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Learning Object Evaluation: Challenges and Lessons Learned in the Hong Kong Context

Jennifer Jones
Consultant
jadesong11@yahoo.ca

Carmel McNaught
The Chinese University of Hong Kong
carmel.mcnaught@cuhk.edu.hk

Abstract: This paper discusses a peer evaluation process that was developed for, and trialed on, Learning Objects funded by the LEARNet project in Hong Kong. The paper begins with a discussion of Learning Objects and the need for evaluation. It then outlines the rationale for choosing peer evaluation in the Hong Kong context, how the peer reviews were conducted, the obstacles faced, and the resulting recommendations for future evaluations.

Introduction

With the importance of eLearning growing every year, producing and locating quality resources is a major focus of educational institutions and communities; but what is the most effective and cost-efficient way of answering this need? The expense of producing resources has led many educational communities to the idea of sharable Learning Objects (LOs), which not only reduce the economic burden on individual institutions but also provide a competitive edge over those institutions which do not share their resources (Downes, 2001). Over recent years a number of eLearning and LO digital repositories (Table 1) have been created to help educators catalogue and find available resources in their field. In Hong Kong, the LEARNet project (<http://learnet.hku.hk/>) was set up to encourage both the development and sharing of quality LOs among Hong Kong's tertiary institutions. These LOs, catalogued within the Learning Resource Catalogue (LRC), were to serve as exemplars within the Hong Kong context – ideally, seeding further development and sharing of resources among Hong Kong universities.

Title of Repository	URLs (accessed 31 March 2005)
Apple Learning Interchange	http://ali.apple.com/ali/resources.shtml
Ariadne Foundation	http://www.ariadne-eu.org/index.html
BELLE (Broadband Enabled Lifelong Learning Environment)	http://belle.netera.ca/
Canada's SchoolNet	http://www.schoolnet.ca/home/e/
CAREO (Campus Alberta Repository of Educational Objects)	http://careo.ualgary.ca
CLOE (The Co-operative Learning Object Exchange)	http://cloe.on.ca/
EdNA (Education Network Australia)	http://www.edna.edu.au/
eduSource	http://www.edusource.ca/
IDEAS (Interactive Dialogue with Educators from Across the State)	http://ideas.wisconsin.edu/
LRC (The Learning Resource Catalogue)	http://www.learnet.hku.hk:8052/
Merlot	http://www.merlot.org
Splash	http://www.edusplash.net/
Wisconsin Online Resource Center	http://www.wisc-online.com/index.htm

Table 1: A Selection of eLearning and Learning Object Repositories

Learning objects are of interest for both education and training because they are flexible and have been designed to answer an educational need for tailored, adaptable online learning (Gibbons, Nelson & Richards, 2000). As pointed out by Friesen “governments around the world are spending large sums of money on initiatives that promise the development of learning objects, learning object metadata and learning object repositories to store both this data and these objects” (Friesen, 2004, p. 59). LOs are defined in the literature in numerous ways. IEEE's definition of an LO

as “any entity, digital or non-digital, that may be used for learning, education or training” (2002, p. 6) lacks the specificity that many educators are looking for. An alternate definition, which states that LOs are “educational materials designed and created in small chunks for the purpose of maximizing the number of learning situations in which the resource can be utilized” (Wiley, 2002, p. 2), brings in the ideas of reusability and adaptability. LEARNet’s description followed this more specific line and described LOs as units of learning that are reusable, updateable, aggregatable and tagged with metadata.

As pointed out in recent discussions (Agostinho, Bennett, Lockyer & Harper, 2004; Boyle, Bradley, Chalk, Jones, Haynes & Pickard, 2003), the initial focus of LO literature has overwhelmingly been on delineating the concept of LOs, their technical specifications and their metadata. This imbalance has led to a call for greater consideration of pedagogical purpose (Agostinho *et al.*, 2004; Jonassen & Churchill, 2004; Wiley, 2003), reflective practice and evaluation (Laurillard & McAndrew, 2003). The challenge for any LO project is to develop a reflective and evaluative culture that will not only help developers improve their products but also gives users confidence that a specific object is worthy of further investigation and potential reuse.

