



UNIVERSITY
OF TRENTO

DEPARTMENT OF INFORMATION AND COMMUNICATION TECHNOLOGY

38050 Povo – Trento (Italy), Via Sommarive 14
<http://www.dit.unitn.it>

SHOULD LEARNING MANAGEMENT SYSTEMS BE
CONSIDERED HARMFUL? THE VANISHING DREAM OF AN
OPEN CULTURAL EXCHANGE.

Marco Ronchetti

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Should Learning Management Systems be considered harmful? The vanishing dream of an open cultural exchange.

Marco Ronchetti

Dipartimento di Informatica e Telecomunicazioni
Università di Trento – Via Sommarive 14, 38050 Povo (TN) - Italy
marco.ronchetti@unitn.it

Abstract: Support to e-learning activities has undergone a transition from simple web-based solutions to complete and integrated Learning Management Systems. Such transformation had an important, maybe unwanted and probably almost unnoticed side-effect: the closure to the outside world. We discuss why that happens and whether it is a desirable or necessary feature. We outline the consequences of such fact on e-learning in general, and on the dream of an open society in particular. Finally, we propose some solutions that allow keeping the necessary protection features while allowing for a more open sharing of learning resources.

Introduction: from a closed society to an open one, and back

The story of e-learning goes back half a century, yet only in recent years, by joining the bandwagon of the “e-anything”, a somehow languishing field has found a new, exceptional vitality. It all started with the Web, which provided easy and powerful access to the Internet. Before the Web any computer-based learning initiative was relying on proprietary definitions and applications, and sharing electronic learning material was almost impossible, due to technological limitations.

Several acronyms pave the road of the history of e-learning: among them CAI (Computer Assisted Instruction), CBE (Computer Based Education) and ITS (Intelligent Tutoring Systems). WBE (Web Based Education) was just one new flavor, in which the Web became the infrastructure used for delivering learning materials and to provide interactive tools that were usable for experimenting with new constructivist approaches.

The flourishing of the World Wide Web, together with the “dot com” hype, and with the growing need for a continuous, just-in-time, ad hoc training/education made the rest, delivering us what we today know as e-learning. Yet in these few years something new is happening, that radically changes the original web approach to e-learning. In the early web days, pioneering teachers started putting on their home-pages lecture notes and learning materials that could be useful for their students. Of course, this allowed also other people, who were unrelated to the course, to view that learning material. It was the dawn of a new bright era of knowledge exchange. It suddenly became easy for teachers to view how their colleagues approached some topic. This had been possible in the past to a limited extent by browsing textbooks, which have often been a template for building a one’s own course. A teacher who had to teach a new course would typically collect a number of textbooks, examine them, so as to be able to compare her/his own view with the ones expressed in the textbooks themselves. Or, s/he might be happy with the presentation available in the textbook and decide to base the whole course on it.

With the web, and with the help of search engines, it became easy to respond to questions like “what kind of Mathematics is taught (and how) in the Psychology curriculum in Germany (or in U.S.A.)?” It became easy to view the teaching material used in other universities, some of the assignment that were given, and get ideas, and compare. Ideas were flowing freely across boundaries and across physical and (to some extent) political barriers. The times in history where such processes have taken place have always been carriers of new wealth.

Today, after just a few years, things are changing again, and this time for the worse. A couple of years ago a Google search for some academic topic would have found tenth of sites that published learning material. Today you can call yourself lucky if the same query finds a few. This is a bitter, amazing surprise. What is happening?

From naïve to structured e-learning.

