LIFELONG LEARNING TEACHERS' NEEDS IN VIRTUAL LEARNING ENVIRONMENTS

Josep Maria Boneu Castells , Maria Galofré Olsina, Julià Minguillón Alfonso
Universitat Oberta de Catalunya, Barcelona, Spain
{jboneu, mgalofre, jminguillona}@uoc.edu

1. Introduction

The increasing use of repositories of integrated learning objects in e-learning environments, whether as a complement to the traditional education (blended learning), or as a common tool in distance learning by means of new technologies (virtual learning), is a clear indicator of the importance given to the organization of the educational resources, with a clear common objective, as it is the reusability of these resources in different educational experiences. Any educational experience requires the use and generation of educational resources that are candidates to be reused in a later experience [1].

Due to the continuous changes in the scope of the learning environments, the teaching staff needs training to gradually adapt to the new technologies and new standards that appear, such as LOM [2], SCORM [9], or IMS-LD [8], in a lifelong learning approach; in this context, it is necessary to adapt the necessities of the standard to the characteristics of the educational situation where the repository is used; in addition, the resources must be tagged appropriately, otherwise it is very likely that the chosen standard is insufficient to describe certain aspects, like the specific aspects of teaching using virtual environments, or on the contrary it may include a great amount of description that is irrelevant for the required purposes.

In this paper we present an educational experience for consultants, in which the objectives were to train the consultants in the use of standards for the description of learning objects, and to get them to know and also obtain feedback from them on the application profile that was being designed by the UOC contents management team for the access to Learning Object repositories within the institution.

2. Teaching in virtual learning environments

The Open University of Catalonia[1] (UOC) is a completely virtual university that offers 20 certified (officially approved) degrees and three official masters that give access to the Ph.D. studies, with around 40000 students and 1800 people among educational, academic and technical personnel. The virtual campus of UOC is a virtual learning environment that allows the users to communicate independently at any time by means of an online email system, fomenting asynchrony. Among other services it contains a virtual agenda, news, virtual classrooms and laboratories, a digital library and other IT related tools. The pedagogical model of the UOC [5] is focused on the student, making him/her the center of the learning process. Each subject is taught in a virtual classroom containing all the necessary elements and resources for the learning process: the email, the specific documentation, the activities to be done, the educational plan, the assessment criteria, the notice board, the forums, the space for debate, etc. The virtual classrooms of the campus are the meeting point for the students to gather around the different activities to be developed. The educational plan shows the objectives for each subject, as well as the activities, the methodology of the learning process, and the assessment criteria. Consultants need to adopt this methodology as part of the teaching process.

---

[1] http://www.uoc.edu

2.1 Learning Resources in the virtual classroom

Within the virtual classroom there is a space called Classroom Resources that allows the teacher to organize all the contents that the students will have to use to work on the proposed activities, as well as other additional contents that can be useful for the learning process. Depending on the subject's typology, there will be accordingly different types of resources available in the classroom resources space, although all these share the same organizational structure:

- Materials of the subject: these include the connections to the educational materials in HTML format and/or PDF, equivalent to the text book, sectioned in modules.

- Tools and support elements: these include additional material of interest for the learning process, like examples of previous semesters (exercises, practices, exams, etc.), recommended readings, etc. It is in this space where students can look for and use most educational resources.

- Sources of knowledge: these include external links to different documents, recommended bibliography, data bases, content suppliers, etc., that can be of interest for the students.

Although all these resources are accessible by means of a space that guides the students to find what they need, following a "browsing" strategy, they also are a part of the university's digital library, and as such can be located following a strategy of "searching". The new organizational and classifying needs brought about by the technological and methodological changes make it necessary to label the resources according to their basic characteristics (format, etc.), but also according to the specific features of their use (subject, etc.), therefore, an application profile must be defined following the established criteria of reusability in each case.

