

In a literature study for the JISC LinkER programme, which evaluated the JISC program 'Linking Digital Libraries with Virtual Libraries', [Markland and Brophy, 2003] see the following emerging trends with regard to the integration of DLs and DLEs.

- The initiative for cooperation in the field of DLs and DLEs is almost always taken by the library, much less so by teachers.
- Successful projects depend on high-level management support, which is more often than not lacking.
- Successful projects also seem to depend highly on cooperation between different departments within institutions.

This in line with my general impression in 2001, as is the case with educational innovation, progress here is also slow. More interesting are the lessons drawn from the nine projects in the LinkER programme. [Markland, Brophy and Jones, 2003] and [Brophy, Markland and Jones, 2003] mention the following.

- Technical problems in accessing learning environments from outside the institution are not uncommon.
- Library staff and teachers do not understand each other.

- In many cases it is not clear who is responsible for the maintenance of metadata.
- More generally, organisational responsibilities and structures are reconsidered.
- Teachers prefer Google when hunting for links to put in courses in DLEs, rather than use RDN.
- There is no mapping between library standards (e.g. MARC, Dublin Core) and developing standards in the world of DLEs (e.g. LOM and SCORM).
- OpenURLs seem the most trivial solution for deep linking from DLEs to DLs.
- Access management (authentication and authorisation) to third party content is not trivial.
- DRM – digital rights management, a technological approach towards intellectual property protection - issues are not clear.
- There is a tension between quick and dirty solutions and a more structural approach.

So, where libraries are trying to make the most of their exorbitantly priced digital resources by attempting to deliver them in the DLE, a lot of trivial and non-trivial problems arise. This calls for a more conceptual approach. Such an approach is offered by [Lynch and McLean, 2003]. They begin by asking the simple question why it is so difficult to integrate DLs and DLEs? They offer a number of explanations.

- DLs and DLEs are both complex environments which develop both fast and independently.
- There are a lot of stakeholders involved, cultural and political issues, even distrust, abound.
- There is a tension between short term quick fixes and longer term open systems solutions.
- There is a lot of confusion in terminology, look for instance at what happened to the term repository, it has become (literally!) a container term.
- There is lots of ignorance about each others worlds.
- In the world of DLEs, IMS – Instructional Management Systems, a global consortium developing specifications for DLEs and related technology (see <http://www.imsglobal.org/>) is an accepted standards effort. There is no such equivalent in the world of DLs.
- There is no consensus in the digital library world on an underlying reference architecture.

A more fundamental problem is that digital libraries themselves are far from ready yet, a point I also made in my 2001 article. There is not one digital library system; in effect it is composed of many different systems, from many different vendors that we try to integrate through systems like Metalib SFX, which more often than not doesn't work. Teachers and students are bedazzled when they are confronted with the many different resources the library has to offer, even on subject specific pages.

[Lynch and McLean, 2003] also point to a deeper lying problem within institutions: there are a lot of legacy systems which in effect are data silos that don't work together because there is no overarching service architecture. Within such architecture, common problems like access management, digital rights management (DRM) and content management should be shared functions in both DLs and DLEs, as well as other administrative systems. Compare this with

an observation made by Robert Martin, Director of the Institute of Museum and Library Services [Martin 2004]:

“Networked digital information technology has simply lifted the veil that has obscured the basic fact that the silos into which libraries, museums, archives, broadcasters, and other developers and purveyors of learning resources and opportunities have been relegated are ghettos of our own making.”

These ideas correspond with [Dempsey, 2003] who pleads for an unbundling of library services which are then delivered within a portal environment at the point of need of researchers, teachers and students. Similar ideas can be found in Eric Lease Morgan’s Top Technology Trends 2005 [Morgan, 2005]:

- “Expect the component parts of integrated library systems to be parsed out as individual Web Services. Expect the functions of things like dictionaries, thesauri, and encyclopaedias to be disseminated using Web Service techniques and combined into new and innovate interfaces usable in many environments and available on many computing devices.”
- “You can decreasingly expect people to come to your website for content. Instead, explore ways to integrate your content and services into the working environments of you patrons. Playing a role in institution-wide portal applications is one example.”
- “Customization is not going away, and gathering personal information is not necessary for personalization. GoogleNews and Yahoo News are expect [sic] examples. At the same time, more and more you see things like Remember Me buttons on commercial sites while logging on. For the most part things like People Like You Also Used and You Might Also Be Interested In are appreciated services. These functions make content providers “sticky.” Balance your professional values for patron privacy with the usability of your Web presence. Strive to create the best mix of professionalism and user expectations.”