In these few years, we have learned that e-learning is not just about “pushing material on the Web”, but is about trying to support the student-centered learning process. Communication and collaboration tools like bulletin boards, chats and forum started to be used in this domain. We also understood that we need to track student’s activities. Universities wanted to offer their students a common framework for all e-learning activities, and that needed more than just a collection of links to the teacher’s web-pages. The enthusiastic pioneering teachers realized that maintaining the web pages was as much work as it had been producing them in first place: as a consequence part of the material simply aged, and part disappeared. In other words, it became necessary to pass from an artisan to an industrial approach. A set of requirements became clear and general enough that companies could start offering software systems for supporting e-learning. To underline the fact that these systems were “the second generation of the web-delivered education”, they got a name: Learning Management Systems. Even further, these Learning Management Systems needed to be interfaced with the University Information System, bringing in some cases to “Learning Information Systems” [1]. Most of these facts require that students identify themselves when accessing the system. A sad corollary is that if you do not identify yourself, i.e. if you do not have an explicit authorization (in the form of a username and a password) you cannot access any of the learning material (here and in the following we will broadly speak of “learning material” meaning all the resources that support the learning process, and not necessarily only lecture notes and similar artifacts). Therefore the transition from the early, naïve e-learning to its highly structured and integrated version was very natural and necessary, but it came to a cost. My claim is that we are not yet fully aware of this cost, and the goal of this discussion is to show what it is.

Such change from the early, truly Web-based approach to the new, LMS-based approach is exactly the one that brings from the Internet to an Intranet. To fully discuss this point we need a short explanation. World Wide Web and Internet are not synonyms, although they are often treated as such. The WWW is just “yet another application protocol” sitting on top of the network infrastructure and on top of the underlying communication protocols collectively known as “the Internet Protocol” (or, more technically, TCP/IP). What is most important, the original Web idea was born in the framework of technologies that were intended to facilitate the exchange of information, and that made it simple to set up a server for publishing (i.e. sharing) any form of knowledge (the original goal was to make it easy to share scientific information in a device-independent way). Yet the WWW protocol can be used in a protected way to allow sharing information and documents in a more restricted setting, by protecting the pages through passwords or even better by hiding them from the external world by setting up a firewall, a technical device that allows only certain packets to pass. In this way one can create a sort of “private Internet” that is called Intranet. This is typically done by medium and large size companies that in this way deploy the Internet technology for their internal use only, without exposing their internal information to the outside world.

So the deal we are trading here is that we buy the easy of use, the integration and the support that is offered by a Learning Management System and we pay that by closing the doors of our system to the rest of the world. We are moving from a perspective of open sharing of intellectual wealth to one of managing teaching as if it was just another commercial activity. All this might be really what we really want, or maybe not. We have to be aware of the price we pay, so that we can really choose in a conscious way what we want. And maybe, we can understand that there are even ways not to pay the full ticket.

The price we pay: a list of broken dreams.

E-learning still has many unfulfilled dreams, the most ambitious being to be able to activate exactly the right learning processes that are needed by a person at a given time of her/his life. The reification of such dream relies on user modeling and adaptive techniques [2,3], but also needs a wealth of material to respond to the learning needs. We argue that the transition to a “closed learning society” implicitly endangers such aspiration, and later we will give arguments to sustain our point of view. Some other dreams are even more directly at risk. They are:

- The ability of reusing learning material
- The ability to provide semantic indexing of learning material
- The ability to interconnect existing learning material
- The open sharing of knowledge resources.

Reusing learning material is important because it reduces the high costs of producing e-learning assets. The idea of reusability is so important that people have agreed on the notion of “learning objects” (LO) up to the point of defining an international standard for specifying their metadata (IEEE 1484 Learning Objects Metadata, also known as IEEE LOM [4]). Of course one could always buy COTS (component off the shelf) that were written to be reused, but the international community could (and we think should) also share LOs in the same way it shares free software. It could also provide items that are sharable upon payment of small amount of money (like in the notion of “shareware”: software freely downloadable, often usable freely with a limitation in their functionality, and fully usable after paying a modest fee). Of course though in order to reuse something we need in first place to find it. In the present scenario, where access to learning resources is strongly controlled by LMSes, it would be impossible to find most learning objects, so that the reusability would be limited to the LOs that are available within the local LMS, or to the (advertised) commercial ones.

Semantic indexing is today a very active research field. The whole “Semantic Web” [5] initiative tends towards the ability to find information based on *concepts*, rather than on the *words* that are used to express them like today’s search engine do. Being able to find the right learning material is the first step towards reusability, and we have already discussed this point. It would also mean to be able to refer to learning material that is contained in different courses, without explicitly reusing single LOs. Students would have the chance to find what has been done in other places and by other teachers, and could be exposed to different points of view and different ways to present concepts.