3. Competence development

Since its beginning in 1994, the UOC virtual campus has been constantly updated in order to incorporate the newest technologies and methodologies which have a strong influence on the teaching and learning process. Several projects dealing with the use of e-learning standards such as LOM, SCORM and recently IMS-LD are changing the way learning resources are stored, searched, retrieved and reused in the virtual campus. Consultants need therefore to be familiar with all these standards and the metadata policies established by the institution.

3.1 Competences for teaching in virtual learning environments

The UOC as a leading institution in the use of the new technologies offers its teaching staff training plans in the new technologies for their adaptation to the new learning environments based on the IT. The university entrusts the educational attention of the students to external consultants, always under the coordination and supervision of the teaching staff of the UOC. These consultants, experts of recognized prestige in their field of knowledge, are not required to have experience in virtual teaching. The UOC is not only in charge of facilitating them the beginning of their educational collaboration as virtual teachers through a supervised activation process, but also tries to provide them throughout the time they collaborate with the university with all the attention and information they might need for the appropriate development of their educational functions. In addition, it offers them the opportunity to improve their virtual educational abilities from the semester supply of updating training courses on the following areas:

- Linguistic and writing competences: in order to work as a teacher in an asynchronous virtual environment, it is precise to have a high competence in written expression, and specially, to command the adequate registry for an educational communication based on the use of electronic mails.

- Methodological competences: to deepen specifically in the knowledge of the educational methodology in virtual learning, being centered in the university's own educational model.

- Technological competences: it is fundamental that they have sufficient knowledge of the technological tools that they have available to improve their skills as virtual teachers, and keeping constantly updated in this field.

- Institutional and legal competences: It is important to know the institutional and legal context in which they must develop their activity so that they may know the implications it can have. For example, it is required to have some basic knowledge about intellectual property issues for publishing educational resources or the basic aspects of the application of the European Space for Higher Education.

These updating training courses are free for consultants, and once these are successfully completed, a completion certificate is issued. The courses for the teaching staff are developed in an identical classroom to the one used for their teaching, and exactly following the same educational model as the one used in the university (they have a person in charge of the educational attention of the course, materials and teaching resources, can interact with their class mates, all of them virtual teachers of the university). Therefore, they can understand the way students interact with the virtual campus and how they proceed with the learning process. In this way, these courses fulfill several functions:

- They offer updated training for the improvement of the university consultants' competence in virtual education, which without any doubt will bring about an improvement to the educational quality offered.

- They help the staff to experience the educational model of the university from the point of view of a student, which undoubtedly will enrich their view and will allow them to better understand and respond to the necessities of their own students.

- They reinforce the existing bond between the university and its educational consultants.

- They serve the university as a test-bed in which technological innovation projects can be shared by all the teaching community, which benefits both the consultants' individual work but also the whole implementation of the UOC's teaching practice. In this context, it was decided to offer training in standards for the description of learning objects, giving the educational consultants access to one of the most recent fields of study in education and technology.

In this context, it was assumed that educational consultants should be trained in standards for the description of learning objects, as the way to provide them with the necessary skills for developing their teaching practice in the field of education and technology investigation.

3.2 Training for consultants in description of learning objects standards

With the objective to present the existence of different e-learning standards for the description of pedagogical resources, two courses, one in May and another one in November were imparted, of an approximated duration of 30 hours each one. In these courses a total of 118 consultants divided in two classrooms participated altogether, one classroom had Catalan as the language of instruction while the other one was conducted in Spanish. This makes around 30 students per virtual classroom. The course focused on the LOM standard, its categories and elements, its use and application profiles, and the use of tools specialized in the generation of XML files to mark the resources, facilitating the reflection on the practical use in educational situations.

Computer literacy as a user of desktop packages and Internet was a requirement to register for the course. The contents of the course were determined upon the objectives previously described, and to support these, two activities were proposed, as well as three debates that were complemented with the materials distributed during the course; the two activities and three debates focused on the following:

- Classification system of pedagogical materials used by each individually, deficiencies of the classification and location of resources in a system based on a structure of directories and descriptive file names, or following notes, and necessity of the use of a metadata file for the description and location of educational objects.

