

The Implications of SCORM Conformance for Workplace e-Learning

Gabrielle Witthaus

New Leaf Training Network Ltd, Leicester, England

gabi@newleaftrainingnetwork.com

Abstract: This paper explores the impact that SCORM conformance has had on workplace e-learning. The author describes a project in which she was requested to “repurpose” some materials that had originally been designed for the face-to-face teaching of English as a Foreign Language, into SCORM conformant e-learning materials. The rationale for this request was that the training centre management wanted to track learners’ progress via a Learning Management System (LMS). However, in order to integrate SCORM-conformant tracking functionality into the programmes, the learning materials would have to have been stripped of all the collaborative, productive and communicative aspects of their pedagogy. The learning designers and training centre management had to engage in a steep learning curve to find an alternative solution that was both pedagogically sound and administratively efficient. This anecdote highlights some of the challenges facing the corporate sector in terms of the management of e-learning content. To put the issues into context, the paper gives an overview of SCORM, and defines some related terminology - Sharable Content Objects (SCOs), LMS and Learning Content Management System (LCMS). SCORM conformance has two main aims: the ability to deliver content on any Learning Management System, and the ability to track learners’ actions and scores when they use the materials. It is argued that, while the higher education sector has chosen to emphasise the first aim, focusing more on the development of stimulating learning content that can be shared across disciplines and across institutions, the corporate sector has emphasised the second aim, focusing more on tracking learners’ progress through learning programmes. It is suggested that this is one of the explanations for the continued proliferation of relatively rigid, behaviourist style teaching materials for workplace e-learning. This instructivist style pedagogical model is considered in relation to the military and programming origins of SCORM, and a number of more innovative approaches to workplace e-learning from the recent literature are discussed. The paper concludes by arguing that, for corporate e-learning programmes to be successful, all stakeholders need to be included in the strategic decisions, and all stakeholders need to engage in a learning process to understand each others’ points of view and explore the available options and their consequences. This study will be of value to anyone who needs to develop SCORM conformant courses, as well as managers who are charged with overseeing such projects, or developing an organisational training strategy involving an LMS/LCMS.

Keywords: learning design, SCORM conformance, LMS, LCMS, learning objects, e-learning 2.0

1. Background: “Why can’t you just make these materials SCORM conformant?”

This study began when the author was leading a learning design team in the development of course materials for a large petroleum corporation in the Arabian Gulf. The team was requested by management to “repurpose” some English language training materials that had been produced for classroom-based teaching so that they could be “delivered” over a Learning Management System (LMS). Specifically, the brief was to make the materials SCORM conformant, i.e. to package the materials in such a way that they met the technical standards set by the Advanced Distribution Learning group (ADL 2007), thus enabling them to be used on any LMS. The main perceived benefit to management was that they would be able to track the progress of learners, since the LMS would produce detailed records indicating which learners had accessed which materials on what dates, and for how long. It would also detail learners’ scores on any tests or quizzes.

The materials had been designed on constructivist principles. Converting them into SCORM conformant format, with the detailed individual learner tracking function requested, would have required breaking the materials down into very small, granular chunks. The materials would have to have been stripped of all activities in which learners wrote extended text of any kind, all speaking activities, and all other student-student interaction. Learner tasks would have been limited to mouse-click responses to multiple choice, true/false and drag-and-drop activities, resulting in no opportunity for learners to practise authentic communication. The trainer’s role would have been reduced to that of an administrator. The overall result would have been to turn a dynamic, interesting set of learning materials that had been demonstrably successful in the classroom into a dead, lacklustre electronic page-turner, punctuated by multiple choice quizzes.