Interconnection of existing material comes as a direct consequence of semantic indexing. Elsewhere [6] we have proposed ways to allow for both “implicit” and “explicit” conceptual navigation, and we have suggested how one could interconnect “knowledge islands” through the use of semantic indexing. The idea is that automatic systems could deploy semantic indexing to suggest to learners paths to explore related material. Such paths could be enriched partly automatically and partly manually by a sort of recommendation system. Students would then be guided in the sea of available material, and could build their own personalized learning paths. Once more, such dream becomes a poor thing if due to the constraints posed by LMSes the sea becomes a collection of disjointed ponds.

The big step forward in sharing learning assets that was allowed by the first generation of Web-based e-learning system has been cancelled by the recent developments. By using LMSes, or at least the present generation of LMSes, we have closed the doors to the outside world. We have preserved the body of the Web (i.e. the technology) but not its spirit. We think most of us do not realize this: our courses are not *really web-based* any more, even though we still use a browser. We do not share our work with our colleagues teachers of all over the world, and our student cannot benefit of the work of our colleagues any more.

Finally, of course the ability to find and activate the right learning process for each student will inevitably depend on the richness of choices we have. Keeping our small private knowledge treasures in our own separate chests will maybe make us richer than our neighbors are, but poorer than we could all be if we shared our goods.

Is the price unavoidable?

At this point we understand that we LMSes are asking for a price, and that we pay it. The next step is to ask ourselves a few questions:

- What is the real cause of this price?
- Is this what we really want?
- Is there any way to maintain the advantages that LMSes have brought to us while stop paying the price, or at least paying a reduced ticket?

In first place, we should admit that *maybe* the closure to the outside world is exactly what we want. There might be very good reasons for that. The business model of our University might be such that it invests in the production of e-learning, and that the result of the investment is seen as a competitive advantage. In this view, a University is a business enterprise. It must to compete with other Universities, and since teaching is the main business, the main assets must be well protected. If we share this view, then there is nothing wrong with what is happening, and in fact LMSes not only facilitate the learning processes, but also *protect* our assets from the competitors. After all

companies do not share their assets with their competitors, but they rather protect them the best they can. Personally, I do not agree with this view, although I can understand it, but any further discussion of this point would be a political one, and this would not be the right place to continue it.

In the following I will therefore assume that the survival and flourishing of our University does not depend on a model that sees other Universities (only) as competitors, or at least that we can allow ourselves to share knowledge (which, after all, is the historical reason for having universities). Under this hypothesis we should understand what other possible reasons justify the restricting behavior of LMSes.

One is copyright protection. The best way to protect intellectual property is to hide it. Unfortunately, that's also the best way to make it completely worthless, like a perfect library where users cannot enter: no one will ever steal a book, but there is no reason any more to have a library. So such argument cannot be taken too seriously: laws exist to enforce copyright, and that should be enough.

Another one is "protection from copyright protection". It might happen that there are some grey areas where is not really clear whether some material can be freely used. In such cases, there might be the temptation to still use such material in a "protected" environment within domestic walls, so that the outside world does not know about possible violations. In some cases (e.g. in the case of the Java Tutorials provided by Sun) you are actually allowed to create mirror copies of the material in your domain, under the condition that you will not expose that copy to the rest of the world. In such case the concern is mainly that when a new version of the material is published, people do not get confused by the existence of publicly reachable outdated versions. In similar cases the concern might be that the owner of the copy does not get credits for the original material (which however would again fall in the already discussed case of copyright protection).

I believe that the most serious reason for justifying the existence of access restrictions has to do with the idea of *controlling* access rather than *restricting* it. Some learning processes need to identify the user. If we want to adapt the choice and presentation of the learning material to the user, we need to identify her/him. Identification is also necessary if we want to track the student's activities, e.g. to prove that s/he followed a prescribed learning path. Also, providing services (ranging from enrollment in class to SMS notification of events) requires user identification. What producers of LMSes have done, it to get the requirement of user identification and applying it to all activities, with the consequences we have discussed above.