- Identification of the attributes necessary to describe the educational materials and to identify the necessity to use an application profile in our working environment.

- To identify and understand the necessity to define the smallest learning object to facilitate its reusability, as well as the advantages and disadvantages involved.

- Debate on UOC LOM Application Profile, the moment it was made available to them.

UOC LOM Application Profile is included within project RUBICON [6] to create a deposit of re-usable objects, accessible by professors and students. Project RUBICON is within the frame of the UOC Contents Management Team. It is based on the CanCore for Guidelines for the Implementation of Learning Object Metadata that serves as a guide to implement the Standard Draft for Learning Object Metadata (LOM). In the first place there is a list of the elements, with the sub-elements in parenthesis to offer a general view:

• Title • Language • Description • Status • Size • Location • Duration	• Format • Learning Resource Type • Relationship (Kind, Resource (Identifier (Catalog, Entry), Description) • Authors (Role, Entity (vCard in RDF/XML), Date)	• Identifier (Catalog, Entry) • Educational Use (Purpose, Source, Taxonpath (Taxon (Id, Entry (StartDate, CloseDate)))) • Subjects (Purpose, Source, Taxonpath (Taxon (Id, Entry))) • Competences (Purpose, Source, Taxonpath (Taxon (Id, Entry)))

Table 1: List of the elements of the UOC LOM Application Profile.

4. Results obtained during the debate

The consultants where asked to discuss they organize their own resources, and how they do expect the organization to provide them with the appropriate tools for doing such task, both at their home or office and within the virtual classroom.

During the first contributions of the participants in the debate about the suitability of UOC LOM Application Profile, a difference was established between the necessities covered by this profile and the real situation of each participant, showing the difficulty of introducing the use of the concept of learning object and the appropriate metadata [3, 4, 7]. Thus, they agreed on the importance of the necessity to have basic tools for contents management that allow a simple organization of contents beyond the possibilities that the operating system of folders and directories offers. All the participants also agreed on the difficulty that entails to find a suitable file name annotation that is sufficiently descriptive and at the same time easy to use; even so, this annotation would not either be sufficient to facilitate the filtrate and location of the wished resource. Therefore, it is necessary the use of additional files that allow describing the resources with the necessary attributes. The adopted solution on the matter will depend on the use in the personal activity of each one of the participants. For a correct use in a professional field, it is necessary that experts in resources cataloguing and description conduct a survey of the necessities of the institution and the resources that will be stored to establish the norms and procedures for the description of the resources, respecting the established conventions (other standards) to facilitate the interoperability between systems. The most outstanding attributes identified by the participants were:

- Year and/or Quarter, Course, Subject or Subject Code, Didactic Unit or Subject, Type of Material (Article, Notes, Solution, Activity, Additional Reading - webs, links, etc. -, Examination, Example, Practice, Guide of Study, Debate, Practical Case, Reinforcement Exercise, Review Resource, etc).

- Size, Dimensions or Duration (number of pages, estimated reading time for a Word document; for a PPT, number of slides; for an ACCESS number of registries, etc.).

- Pedagogical objective: exploration of previous ideas, elaboration of a new knowledge, application, generalization, etc.); Way of use (individual, collective, etc.); whether it has been used or not; Pedagogical Use of the Material (descriptive, interactive, self-taught, test, cooperative, training).

- Description of the materials with references to the pedagogical quality that we find from two points of view: to value the materials that integrate concepts, attitudes and procedures in the activities, that is to say, those that include a constructivist view of learning; and to value those materials that integrate different means: text, sound, image.

- Pedagogical requirements, Assessment of the resource, when the assessment is made (beginning, monitoring or end), Availability (in Internet, library - nº of copies -).

Other relevant comments made by the participants were:

- The materials of the UOC are mainly of a linear sequence structure, the type of interaction is expositive and the interaction level is low.

- StartDate and CloseDate would have to be in the LifeCycle category and not in the Classification category.