The scenario was frustrating for the learning designers, and puzzling to the project's sponsors, who had expected the "repurposing" of the training materials to be a straightforward process. After substantial research, experimentation and dialogue between the learning designers, technical assistants and management representatives, it was agreed that SCORM conformant materials which allowed for detailed LMS tracking functions should not be used as the primary teaching mode. Instead it was decided that they should be used as a support for either face-to-face teaching or for online courses involving the use of synchronous and asynchronous collaboration tools. In addition, the learning design team proposed that the company select an LMS on which the content could be seamlessly integrated into a more collaborative learning environment, such as Moodle, a popular open source platform. These conclusions directly contradicted the simplistic advice that had been given to management by vendors of large, commercial LMSs and e-learning software.

The above scenario highlights some of the challenges facing corporate trainers surrounding the use of technology in learning. Wilson's (2007) recent study on how several large, multinational corporations are approaching e-learning points to the sector's lack of awareness regarding the complexities involved in learning content management. To put these issues into context, the next section provides background on the history of SCORM and its current applications.

2. Overview of SCORM

2.1 Some definitions: SCORM, SCO/ LOs, LMS, LCMS

SCORM stands for "Sharable Content Object Reference Model". Its main aims are:

- to enable developers to format and package learning content in a standardised way so that the content can be used on all LMSs and shared amongst other members of the learning and teaching community
- to enable delivery of the learning materials to the learner and tracking of learners' actions and scores (e.g. indicating when learners open a new page, complete a quiz, etc.)

To date there have been two widely accepted versions of the SCORM: SCORM 1.2 and SCORM 2004. A new version is currently under development, and will be released by the end of 2008. (LETSI 2008) (See 3.2.)

There has been a great deal of debate as to the definition of Sharable Content Objects (SCOs), which are sometimes interchangeably referred to as Learning Objects. (Dalziel 2003, Koohang and Harman 2006, McGreal 2004, Oliver 2001, Wiley 2000) Much of the debate has surrounded the concept of "granularity", or the extent to which a piece of a course can be removed from its context and used for other purposes. An SCO can be anything the learning designer (or the technologist) wants it to be: in many commercial programmes it is as small as a page; in the open-source offerings from higher educational institutions such as MIT, entire course can be a learning object. The defining feature of an object is that the LMS treats it as a separate entity, enabling it its own bookmark, score and completion status. (Rustici 2002)

The extent to which learning objects can be reusable has also been debated – some have argued that, divorced from their original learning context, learning objects may become meaningless. Questions have also naturally been raised about how authors and publishers would be paid for their contributions to learning object repositories, as well as how intellectual property rights would be protected. (Letts 2002) Despite these unresolved issues, there appears to be significant buy-in to the concept of sharing digital learning resources in common repositories, especially in the higher and further education sectors. (See 2.3 for further discussion on this.)

A related concept that has been the subject of some confusion is the distinction between Learning Managements Systems (LMS) and Learning Content Management Systems (LCMS). The main function of an LMS is to manage the administration of learning programmes, for example to track the time spent by learners on programmes or components of programmes, and to track their test scores. The main function of an LCMS is to manage the learning content – primarily to serve as the repository for learning objects inputted by learning designers/ content developers.

2.2 SCORM: military in origin and “pedagogically neutral”

SCORM was developed in 1999 by ADL (Advanced Distributed Learning) – a group formed by the US military – in cooperation with government, academia and industry. The purpose was to initiate a “collaborative effort to harness the power of information technologies to modernize structured learning”. (ADL 2007) The SCORM framework consolidated the work of several national and international bodies into a single reference model.

Responsibility for overseeing the SCORM initiative was recently handed over to an international, non-profit federation called LETSI (Learning-Education-Training Systems Interoperability). (LETSI 2008) Whilst LETSI’s 12 sponsors include organisations as diverse as Adobe Systems, Korea Institute for Electronic Commerce, the Aviation Industry Computer-Based Training Committee (AICC) and Fraunhofer Institute Digital Media Technology (LETSI 2008), the US Department of Defence remains its chief sponsor. A 1991 book by Douglas Noble called “The Classroom Arsenal”, gives some indication of the value placed on educational technology by the US Department of Defence:

“Each year..., the military spends as much on educational technology research and development as the Department of Education has spent [on similar research] in a quarter of a century.” (Friesen 2004)