What Kind of Evaluation?

The aim of the LEARNet evaluation project was to develop and trial an evaluation scheme which the LEARNet project developers and potential users could utilize to determine the quality of LOs. There were three main goals for the evaluation. First, the evaluation needed to provide users of the LRC with credible information about the quality and potential usefulness of the LOs. Second, it needed to provide the developers with feedback and evidence from peers regarding the perceived quality and potential usefulness of their LOs. Last, it was to act as a practical and sustainable evaluative model which could be applied to subsequent LO development. Given the increasing pressures that face higher education, an overriding consideration was the need to create a pragmatic model that could be carried out within a relatively short time frame.

Taking these goals and needs into consideration three different evaluative models were considered – expert panels, user trials and peer reviews. Setting up an expert review panel, much like the one set up for MERLOT was considered. Having a panel of experts all familiar with concept of Learning Objects, the LRC and an agreed set of standards would be ideal. However, belonging to such a board would represent a significant commitment of time and, unlike similar editorial boards for academic journals, there would be little or no professional recognition from the board members’ universities. It was noted by some LEARNet committee members that similar panels in Australia had great difficulty recruiting and maintaining membership of such panels. For example, Taylor & Richardson (2001) were commissioned by the Australian government to develop an expert peer review system for ICT-based learning resources. After extensive consultation across the country, they produced a detailed proposal that, however, was never implemented. Therefore, the LEARNet committee felt that the creation of such a panel might be a goal to aim for at some time in the future but was not a realistic option at the present time. User trials were considered to be a supplementary step, which could be carried out by the users of the object; however, the time frame for such a trial is often a semester and so was deemed inappropriate as a sustainable model. With expert panel reviews and trials having been ruled out by the committee, the evaluation team turned to the idea of peer reviews. Peer reviews were seen to have the advantage of being less labour- and time-intensive and would create an evaluation model which developers could use themselves, while also trialing potential questions for a future LRC expert panel.

Developing a Peer Review System

MERLOT and CLOE are two repositories that have worked to establish quality measures on the resources in their catalogues and both have put evaluation schemes into place. CLOE’s evaluation works more as a gatekeeper, setting a minimum standard for the LOs to pass in order to be published in the repository. MERLOT reviews selected objects after they are listed and then displays the results of the formal peer and informal user evaluations for all members to view. Drawing on the evaluation suggestions of Williams (2000), Reeves and Hedberg (2003) and those of other digital repositories (Table 1), a set of questions were drafted for the evaluation process and sent out to the project developers for feedback. Taking into account differences between the various LOs and the LO developers’

comments, a customized set of questions was created for each LO. If necessary, these questions were negotiated with the LO developer.

During this process we discovered that the LOs seemed to fall into one of two groups – content LOs (in which the content was included in the LO) and LO tools (where the content was provided by the user of the object). Among the 17 completed LO evaluations, five were of LO tools – an interactive graphing object, an ePortfolio tool, a matrix calculator, a metabolic calculator and statistics simulation software. The applicability of these tools to several discipline areas was of especial interest to us. Despite the fact that we found the evaluation process difficult, the designs of several of the LOs that we examined were very interesting indeed. These LO tools, in particular, were designed to support adaptability which Parrish (2004) noted is one of the most challenging aspects of LO reuse potential. It should be noted that this paper is focused on the process of evaluating LOs, and is not a report on the quality of the LOs themselves as separate entities.

