Geronimo's Cadillac: Lessons for Learning Object Repositories

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Abstract. Much of the work into learning objects and repositories work has, to date, been driven by the philosophical and technical considerations of metadata, ontologies, semantics, user-modelling, architecture, interoperability and standardization issues etc. This work is very important. However, this paper discusses the importance of understanding the context of application for learning object repositories and argues that their successful adoption by the educational community will require careful attention to the issues of professional and organizational change. We identify a major driver for this change in the different business models that are inherent in these technologies compared to current practices. The ideas behind this paper are based on a synthesis of ideas from pedagogy, systems theory and software engineering. These ideas are illustrated in the work of the UK TrustDR project that is examining practical ways of managing IPR in institutional learning object repositories.

1 Introduction

The lesson we refer to in the title of this paper[1] epitomised in the phrase "Geronimo's Cadillac" – is that of trying to use technology in an area that is not yet ready for it, as this extract from a training document produced by Digitalinsite® explains (www.digitalinsite.co.uk):

"Geronimo, last free leader of the Apache nation agreed to a peace treaty and was sent to live on a reservation. As a peace offering the US government made a gift to Geronimo of what was at that time one of the most advanced items of technology they had – a new Cadillac motor car. The trouble was that on the reservation there was no one who could drive, no mechanics, no oil, no petrol and no roads. Geronimo was forced to pose in it for photographs but after this the car was used as a chicken coop."

The TrustDR project (http://www.uhi.ac.uk/lis/projects/trustdr/index.html) is investigating the technical legal and cultural factors that need to be understood in order to finds practical ways of creating Digital Rights Management (DRM) systems for institutional repositories of learning objects. The project is funded by JISC (Joint Information Services Committee), the UK government body responsible for developing the use of technology in the service of education. It quickly became apparent to us that DRM in e-learning shared many of the general problems associated with the implementation of e-learning in general – particularly the largely unexplored area of organisational change and development in this context. E-earning is still in a relatively immature stage and operates in a manner that reflects the ad hoc bottom-up nature of our educational institutions and their professional cultures. The great unresolved issue regarding the sustainable adoption of e-learning is that these technologies carry a strong centralising and corporate business model [1] that is in tension with existing practice. Until this tension is resolved we are not likely to see e-learning being successfully embedded into practice. The legal issues in learning materials also bring to the surface many difficult issues regarding power and ownership, status and control.

This paper may surprise the reader who is expecting a concentration on the more legal and technical aspects of DRM in the project. We do indeed cover these issues in our project work but we also need to have a sound and clearly articulated understanding of 'the business of e-learning' – as it is and as it might develop. The reason for this is simple; setting up a DRM system in any environment is potentially problematic and

[1] A footnote from history - This episode was immortalised in 1972 by the Irish American songwriter Michael Martin Murphey who released an album and a song called *Geronimo's Cadillac*."

expensive, but in the education sector that is rapidly changing and has had little experience in the IPR area until now this is especially challenging. To make practical and workable suggestion for implementing DRM, as this project aims to do, we need to have a firm understanding of the business it is being applied to and not content ourselves with an abstract legal or technical study or accept all the 'spin' that is sometimes put on e-learning activity to satisfy commercial and political agendas and funding opportunities [2]. This 'systems' approach would be normal in any commercial project and we think it is especially applicable to the area of e-learning. As Tom Boyle [3] and Norm Friesen [2] points out there is a need for more studies of the educational and organisational aspects of the application and uses of learning objects and repositories.

We seek to align our work as part of a process that sees the future of e-learning developing from its current state in to a more mature and organisationally coherent activity. In this paper we set out some of the salient factors that we think are important to understand about the education sector, e-learning and learning objects and examine how these might help shape the operation of learning objects repositories as digital libraries.

2 E-learning and Learning Objects - The Current Situation

This section highlights the importance of taking the local context and culture into account when developing and implementing technological solutions in complex social systems like education. The failure of the government-backed UK e-U virtual university being a case in point. Many of the failures in software development and engineering are down to this basic error – i.e. of not understanding the needs and situation of the users. In 1994 the Standish group published a report entitled *The Chaos Report*, on the state of the software industry that found that the single largest cause of project failure was a lack a lack of user consultation. A significant finding was the inability of the industry to learn from its mistakes, comparing the discipline of software engineering to that of construction and civil engineering they make this sharp criticism:

"When a bridge falls down, it is investigated and a report is written on the cause of the failure. This is not so in the computer industry where failures are covered up, ignored, and/or rationalized. As a result, we keep making the same mistakes over and over again."