- The participants are worried about the complexity to elaborate an application profile, and use it to describe the resources.

- The authors should not be responsible for filling in category 9 of the LOM standard.

- Granularity and modularity of the learning objects will be positively valued, as contributors to the competence-based learning.

- The granularity of the learning objects will vary depending on the dominion of application and on the objectives raised in its educative program.

- It is considered necessary to include the element Technological Requirements.

Upon completing the two series of courses, the participants were offered the opportunity to give their opinion by answering a quality questionnaire, designed to assess, among other concepts, the activities proposed, the materials used, the methodology and development of the course, and the relationship between the consultant and the participants. The feedback provided by participants in the two courses was quite positive, though the second series was slightly better valued with over 80% of satisfactory opinions.Finally, participants valued the practical application of the course contents to their teaching practice for UOC slightly lower than the previous concepts, showing around 60% of satisfaction on this particular respect.

5. Conclusions

Nowadays any educational experience supported by IT needs and generates a set of educational resources that have to be organized in an efficient way for its later use. In the case of a virtual learning environment, where the students freely access the learning objects repositories, it is evident the necessity to select a methodology that is coherent with the pedagogical model and that allows the student to obtain the proposed objectives, by finding and using the appropriate resources.

In the UOC virtual learning environment, it is necessary to facilitate the reusability of the supplied resources, not only by the students to locate additional educational resources, but also by a system of contents recommendation integrated in a personalized learning process based on adaptive itineraries. This entails the necessity to have suitable metadata for the construction of such itineraries, in a semiautomatic way by an educational team made up of professors and instructional designers. The creation of an application profile is not free of difficulties: to maintain the compatibility and interoperability with other profiles and simultaneously allow and satisfy all the necessities for cataloguing of the group of users to whom it goes directed are two objectives normally opposed; the point of balance must be found, located between the specificity and the interoperability. On the other

hand, a teaching experience oriented to professors, management personnel and consultants was made with the objective to make known the application profile and to assess its limitations, in which the participants showed their desire and interest to include more descriptive metadato of the learning object and its pedagogical aspects.

At the moment, there are diverse projects related to the creation of learning objects repositories integrated in the virtual environment learning process. Among the various lines of investigation, some stand out: the one focused on personalizing the learning process by means of adaptive educational itineraries based on reusable learning objects, but also other compatible lines on content description by means of using ontologies to help solve problems of multiple representations, as it is the case of multimedia contents, where it is possible to use more than one standard (LOM, but also MPEG-7) to describe the same content from different points of view.

6. Acknowledgments

References

1. McNAUGHT, C. (4-1996) *Are learning repositories likely to become mainstream in education?*. Proceedings of the 2nd International Conference on Web Information Systems and Technologies, Setubal, Portugal, pp. 9-17

2. IEEE: WG12 (2002) *Learning Object Metadata*. http://ltsc.ieee.org/wg12/index.html

3. FARANCE, F. (2003) *IEEE LOM standard not yet ready for 'prime time'*. Learning Technology newsletter. http://lttf.ieee.org/learn_tech/issues/january2003/index.html#8

4. POLSANI, P.R. (2003) *Use and abuse of reusable learning objects. Journal of Digital Information*. http://jodi.ecs.soton.ac.uk/Articles/v03/i04/Polsani/

5. SANGRÀ, A. (2002) *A new learning model for the information and knowledge society: The case of the UOC*. International Review of Research in Open and Distance Learning.

6. UOC (2006) *UOC LOM Application Profile. Metadatos RUBICON*.

7. DUVAL E. (2001) *Metadata standards: what, who and why*. Journal of Universal Computer Science 7, 591–601.

8. IMS (2004) *IMS Meta-data Best Practice Guide for IEEE 1484.12.1-2002 Standard for Learning Object Metadata v1.3*. http://www.imsglobal.org/metadata/

9. SCORM REFERENCE MODEL http://www.adlnet.org/downloads/files/67.cfm