SCORM’s military origins can be seen in the illustration (Figure 1) by ADL member Slosser (2002), showing how Sharable Content Objects (SCOs) are expected to lead to learning. The diagram clearly shows the implied “command and control” approach to learning evident in SCORM’s earliest formulations – despite protestations from SCORM’s proponents that the model was “pedagogically neutral” (IMS 2003). In Slosser’s depiction, objects are placed in the LMS, where they are processed by the machinery of the system, and are spewed out in the direction of the learner through a “delivery device”. The two-way arrows between the learner and the delivery device indicate that the learner’s role is simply to respond to the given stimulus.

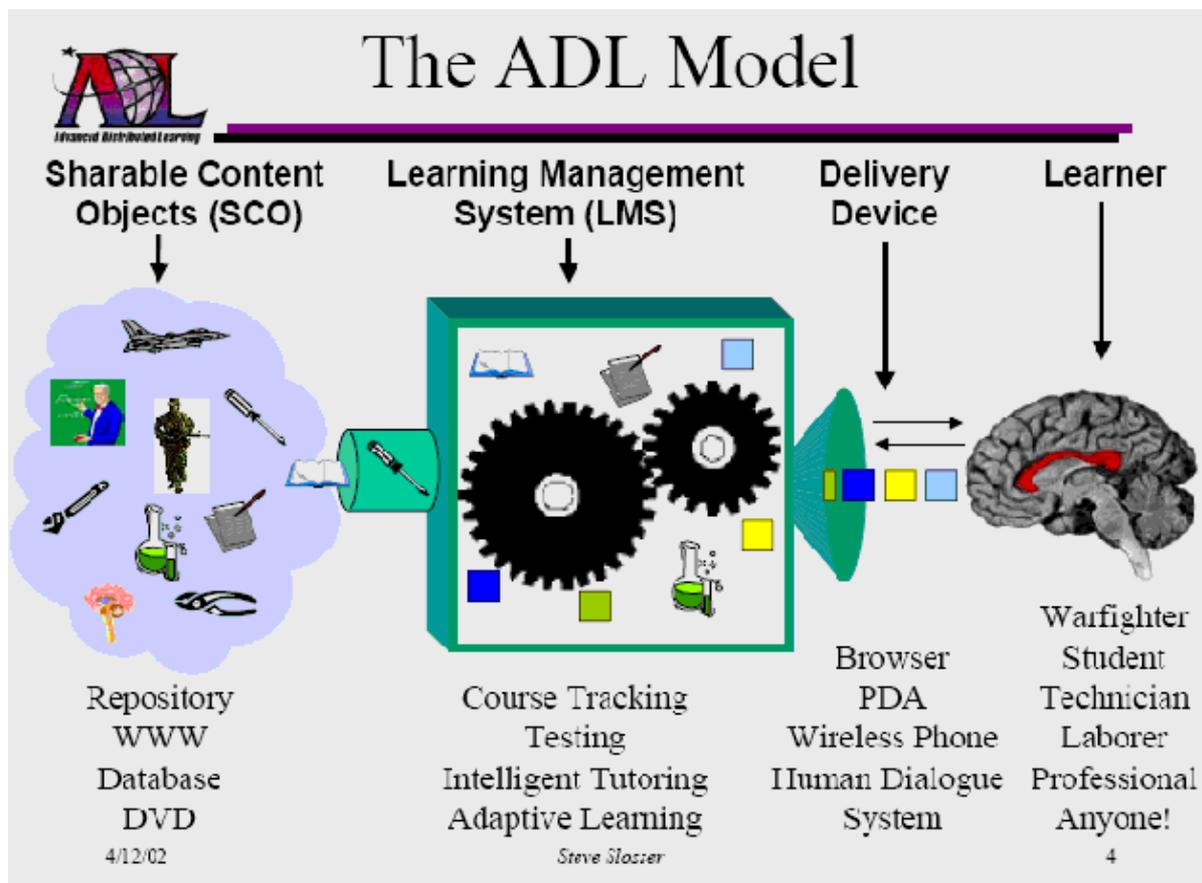


Figure 1: How learning happens – the military way (Slosser, 2002)

