

eduBITE

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Educating Business and Information Technologies

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Abstract: Although there are a lot of web based e-learning solutions on the market, using these tools to design and organize courses still stays a very difficult task for most teachers. Within the eduBITE project a courseware system design tool (eduWeaver) was developed with the aim to support the courseware development process during the courseware design and implementation phases providing access to a learning object repository and a graphical language for course design.

Keywords: courseware design tool, learning object, repository, reusability

Introduction

A courseware system is a special form of a software systems characterized by multimedia e-content and special requirements on didactical standards. It is aimed to support learners and teachers during the distance learning process. There exists a variety of different types of courseware systems like monolithic CBT (Computer Based Training) courses, individual web pages built for resource download or online courses accessible via learning management systems (LMS). Although there exist a lot of web based LMS on the market using these tools to engineer courseware systems and to organize online courses still stays a very difficult task for most teachers.

Giving an online course a teacher is supposed to design a courseware system that supports the intended education process in an optimal way. In spite of the LMS the teacher has mostly at hand he has often problems

- to design the courseware system within a LMS according to the optimal education process,
- to author multimedia e-content because of the complexity of the tools and lack of time for this purpose,
- to find and reuse well suited e-contents that fit into their course context,
- to switch from one LMS to another because of interoperability problems.

Clear courseware system design rules, a graphical education process modeling approach supported by a tool and the access to a content repository would help to do the work more efficiently. In 2002 teachers of 5 Austrian universities and polytechnics designed a project called eduBITE (Educating Business and Information Technologies) to overcome these problems. The main objectives of this project are

- to develop e-content in form of learning objects in the field of integrated business information systems
- to support teachers with a computer aided courseware system design tool called eduWeaver. In analogy to a CASE-Tool (Computer Aided Software Engineering) this tool should be used during courseware system engineering to conceptually model education processes, to reuse learning objects and to generate courses ready to be used in a LMS. The focus of this paper is dealing with eduWeaver supporting the modeling of education processes.

eduBITE started in summer 2002 and has a running time of two years. It is funded by the Austrian Federal Ministry for Education, Science and Culture [bm:bwk].

Role of eduWeaver within EduBITE Project

In 2001 a group of about 10 Austrian university teachers made an effort to cooperate in IBIS (Integrated Business Information Systems) education to reuse their e-content within the group and to extend their e-learning efforts. Until this point in time they mainly taught in form of face to face courses using a lot of individual teaching and learning materials (slides, books, scripts, exercises). However the existing e-contents soon proved to be unusable for e-learning purposes because they were very inhomogeneous, overlapping but showed different levels of detail, monolithic, hardly combinable and mainly usable in face to face classrooms. So new e-content in form of reusable LOs had to be developed. LOs are self-contained reusable multimedia materials describing a homogenous chunk of content to be learned. LO can represent learning materials but also trigger communication processes. In general a LO should not proceed 10 – 30 minutes learning time and follow special didactical and technical guidelines.

The eduBITE team agreed to start with the e-content for a course dealing with the principles of IBIS for undergraduate students based on a demo-enterprise called deBITE. The developed LOs should be stored in a LO repository. With the objective to feed in other LOs to the repository in future, also flexible search functionality within the repository and a simple aggregation of LOs to courses had to be realized. To achieve this goals eduWeaver was put into place to serve as an LO platform and as a courseware system design tool. Figure 1 shows how eduWeaver is embedded in the eduBITE course development and course management process.