Design & Functionality	
1.	The navigation system is easy to use.
2.	The information, graphics, etc. are uncluttered.
3.	The Learning Object uses highly readable colors, fonts and text sizes.
4.	The [audio and video] operate smoothly. (Substitute as necessary – Flash programs, video, animations, PowerPoint presentations, etc.)
5.	The [audio and video] are of good quality.
6.	Manipulating and entering content into the Learning Object is straightforward
7.	The tool operates smoothly
8.	The interface is easy to use
9.	<i>Comments about the Interface Design</i>
Quality of Content	
10.	The Learning Object is free of spelling/ grammar errors.
11.	The Learning Object is free of informational errors.
12.	The content of this Learning Object is up-to-date.
13.	The Learning Object has a clear set of instructions/help files that support the user's needs well.
14.	The Learning Object has made suitable reference to credible references.
15.	The content is well organized and all information can be easily located.
16.	<i>Comments about the Quality of the Content:</i>
Learning Potential	
17.	The Learning Object could aid students' understanding of the concept(s) or topic(s) being presented.
18.	The Learning Object provides opportunities for higher-order thinking.
19.	Learners are required to use the Learning Object in an interactive way.
20.	The Learning Object provides the learner with appropriate and useful feedback.
21.	The Learning Object could be easily incorporated into larger collections of content (i.e. traditional course structures).
22.	<i>Comments about the Learning Potential:</i>
Record in The LRC	
23.	An accurate web address to the Learning Object is given. (Or 'Clear information about how to obtain a copy of the resource is given'.)
24.	The educational aims/goals described in the LRC record accurately describe those of the Learning Object.
25.	The educational level is clearly identified in the LRC record.
26.	The author has given enough information for users to use the Learning Object effectively.
27.	Overall, the information given in the LRC record accurately matches the Learning Object.
28.	<i>Comments about the Resource Record:</i>
Overall	
29.	Overall, I would rate this Learning Object highly.
30.	<i>General Comments about the Learning Object:</i>

Table 2: Basic set of evaluation questions used in the LO evaluations

This distinction between content LOs and LO tools required different focuses within the question sets. In some cases, the LOs were a combination of both types (i.e. tools with sample content). The questions focused around four areas: Design & Functionality (the user friendliness of the navigation, the functionality of the LO's technical aspects, etc.), Quality of Content (this section was not used for LO tools), Learning Potential, and The Quality of the LRC Record (metadata). After the evaluation questions were set for each object, an evaluation website was created and sent to the peer reviewers who then evaluated the LO and its LRC record. Table 2 contains the basis set of evaluation questions that were customized for each context. A standard five-point Likert scale was used. Instructional notes were included with each section.

The peer reviewers were usually nominated by the LO developer; however, at times the evaluation team also nominated reviewers. The original aim was to have six subject area peer reviewers volunteer to look at each object. In practice, the projects averaged just over three reviewers each. Subject area reviewers were chosen over instructional design experts because we felt it was important that reviewers had a familiarity with the concepts being presented in the LO and with teaching such concepts to students. This would enable them to provide knowledgeable feedback on the 'Quality of Content' and 'Learning Potential' of the LO. The areas of Design & Functionality and the Quality of the LRC record were not designed for instructional designers or metadata experts. Instead we wanted to get an idea of how 'comfortable' potential users, such as the peer reviewers, felt with the design and cataloguing of the LO (for example, was there enough information for them to find and use the LO, could they easily navigate using the LO's interface, etc.).

After the evaluation had been completed by all of the reviewers the data were compiled into reports which showed the quality ratings (displayed as star ratings with one being the lowest and five being the highest) of the LO on the various scales. Sample reports are at <http://learnnet.hku.hk/production/evaluation/reports.htm>. Links to the reports were then placed in the LO's resource record in the LRC.

The Evaluative Experience: Challenges

Arising from this project we identified a number of challenges related to LRC evaluation tools, project management, and peer reviewers.

Evaluation Tools

The initial goal was to set up the peer review within the LRC using the evaluation tools that were available at the time. However, upon investigation of the available LRC review and evaluation tools, we discovered that they were not suitable for our needs and concluded that due to time constraints it would not be possible to wait for the LRC tools to be updated. This does point to the need for developers of LO repositories to consult educational evaluators when designing and building systems.

Project Management

The project leaders had all received small grants to build or repurpose learning objects, so as to fairly quickly populate the LRC with some high quality LOs. However, the speedy development and evaluation plan was not realized. In all, 36 LEARNet projects were funded in three stages – 17 in Round 1, 12 in Round 2 and 7 in Round 3. At the time that the evaluation was conducted (late 2004) several of these LO projects were not completed even though they had received funding a year previously. Nineteen projects were completed by the evaluation cut-off in late 2004 and 17 were evaluated (Table 3).