Hoel (2006) refers to the implied pedagogy here as the “knowledge injection” model. Friesen (2004) and Wiley (2000) point out that, in addition to its military origins, SCORM was greatly influenced by

the computer programming field; in fact, the term “learning objects” and the formal description techniques used in the SCORM model arose out of the field of object oriented programming. It should perhaps come as no surprise then, that many of SCORM’s proponents promote a decidedly behaviourist view of learning. McGee and Green (2008) locate this approach within a Fordist view of the world, pointing to the emphasis on administrative control and the use of standardised, mass-produced courses. They note that this approach is clearly suited to the military, and possibly also to large corporate training departments in organisations that have “command and control” style leadership. Many organisations, however, have chosen an alternative approach, as discussed below.

2.3 Who is SCORM for and how is it being used?

In a “special briefing for implementers” in 2002, Dan Rehak, an ADL representative, announced somewhat controversially that “SCORM is not for everyone” (Kraan and Wilson 2002), and noted in particular that SCORM was not suitable for primary and higher education. According to Rehak (Kraan and Wilson 2002): “SCORM is essentially about a single-learner, self-paced and self-directed. It has a limited pedagogical model unsuited for some environments.” Whilst this statement led to some fierce debate at the time and called ADL’s integrity into question for contradicting earlier messages about “pedagogic neutrality” (Kraan 2002), it appears, with hindsight, to have been misguided. On the contrary, there is today a great deal of SCO-generating activity taking place in the higher education sector, as evidenced by the existence of large repositories such as MERLOT in the USA (Griffith et al 2003), JORUM in the UK (Stiles 2005), OpenLearn of the Open University in the UK, DART (Bond et al 2008), and LAMS, which was initiated in Australia (Dalziel 2003), to name just a few. This movement has not been without its challenges – Letts (2002), for example, points out that the educational publishing community has been slow to join the movement, due to concerns about copyright protection and payment, as well as uncertainty about the profitability of the model. He also details the conceptual difficulties that learning designers in higher education have encountered – primarily the need to shift from a paradigm in which the learning designer has complete control over an entire learning programme to one in which instructional materials are broken down into discrete, self-contained chunks. Nevertheless, the idea of creating and sharing user-generated materials in a digital format fits in with the growing Web 2.0 culture, and it seems reasonable to predict that the already substantial voluntary participation in learning object repository schemes located within the higher education sector, mentioned above, will continue to grow.

In the corporate sector, on the other hand, it appears that the “single-learner, self-paced and self-directed” model put forward by Rehak (Kraan and Wilson 2002), along with the ability to monitor learners’ activity through the LMS’s tracking function, was well accepted. It was perceived to be particularly well suited to compliance training, for example for mandatory health and safety courses. (Frauenheim 2007) The tracking function offered by SCORM enabled management to follow every click of every learner on every course, giving them a sense of control over the learning process, as well as a means of standardisation. The ease of “delivery” via the LMS also promised companies a substantial return on investment. However, the emphasis on compliance training and the extensive use of low-challenge training materials has led to severe credibility problems for workplace based e-learning. As Hoyle (2007, p12) puts it, “The more electronic page turning learners do, the more (they) are turned off.” He cites an example of a major UK-based corporation in which the completion rate for mandatory courses is less than 65%. Accordingly, he notes that much of the time, the “learning” consists of “repeatedly taking the test until, by a process of elimination they get the right answers (or are told them)”. (Hoyle 2007, p12) Whilst this is probably a relatively common scenario in corporate e-learning, it is, happily, not the full story. Some significant innovations that companies have introduced, or are introducing, into their e-learning strategies, are discussed in the next section.