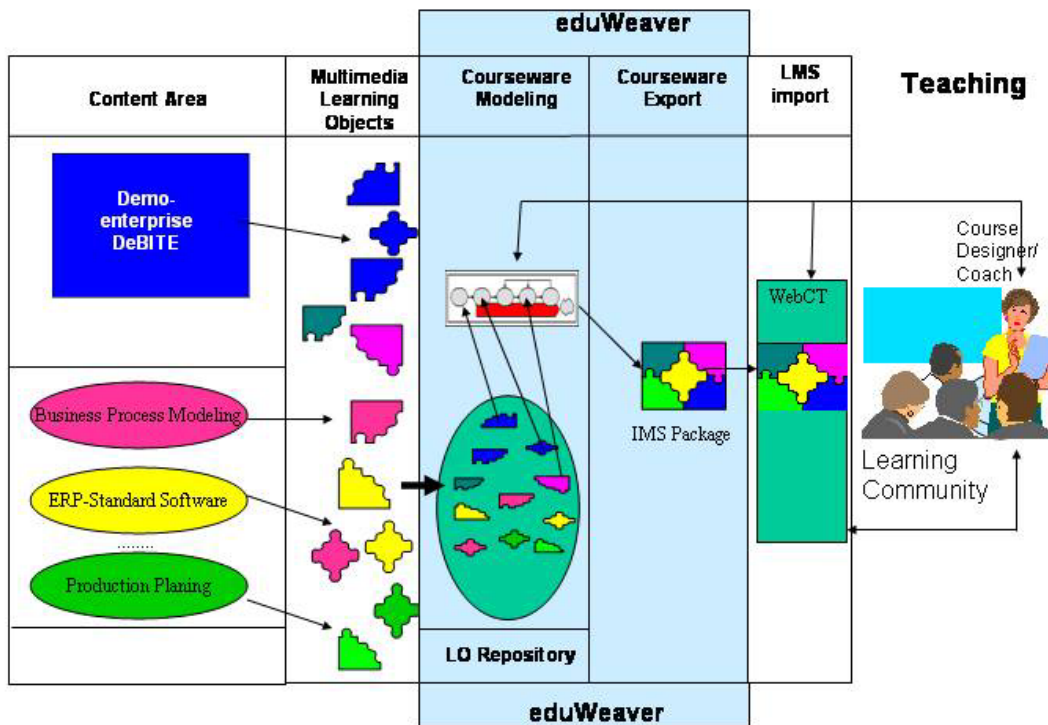


Figure 1: The role of eduWeaver in eduBITE

A teacher can slip into three different roles using eduWeaver. As content author the teacher can compose multimedia LOs and publish them in the LO repository by uploading and meta-indexing them. In the role of the modeler he/she can retrieve LOs from the pool and reuse them in order to compose and model graphically lessons, modules and courses. As a coach the export functionality into IMS content packages can be used in order to provide the multimedia courses through any IMS-compliant LMS.

Course Modeling with eduWeaver

EduWeaver is based on the metamodeling platform ADONIS® [BOC]. ADONIS® is a process modeling platform that allows the usage of common or newly defined modeling methods [Kühn]. Figure 2 represents a simplified part of the metamodel of eduWeaver.