This might all sound very negative (it’s not, it just implies a lot of work), so before I conclude this section, I should also point to some interesting new approaches. One such a new approach is project Silkworm by Talis, a UK library systems vendor. Project Silkworm aims to open up the closed silos that today’s library systems are and to make the user experience and interaction with libraries more akin to the experience that users have with systems like Amazon and Google.

One idea (and there are lots of ideas in their paper) Talis would like to pursue is that users can add reviews to an OPAC record, much like buyers can publish reviews in Amazon. Lorcan Dempsey announced a similar, interesting experiment with OCLC’s Worldcat in his web log on 29 May 2005 [Dempsey, 2005]. Their idea is to use a wiki – in essence a web platform for collaborative editing - to enhance bibliographic records with user input, like reviews, comments, cover art.

Other libraries are working together with Google to enhance user experiences. Indeed, why fear Google when you can work together with them? In May 2005 more than a 100 colleges and universities made arrangements with Google so that when their users search in GoogleScholar, they find direct links to the full text of articles, or even the location of a

printed copy of an article on the shelf [Young, 2005]. Another interesting example is of course the already mentioned GooglePrint project that strives to digitize millions of books from prominent academic libraries in the USA and UK.

Finally there is activity on the side of DLE vendors. One example is the Blackboard Content System [Oerter and Everhart, 2004] that promises opportunities for e-portfolio's, reuse of content, and integration of digital library assets. The library's visibility in this solution is greatly diminished; in fact the (digital) library disappears into the DLE. To many libraries, or maybe better: librarians, this seems unattractive and might meet resistance. On the other hand, as Lorcan Dempsey argued in a presentation for the LIBER conference early July 2005 the real issue is how to get the library in the user environment, and NOT how to get the user in the library environment – which has probably been the paradigm in libraries for ages: if you build it (collections, systems...) they will come. Well not any longer, not in the age of – as Dempsey calls it - Amazoogole. There are simply too many other options in the networked environment with much more opportunity for immediate satisfaction than library systems have to offer. The real question for Dempsey is how to connect library services with the workflow, learning flow, teaching flow, research flow etc.

4.2 DIGITAL PORTFOLIOS

Digital portfolios collect a student's work throughout his training and are used as evidence of the student's mastering of skills, as well as a tool for students and teachers to reflect on their progress and to plan their educational activities. Digital portfolios can contain text as well as multimedia.

One of the disconnects [Lippincott, 2004] mentioned was that libraries emphasize access to information but do not support student creation of new information products – a portfolio is a student creation. This is not entirely true. At least in the Netherlands, and I am sure elsewhere too, work is being done on capturing students' theses in institutional repositories.

Also, not related to digital portfolios, but worth mentioning here, the possible use of institutional repositories for storing learning objects – so-called learning object repositories, is being studied. Learning objects can be thought of as resources that can be used and reused in DLEs. A problem here might be that there are, yet, hardly any learning objects to be stored in a repository.

In the literature, the term digital portfolio is frequently used in relation to the integration of DLs and DLEs. Although there have been interesting developments in the use of (digital) portfolios in the Netherlands, their uptake has been much slower than I expected in 2001. This is undoubtedly related to the much slower pace in educational innovation than I expected.

4.3 INFORMATION LITERACY

Information literacy is dealt with elsewhere in the program of the Libraries and Teaching and Learning day of the 2005 International Ticer School, so I only make a few remarks here.

First, the information literacy movement is still strong, especially in the US and UK. The European continent seems to pick up a bit slower. Second, if students' (and probably also faculty's) first resort is to search in Google, than information literacy programs should take this into account (the Texas Information Literacy Tutorial, <http://tilt.lib.utsystem.edu/>, is an example of this). Also keep in mind [Fallows, 2005] who reports that Internet users are very positive about their online search experiences. How many people would say that about searching a library catalogue? To be fair, Fallows adds that Internet searchers are also unaware and naïve. Third, plagiarism - and avoiding plagiarism is an essential competency related to information literacy - is a subject that seems to gain more and more publicity. The vendors of plagiarism detection software in part generate this publicity, but the subject seems here to stay. In the UK for example, universities need to show in the accreditation process that they have an anti-plagiarism policy. An information literacy program seems to me a good opportunity for turning something bad (plagiarism) into something good.