The report can be found at: http://www.standishgroup.com/sample_research/chaos_1994_1.php

It is worth while pointing out that having a shared, centralised, digital, collection of teaching materials is currently a very rare occurrence in most of our institutions and that the kind of shared teamwork in teaching that such a model implies does not routinely exist either [4]. Even rarer are any actual working and used institutional repositories of learning objects, while implementations of Learning Design are still at the experimental stage. Until recently, we have been building infrastructures, creating content, and developing technical standards and architectures etc, in the assumption that the 'soft issues will take care of themselves'.

The alt-i-lab 2004 document *Repository Management and Implementation: A white paper* [5] makes the observation that there is an assumption that a shared collection of learning objects is what people want but that this assumption may be based on a rather thin premise. It points out that much work has been done that focuses on technical issues but that even the 'techies' acknowledge that there are many questions relating to culture, politics, and practice that remain to be addressed, such as pedagogic tradition, professional working cultures and institutional structures and values. They go on to stress that the drive towards technical interoperability must be accompanied by a reassessment of these broader issues.

The alt-i-lab report goes on to point out:

"While information management professionals might be aware of the strategic benefits of implementing repositories, educational practitioners are still inclined to ask why should they use repositories in the first place? What will they do to facilitate their current practice? The "Why" question is perhaps one of the most

significant problems relating to the use of repositories that the learning technology community has failed to adequately address. In theory this question is simple to answer; repositories facilitate more efficient storage and management of resources, they enable users to share their resources and to discover resources shared by others. In practice practitioners argue that they are capable of managing their own resources on their own desks and desktops. In addition they ask why would they want to share their resources anyway, and even if they wanted to share, where would they find the time to create all that metadata …and isn't this the library's job anyway?"

In the mid 1990's Terry Mayes [6] in an article called *Groundhog Day* looking to the future of learning technology (http://apu.gcal.ac.uk/clti/papers/Groundhog.html) makes these points:

"Thus, there are good reasons for supposing that today's learning technology will this time lead to radical change in education. Yet doubts remain. For one thing education is a social and political system, and the checks and balances that keep the system working may not be shifted by any technology. Secondly, current learning technology may not be well-matched to real user needs. Here we ask, not how powerful is the technology, but where is the learning need?"

Educational institutions are complex entities and the mere fact of introducing technology into them can provoke problems and bring hitherto hidden issues to the surface (a reification). In research findings funded by the ESRC that foreshadowed the later collapse of the UkeU (Britain's first government-backed virtual University) Pollock and Cornford [1] make the useful observation that often these technologies carry strong implicit organisational and business models. Norm Friesen [2], who has been heavily involved in e-learning standards work gives a good description of these implicit models in an often-referenced paper called *Three Objections to Learning Objects and E-Learning Standards* makes these points:

"Only recently has discourse in this area moved beyond broad generalization, technical elaboration, or promotional [activity]. To the knowledge of this author (and as clamed by Banks [2002]), there have been no in-depth studies of the pedagogical consequences of these systems and ways of thinking, and no examinations of their epistemological and ideological implications. On a more practical level, others have noted a general lack of adoption of these technologies by both practitioners and vendors (e.g. Robson, 2003; Farance, 2003)."

These implicit models, we would argue, are the cause of most of the confusion and failure in the world of learning technology to date. Casey et al [4] explores these themes in some more detail in particular relation to learning objects and Learning Design and examines ways of resolving them. Professor Mark Stiles [7] has done some very useful work, including case studies, to identify the role of policy development in driving the required cultural change.

To date e-learning has not been as successful as some have wished. There are many reasons for this but a consensus is building around the idea that educational institutions and the professional cultures of those working in them have to change in a fundamental way in order to make effective use of the technology. Without this change, not surprisingly, the result is often not satisfactory as van der Klink & Jochems [8] put it:

"The current situation can be best described as high-level ambitions with poor implementation."