	Total #of new projects	# of projects completed by cut-off	# of projects evaluated
Round one	17	9	9
Round two	12	9	7
Round three	7	1	1
Totals	36	19	17

Table 3: Number of Projects Completed and Evaluated

Being involved in an evaluation process was a stipulated part of the grant. However, some of the project leaders were clearly not aware that they were obliged to evaluate their resource in some way. As the grant money had been dispensed and spent, we had little 'hold' over the LO developers. For many, the evaluation phase was a very low priority, and several LO developers were slow in producing a list of reviewers and slow to giving feedback on the proposed questions. All this points to the need for clear and explicit project management and a tighter ongoing communication between the LEARNet team and individual LO developers.

It should be noted that once the evaluation had actually been completed, the project leaders were pleased with the reports they received. Perhaps our challenges with this process would be less in the future, as the 'academic grape vine' spreads the word that evaluation is actually useful.

Peer Reviewers

As expected with something new, there was a great deal of email and phone contact with the peer reviewers in order to explain the method of doing the review. Despite having agreed to be reviewers, the response rate was low. It was noted that we had improved responses when reviewers were provided with a stricter timeline – being pleasantly assertive seemed to work! As the LO developers recruited the peer reviewers, the reviews were not blind; the reviews were largely positive, though there were often comments to justify opinions. However, we cannot rule out the possibility that the reviewers were somewhat biased and did not wish to upset their colleagues.

Recommendations

There are three main observations that we wish to make about this experience. These are:

1. The need for a well managed project
2. The need to communicate the importance and purpose of evaluations
3. The need for feedback into the community of practice

Points 1 and 2 have been discussed briefly under the 'Challenges' section above. In order to address point 3, we constructed resources which have been incorporated into the LEARNet website in order to support any future evaluation attempts (<http://learnnet.hku.hk/production/evaluation/index.htm>). There is:

- a checklist for LO developers (<http://learnnet.hku.hk/production/evaluation/Checklist.htm>);
- the set of generic evaluation questions with commentary (<http://learnnet.hku.hk/production/evaluation/GenericQ.doc>); and
- some help files. Extracts from these help files are listed here.
 - Set firm, short deadlines of two to three weeks. If an extension is necessary, try to limit it to one week and do not continue extending it beyond that period. The experience during the trial was that peer reviewers who did not respond within that time were unlikely to respond even if they were given more time.
 - Make sure that you include enough information for your evaluators to understand the purpose of the evaluation and how to complete the questionnaire. However, also make sure to keep it as simple as possible. Do not overwhelm them with too much information.
 - Make the process as simple and time efficient as you can for your reviewers. For example, if they need to become a member of your site or the LRC, help them by setting up the account in advance and then give them the login and password.
 - If the Learning Object is a package that people must download and install, make sure that clear instructions on how to do this are given. Do not assume that the evaluators will just intuitively know how to do this.
 - Make sure to inform the reviewers of any technical requirements the LO may have. For example, is it PC only, do you need IE 6.0 or higher; or do you need to install plug-ins.

Indeed, this paper is an offering to the community of teachers and developers who are interested in developing, sharing and using LOs.

Conclusion

As noted previously, the primary push of the LO community has been to define, create, catalogue and distribute LOs with limited attention given to evaluation. The goal of the peer review was to gather evidence as to the quality of the

LO within a short period of time and hopefully start a community evaluative approach where future users would feed back into the process. However, the whole evaluation process was problematic. We believe that evaluation is an essential aspect of LO development and sharing in order to ensure that we build up LO collections of high quality.

An evaluation culture needs to be developed and this requires space and time for dialogue and reflection. One possible way forward is not to assist LO developers with 'quick fix' evaluation strategies as we tried to do. This culture change may be better supported by a series of small action research projects involving teachers who are keen to gather evaluation data. Their LOs could be evaluated in peer reviews and in user trials, as seems appropriate, and the results well disseminated. Incremental change may seem slow but may well be the only truly sustainable evaluation strategy to adopt.

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