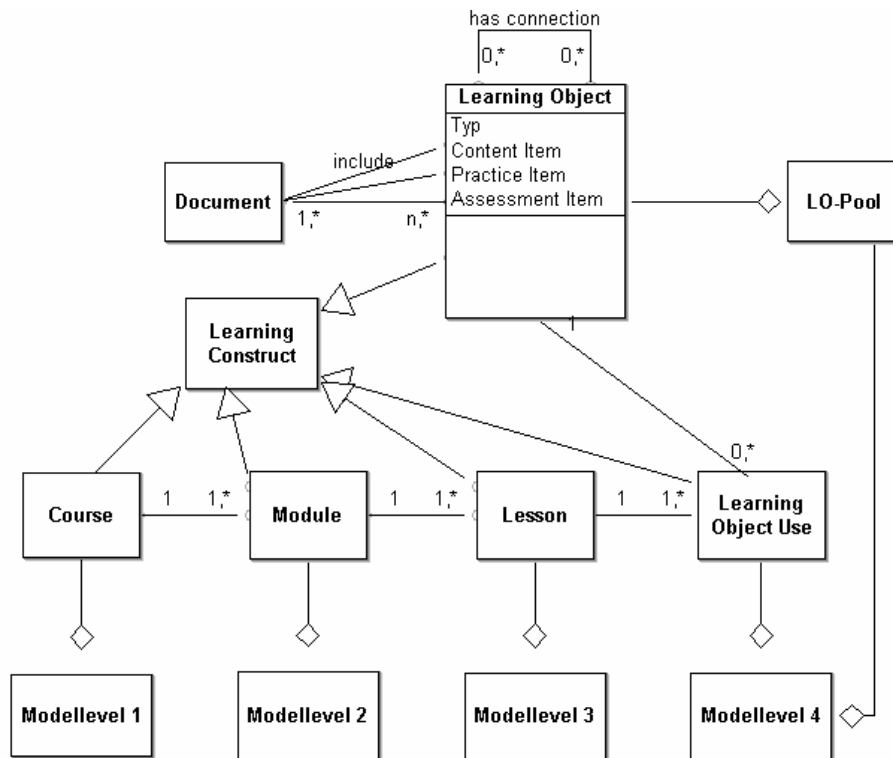


Figure 2: Simplified metamodel of eduWeaver focusing the modeling functionality

If learning objects are available in the eduWeaver LO-pool a teacher can start with the design of a new courseware system. EduWeaver offers 4 model levels consisting of the model types *course*, *module*, *lesson* and *learning object use*. These model types are hierarchically linked to each other by internal references.

On modeling level one, the highest level of abstraction, *courses* can be defined as independent units. On level two *modules* of a course can be defined representing thematically coherent learning units and their meaningful orders of sequence building a teaching process with possibly several different paths. Going deeper into courseware system modeling on level three *lessons* are modeled describing what happens in a module. Lessons correspond to one unit of about 45-90 minutes of learning time. Splitting the lessons into the smallest possible units the designer comes to the fourth modeling level, the level of learning object use. Here the LOs can be grouped and made part of the education process. In order to do so the designer defines references into the learning object pool. One lesson should consist of about 7 +/- 2 learning objects beginning with an overview and ending with a summary of all learning objects.

Figure 3 shows the details of a lesson consisting of three LOs and two different paths. This lesson is about process modeling and starts with an introductory LO to this topic. Then the learner can follow either with a theoretical LO or use a practical example. Then this lesson is finished.

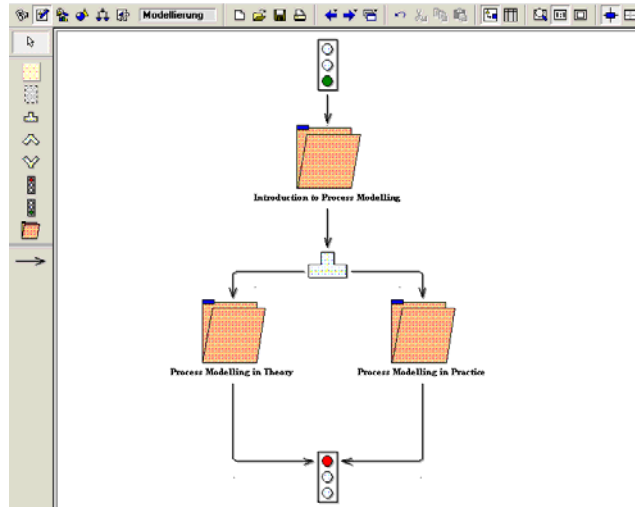


Figure 3: Simple example for modeling level 4

Conclusion

Multimedia e-content authoring and online course provision is becoming one of the most challenging tasks for teachers. Without access to reusable high quality learning objects in a user friendly, tool supported environment courseware development is very expensive or of low quality. This problem is aimed to be overcome by eduWeaver which provides user-friendly support throughout the course engineering process. By providing an open learning object pool, teachers are helped to exchange their e-content or to reuse e-content created by professional authors.

The main functionality of eduWeaver supports teachers in designing their courseware system by providing a graphical courseware modeling language. The export functionality of eduWeaver creates IMS packages consisting of the course structure as well as of the multimedia material, which can easily be imported into any IMS-compliant learning management system, allowing an easy provision of web-based courses. To be accentuated eduWeaver does not offer any authoring possibilities in terms of multimedia content creation neither fulfills functionalities of a learning management system, like students authentication, course provision or communication functions. On both sides the market offers highly sophisticated tools. EduWeaver supports teachers bridging the gap between these two sides and so making it easier to realize e-learning.

Future development possibilities for eduWeaver cover the handling of individual learning patterns and support personalized learning. So not only e-learning provision but learning on demand and life long learning become realistic scenarios in everyday life.

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