David Griffiths, the manager of UNFOLD, an EU project (http://www.unfold-project.net:8085/UNFOLD) examining the educational and technical dimensions of adopting the IMS Learning Design specification makes this comment regarding the adoption of learning objects to date [9]:

"However, there is a growing feeling of uneasiness, a feeling that the primacy of re-usable learning objects is leading to e-learning limited to lone-learners reading from screens and being tested on their understanding."

3 The Information Management Failings of the E-learning Community

Our ability to curate (i.e. to look after and exploit) digital learning materials has to date been poor with materials from publicly funded schemes falling into technical obsolescence or just being lost the £40 million UK Teaching and Learning technology Programme[2] (TLTP) programme is a good example of this. Partly because of this experience national initiatives like Digital Curation Centre[3] (DCC) and the national UK JORUM[4] learning object repository have been set up. Now, useful work is being done on ways to 'resurrect' obsolete materials from the TLTP by the RECAL[5]project. It is also only relatively recently that serious consideration has been given to managing the IPR in digital learning materials. This was largely due to the JISC funded Exchange for Learning[6] (X4L) programme which ended phase one in 2005, it set out to investigate the issues surrounding regarding reuse and learning objects. Outstanding factors that we need to emphasise are a] the general lack of institutional management of IPR in learning materials which is evidence of the dominance of the bottom-up activity model for e-learning and b] the lack of involvement of the one group of staff that have the skills, interest and indeed official responsibility to be able to deal with this - institutional librarians

Another ongoing problem with our ability to look after and preserve digital materials is an apparent reluctance to fund the creation of adequate metadata; the experience of the Yorkshire High Level Skills for Industry repository [10] and the research work of Currier et al [11] are particularly instructive in this regard. Yet recent discussions on CETIS mail lists and elsewhere[7] reveal a continuing aversion to spending some time and money on creating metadata and the belief that there may be some technical panacea to remove this tiresome burden. The reluctance to create metadata even endures even when we have projects that are paid to create materials from scratch to deposit in repositories. There may be a number of reasons for this but one that stands out for us is that in institutional terms the role of librarians and information professionals has been sidelined and downgraded in favour of IT services since the inception of the world-wide-web. Typically, IT departments have little expertise in the area of information management – but believe they do. Metadata creation, cataloguing and classification may not be currently fashionable but it does provide an essential means to find materials and avoid 'digital oblivion', and these activities are the natural preserve of librarians. Yes, some of the proponents of the application of detailed metadata schemas seem to be at a distance from the economic reality facing most of us but that seems equally matched by those who seem to believe in rather utopian solutions involving Artificial Intelligence etc. We would argue the future lies between the two extremes[8] and agree with Casey et al [4]:

"Those who have recovered from their AI hangover now advocate using technology to support human intelligence in dealing with these kind of problems which is well fitted for dealing with complexity and multiple meanings – and resolving them. The future of e-learning will consist of humans, assisted by technical agents; operating and maintaining networked e-learning systems."

4 Looking Forwards

So, where can we look for guidance? As van Rijsbergen [12] puts it:

"The information retrieval community is a good candidate, representing a fruitful if sometimes tense collaboration between information science, computer science and librarians"

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[2] http://www.le.ac.uk/tltp/
[3] http://www.dcc.ac.uk/
[4] http://www.jorum.ac.uk/
[5] http://www.recal.mvm.ed.ac.uk/
[6] http://www.jisc.ac.uk/programme_x4l.html
[7] http://opencontent.org/blog/archives/256
[8] We would like to acknowledge Prof. Rob Koper of the Open University of the Netherlands for making this useful observation about AI and its uses during a meeting of the UNFOLD IMS Learning Design project in Barcelona 20-22 April 2005

If we can agree that an institutional digital repository of learning objects is a form of digital library then Sølvberg [13] proposes three criteria that a such a library should share with a traditional 'bricks, mortar, and books' library, they are: permanent, managed, quality controlled. This coincides nicely with research about metadata quality and management issues [11] and gives us a big picture' view of how a repository should fit into existing institutional structures.

The issue of permanence is an important one for the e-learning community to take on board and one that the library community can help with. In the UK since the 1980's e-learning activities have been characterised by short-termism and a 'not invented here syndrome'. There are signs that this is beginning to change, the launch of the national UK learning object repository, as a permanent service is an indicator of this.