3. Where to now for corporate e-learning?

3.1 The gradual merging of LMSs and LCMSs

As discussed above, it appears that the distinction between LMSs and LCMSs has played out in different ways in higher education as opposed to industry. The education sector seems to have been inspired by the ideal of creating enormous, inter-disciplinary, inter-organisational repositories of sharable content objects that can be constantly drawn from, added to, and improved upon by educators. Teachers and learning designers in higher education have felt the impact of SCORM through their engagement with Learning Content Management Systems, and this has no doubt contributed to the growth of large, open-source LCMSs, with active volunteer developer communities,

such as Moodle and Drupal. One indication of the success of such platforms in higher education is the decision by the University of Southern Queensland (Australia), which recently won a Commonwealth Award for Excellence in open learning (USQ 2006), to replace the commercial LMS, WebCT, with the open-source LCMS, Moodle at the start of 2008. (USQ 2008)

In contrast, the focus in industry-based training has, to a large extent, been directed more towards the administration, tracking and reporting of e-learning, “enabling detailed analysis of the effectiveness of (their) training investment.” (Nishtar 2006) Hence the hugely successful market for large, commercial LMSs which promise to rigidly administer employees’ progress through a linear path of prescribed programmes. This market continues to grow, despite the reservations held by many corporate trainers and managers as to their effectiveness. According to the Chartered Institute of People Development in the UK, for example, “e-learning is seen as ‘most effective’ by only 7% of organizations, yet 57% of organizations use this form of development in some capacity.” (CIPD 2008, p13) In addition, over half of the organizations providing e-learning feel that less than a quarter of their employees actually take up, or complete, e-learning courses. (CIPD 2008, p16) These statistics possibly reflect the same disjuncture between the corporate world’s preoccupation with the administrative functions of LMSs, and their recognition that many of the courses which are designed to be easily trackable are not achieving their pedagogical goals, as described in the anecdote at the beginning of this paper. The same dilemma seems to be apparent in the US corporate sector. According to Kranz (2008), who summarises the results of two major, recent surveys on the US training market (ASTD and Bersin and Associates), “30% of training last year occurred online – up from 7% in 2005 – an astounding leap. But the question as to whether it improves worker performance or not remains unanswered.”

Interestingly, it seems that the higher education and corporate sectors may be starting to see possible benefits in each other’s vision regarding learning content management. Brandon Hall (2008) notes that the distinction between LMSs and LCMSs is becoming blurred, as more and more LCMSs include LMS functions. Also, many of the large commercial LMS providers (e.g. Saba, SumTotal, SAP) have recently begun to add content management functions, as well as options for learner collaboration such as chat applications and discussion forums, to their platforms. (Frauenheim 2007)

The next section looks at the emerging influence of Web 2.0 on the next generation of LMSs, and the possible impact on corporate e-learning.

3.2 e-Learning 2.0 at the workplace?

Allison Rossett, quoted by Sloman (2007), paints a colourful distinction between the “stuff and the stir” in e-learning. The “stuff” consists of learning objects stored in LCMSs, and the “stir” refers to the collaboration amongst learners, made possible by Web 2.0 tools, that is making learning more interesting – and potentially more effective. Downes (2005) coined the term “e-learning 2.0” to reflect the learning opportunities inherent in recent developments such as social networking platforms, social bookmarking, the open-source movement (e.g. MITOpenCourseware 2002, Shuttleworth Foundation and Open Society Institute 2007), and the ability for individuals to rapidly create their own digital learning objects and share them with others.

The notion of e-learning 2.0 is becoming a reality in the EU. The HELIOS consortium – a European consortium of researchers set up to inform policy decisions on e-learning – has summarised the shift towards e-learning 2.0 as follows:

- “Learners create content, collaborate with peers through mechanisms such as blogs, wikis, threaded discussions, RSS and other means to form learning
- The learning experiences are learner-centred, taking advantage of many sources of content aggregated together in learning experiences
- Teachers (if any) and learners (students) are peers within social networking environment(s)
- Learning experiences are increasingly [characterised] by knowledge management, collaboration and search
- We are moving from “Communities of practice to social networking” (Downes)
- Finally, there is a shift from traditional learning applications and systems managing learning objects within a pre-defined architecture to an open learning environment composed of

interoperable, loosely coupled open-source platforms and tools aimed at supporting the social interaction of peers.” (Aceto et al, 2007)