Realizing that fully restricted access is too strong in certain cases, a partial solution can be offered in certain cases by providing complimentary "guest access". Some systems advise you that you can enter, and visit a subset of the system by using a provided username and password (typically guest/guest). Unfortunately that might work with humans, but does not work with robots, spiders and crawlers (the automata that collect data for the search engines). The effect is that, although the learning material would in principle be accessible to anyone, in practice is not, because since it can not be indexed by search engines, its existence is doomed to remain in the shadow for the vast majority of potential users. At the time when sharing occurred via FTP, there was a standard convention for anonymous access to some resources. There is not such a standard for accessing "public" portions of LMSes.

What can be done?

The problem is a serious one, but luckily enough something can be done to make things less dramatic. Being aware of a problem is often the first step towards a solution.

If you build a custom LMS (many still do), you should be aware of the distinction between "access control" and "access restriction", and restrict access only when it is really needed for serious reasons. For instance, in the LMS we are building for the University of Trento, unidentified users still can access relevant portions of it. The LMS is seamlessly integrated in the University Web site, so that it is easily reachable by robots. A login is not a prerequisite for just any action, but is required only when trying to perform tasks that are in fact restricted. Moreover, the system remembers identities (by using cookies) so that identified users can always be tracked. A special authorization algorithm [7] allows defining contextual access permissions, where the access permission itself is granted on the basis of the context in which the material is viewed. Each teacher can declare as public or private any material (with a low granularity). A special page built for robot consumption can therefore list all the public URLs.

If you buy a commercial LMS, among the other parameters you're considering for picking the best choice you should take into account the availability of policies that allow viewing (chosen parts of) the learning material to external users in a robot-friendly way.

A solution should be found for the cases where to enter some public portion of sites "the magic word is needed" (e.g. by explicitly assuming "guest" identity). A proposal in this direction could be to standardize some attribute of the HTML "META" tag (like for instance `<meta public_identity="guest" password="guest">`). Although the proposal is in itself simple, the difficult part is to let it become an accepted standard.

If you already use a LMS that does not allow for unrestricted access to material that you think should be public, and you do not really need user identification, you can use an extreme and simple (although not fully satisfactory) solution: deposit the learning material in a traditional web site, pass its root address to search engines and link the material from within the LMS.

It's important to pay attention to the default settings: some systems allow the teacher to decide whether the published material has to be restricted or not. Many teachers will not bother with settings, and keep the default choices. It is therefore very important that to establish a general default policy that takes into account the above discussed issues.

Finally, if everything else fails, we might hope in the development of public learning objects repositories, where people can willingly contribute. The free software model has moved along this line, and today exist places like Sourceforge (<http://sourceforge.net/>), a very popular repository of free software projects. Of course this would have to be well planned: dropping LOs into a box leaving them out of context might not be the best choice to foster sharing and reusability. Moreover, this would require the deliberate act of depositing the material, and it would suffer of the extra-effort needed to be aware of the initiative and to take the time to deliberately contribute to it. The simple publication of learning material in an open e-learning context for the core business of teaching would instead seamlessly reach the goal of sharing resources without any deliberate act.

Related work.

The concerns expressed in the present work started crystallizing when encountering big difficulties in gathering the learning materials that were needed in a project for automating semantic indexing [8]. Later on I was pleased to find similar concern expressed in a work presented at a conference [9]. I interpret that as the good sign that awareness of the problem is starting to be shared by academics, and I hope that this contribution will help spreading the alarm before it's too late. With respect to [9], this paper discusses in more depth the reasons from which the problem arises, and outlines some possible technical solutions.

Conclusions.

We have argued that the advent of Learning Management Systems has an often overlooked side effect, by making learning materials available only to the people having a password to enter the system. This dramatically diminishes the open availability of shared learning material, much in contrast with the historical university vocation of spreading knowledge. We evidenced the negative impact that such fact may have on future development of e-learning. The choice of closing the doors to the outside world might be a logical consequence of a business model. If that is not the case, then we should though find a solution. We have outlined several possible solutions including the establishment of new standards, the customization of default access policies, the inclusion of new requirements for the next generation of LMSes, the creation of ad-hoc repositories for sharable learning objects. The first step, which is the main goal of the present paper, is to raise awareness for a problem that risks to strongly limit the future potential of academic e-learning.

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