Another useful perspective is that expounded by Cliff Lynch, Director of the Coalition for Networked Information (http://www.cni.org) at a JISC joint programme meeting in Brighton in 2004. The concept is simple but profound – the previously separate activities of education, publishing, libraries and archives and IT services are coming together to occupy the same digital space. These activities and their constituent professions and cultures are, however, still operating separately. This needs attention.

Another useful source of wisdom and expertise is that of the museum community – that has been taken onboard by the establishment of the UK Digital Curation Centre. A lot of thought went into their choice of title; a curator is someone who looks after a collection of items but also actively seeks to make use of them in order to bring extra value to the collection.

So, the future organisation of a digital library of learning objects needs to include all of these roles and perspectives and perhaps most importantly be engaged with the core mission of education. We believe that central to this is the need for the library profession to engage with the domain, they have a particularly important customer service/community role to play that IT departments struggle with. We can discern the beginnings of this process in the discussions about metadata in the educational technology community over the last few years – especially the JISC-CETIS metadata mails lists. Developments in the Irish context are encouraging. This was brought forcibly home to us when we attended the Irish Universities Information Services Colloquium (IUISC) in March 2006, in Ireland librarians are getting more involved in managing online learning resources. In contrast the situation in most of the UK might be described as a librarian-free environment[9]. At Ulster University this involvement is embedded in policy that dictates librarians have to be involved in compiling and checking the resource lists for courses in the institutional VLE. This simple arrangement is an important signifier of a move away from bottom-up ad hoc activity to a more organised and team-based approach that is required. This arrangement also makes possible the beginning of effective IPR management and the creation of a workable institutional DRM system, we would also argue that it would help enable a more sustainable model of e-learning than is now the case.

Those in charge of implementing learning object repositories will find it useful to be aware that their activity will be at the centre of contesting visions of what the public education system should be like as Friesen [2] provocatively argues:

"For the full potential of e-learning standardization and infrastructure efforts to be realized, it is important that these efforts place significantly greater attention on existing educational practice, on issues of innovation adoption, and on the heterogeneity of educational activities and contexts in general. To properly deal with this divergence and complexity--and with issues also now emerging from training and other communities--it is necessary to look beyond systems engineering techniques and standardization processes. These techniques and processes may work well for more exclusively technical applications, but they are proving inadequate for dealing with the ambiguities implied in education and even in the deceptively simple term "learning." They also bring with them a culture and set of connotations that are (at the very least) not entirely helpful in public education. Perhaps most importantly for e-learning content and

[9] From discussions in the SCONUL (Society of College National and University Libraries) e-learning task force, which the project manager is serving on; http://www.sconul.ac.uk/activities/elearning

standardization, it is important to recognize that objects and infrastructures for learning cannot simultaneously be both pedagogically neutral and pedagogically valuable. Developers and designers will have to recognize and choose relevant (and probably differing) pedagogical positions, or risk pedagogical irrelevance."

As this dialectic between the status quo and the inherent models in learning objects develops orthodoxies from both traditions are being challenged in the new and emerging teaching practices and learning communities appearing at this interface. To move forward we need to address the so-called soft issues of professional and institutional cultures as well as some of the assumptions implicit in the technologies. As Mayes [6] reminds us:

"education is a social and political system, and the checks and balances that keep the system working may not be shifted by any technology"

Along the way, we in may indeed find that learning objects and learning design do help in transforming teaching in education – it just might not happen the way we thought it would.

Finally, we make some general points for discussion about the future of learning object repositories as Digital Libraries

- They need to be supported by top-down policy directives to be sustainable (as does e-learning in general) and as part of the institutional teaching and learning policy.
- They require a multidisciplinary approach with librarians in the lead (it is too important to be left to IT departments)
- Metadata creation and management needs human involvement
- The market value of the content of many repositories is likely to be very low – so how do we arrive at a cost-benefit analysis?
- Utility value of the content may be high
- Usage data may be the most valuable commodity associated with a repository – what would we use it for?
- Who owns the content? Does it matter?
- How do we manage the content? What values and reference points do we use?
- How do we manage risk in a repository?
- Why do we want to have a repository? What do we want to achieve? What might be the impact on the institution?

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