4.4 COLLABORATIVE COURSE DESIGN

We have already seen, when discussing the LinkER project, that librarians and teachers do not seem to understand one another. Working together with faculty and other experts in designing resource rich learning ware was seen as crucial in my 2001 article. [Christiansen et. al, 2004] show that this might, again, be harder than I expected. Both groups, faculty and librarians experience a disconnect (again that word, it is really worrisome) that keeps them separated. However, only librarians experience this disconnect as problematic. Analysis of the factors at work in this disconnect points to sticky issues. These factors are both organizational and cultural. Nevertheless, [Christiansen et. al, 2004] point out that faculty and librarians are mutually dependent and are both necessary to the successful functioning of any academic institution. This might be even more so in the case of e-learning and, more generally, educational innovation.

One might argue that the distance between faculty and librarians has been reinforced by the introduction of digital libraries. Because the library is now mostly on the desktop, there is much less need for faculty to come to the library building than there was, say, 10 years ago. What keeps puzzling me here is that librarians have such a hard time drawing an obvious conclusion. If you move, through digitizing the library, the library experience to the desktop, then it should come as no surprise that faculty will have a much reduced incentive to visit the library building. With the proliferation of wireless networks and notebooks and PDAs the same might soon be the case for students too. If it is more attractive to work (together) in the campus café than in the library, students will go to the campus café. So, which conclusion will you draw? Stay and sit in the quiet library, filled with books that hardly anyone bothers to read anymore? Or go out and try to understand your students and faculty and see where you can help them? And then, of course, there is also the alternative of making your library a more attractive environment. Which brings us to the final strategic opportunity.

4.5 RELATION BETWEEN PHYSICAL AND VIRTUAL LEARNING ENVIRONMENTS

In July 2005, I googled “learning spaces” – 63,700 hits, googled “learning centres” – 503,000 hits, and googled “learning centers” – 925,000 hits. This is just one way to illustrate the importance of a good physical environment in a world where technology is becoming ubiquitous. The real challenge is to connect the physical and virtual.

Introducing group work facilities in libraries has been a major trend in the past years. Terms like learning centres or information commons have become standard. Some libraries even go so far as to make a trade off between spaces for books and spaces for learning [Blumenthal, 2005]. Another trend is that these environments are more often than not available on a 24/7 basis, although service levels are down during the night.

Some interesting trends can be extracted from [Klein, 2005] who gives an overview of some recently built facilities on American campuses.

- Wireless,
- enabling different work and leisure modes,
- group work and individual work,
- students are on campus all day and need an all-in-one solution where they can “hang out, study, eat, check [their] e-mail” meet friends and fellow students,
- students are more and more involved in the design process,
- give students a sense of ownership of their campus,
- living room like with lounge like seating and moveable furniture, and
- flexible use of space.

The July / August 2005 issue of Educause Review (<http://www.educause.edu/er/erm05/erm054.asp>) is for a large part devoted to the subject of learning spaces. The projects reported there reflect the changing insights in the importance of the physical campus as a meeting place where students and staff can seamlessly switch between face2face (real word encounters) and virtual contacts. They also point to the importance of starting from institutional context and learning principles when designing new spaces.

Obviously, and one can also see this at Tilburg University, the library is no longer the only place on campus where learning centres are being created. Libraries pioneered these developments. The insights gained in these experiments are now guiding the design of more flexible learning spaces.

CONCLUSIONS

Disconnects run through the story. Not just with students and teachers, but also, not the subject of this paper, researchers. As the UK LinkER project shows, these disconnects are only experienced by librarians as problematic. The only conclusion then is that there is work to do for librarians in reconnecting with their patrons. This requires a move away from a collection-centred, building-centred and system-centred attitude towards a learner-centred, teacher-centred and researcher-centred attitude. The challenges are tough but real. Also, the

conditions are not to favourable: budgets are tight, external funding for digital library projects is nearing zero, and libraries are no longer seen as strategic assets to universities. On the other hand, such circumstances are, from a change management viewpoint, ideal for rethinking vision and mission and making strategic choices. What might those choices entail?

An obvious choice is to follow Dempsey's and Morgan's advice and disintegrate the digital library into portal environments, where, as component services, a much better integration with students' and faculty's workflow is possible. This is not a trivial choice and it requires a concerted effort of libraries, library system vendors and content providers. Meanwhile, if your institution has a portal project going on, be sure the library is involved. Also, stimulate cross-departmental thinking in your institution to create awareness of the organisational barriers that lead to the persistence of data silos.

A second choice would be to integrate the library building more into campus life. This will require that the library becomes a more attractive place for Net Gen students. It might also require that space for books be traded for social space. With ever more content becoming available electronically, opportunities for this should expand quickly. There are already opportunities for this, but I am amazed that so few libraries have for instance deselected journal volumes while having a JSTOR subscription.

So disintegrate (and reintegrate) the digital library, and integrate the library building. There are more possibilities, depending on the situation at specific institutions.

Most of all: do cool things!

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