While Naish (2007), in his research amongst companies applying for Brandon Hall’s prestigious US-based “Excellence in learning” awards, concludes that e-learning 2.0 is not yet mainstream in the corporate sector, Wilson (2007) notes that there is a rapidly growing awareness amongst companies concerning the nature of the content management challenges they are facing. Frauenheim (2007) notes that there is an increasing demand within industry for training programmes that encourage informal learning and peer collaboration – a trend he refers to as “water cooler 2.0”. For one thing, he notes that the ease with which individuals can create customised learning materials for their colleagues, using tools such as Microsoft’s PowerPoint, Articulate’s Presenter application and Adobe’s Captivate 2 product, has led to a decrease in reliance on off-the-shelf training programmes that may be less relevant.

Taking “water cooler 2.0” to the next level is the emergence of serious gaming within pockets of the workplace e-learning sector. Hoyle (2007) gives an example of a simulation game on client relationship management produced by a consultancy firm using an e-learning authoring tool. The game was relatively simple from a technical point of view, but highly compelling and effective as a learning tool.

Although some of this game-based training is taking place outside of the confines of LMSs, such as the courses offered by IBM to its staff in the 3D, online virtual world of Second Life (Frauenheim 2006), Burgos et al 2007 point out that it is possible to create games, or repurpose existing digital games, within a SCORM conformant format for use on LMSs.

These examples are probably not representative of developments in the corporate training sector as a whole, but they do point to some interesting directions for companies that are willing to go beyond the confines of closed, packaged content on LMSs. For mainstream corporate training programmes, however, there may be several advantages to retaining LMSs for the foreseeable future. For example, Alexander (2008) points to the relative ease of initiating instructors/ trainers into the strategies and techniques of technology enhanced teaching within the structure of an LMS. He also notes that there is nothing within the architecture of LMSs that prevents learners and teachers from creating hyperlinks to the World Wide Web, thus allowing for links to learner-generated media such as wikis and blogs, as well as to synchronous VoIP programmes if these are not included on the LMS platform. Wilson (2007) advises training departments to use content on the LMS for employee support, for example in the context of informal, peer-to-peer learning. Hoyle (2003) suggests integrating learning objects into people’s daily work routines in the form of job aids, rather than keeping the learning materials “locked up” in LMSs, where they are inaccessible to most employees.

Finally, it is worth noting that, in anticipation of the release of the next version of SCORM, a Teaching and Learning Working Strategies Group (TLWSG) has been set up under the auspices of LETSI. According to the LETSI website, “The purpose of the TLWSG is to provide input on teaching and learning so that SCORM 2.0 will support and facilitate a wide variety of teaching and learning strategies.” (LETSI, 2008) Let’s see...

4. Conclusion

This study has attempted to shed some light on a dilemma facing corporate training, namely that the demands for both pedagogical soundness and administrative efficiency appear to, at times, be at odds with one another. The conflict may be worked out in the SCORM arena, as SCORM seems to promise different things to different people, depending on whether their orientation is towards learning design or administration. Decisions about the choice of LMS to be used, the kinds of materials to be offered via LMSs, and the ways in which those materials are to be integrated into a broader, more informal and collaborative learning environment, need careful consideration, and should be made by management together with learning designers. It is likely that all stakeholders will need to engage in a shared learning curve in order to be able to understand each others’ concerns and expectations, and to fully understand the various options available and their consequences. Training administrators need to be aware that an overemphasis on data tracking can have negative implications for the learning process. Learning designers need to engage in the debates that are currently taking place in the field, and explore the exciting possibilities for learning design based on Sharable Content Objects.

Management needs to promote a culture of open dialogue and learning amongst those responsible for teaching at the workplace.

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