

Platform Independent Instruction Design - The Tool ADVISOR®

Judit Kotauczek, Dimitris Karagiannis

University of Vienna, Faculty of Computer Science, Institute of Knowledge and Business Engineering

Key words: *Instructional Design, Platform Independence, Reusable Courseware, Teaching Process Modelling, E-Education*

Extended Abstract:

Reusability of Courseware is one of the main research questions to be answered in the field of instruction design. [1,2] The main problem that arises by trying to reuse courseware is the dependence and inseparability of courseware from the used Learning Management System (LMS). Not only that export interfaces hardly exist, the fast development and turnover of LMS require an independent tool that allows the design of courses for e- or blended-learning settings and then the decision is to be made, which platform is being used for teaching. This paper introduces the conceptual idea behind platform independent instruction design and presents a tool called ADVISOR® [3,4] that provides a usable solution for the above mentioned problem.

1 Introduction

Platform independence in the context of instruction design has to be considered from two sides:

On one side complete courses should be reusable in any Learning Management System (LMS), on the other side the used materials within one course should have no or almost no restrictions regarding their formats. Figure 1 shows a general picture of these requirements of platform independence in the context of ADVISOR® [5]:

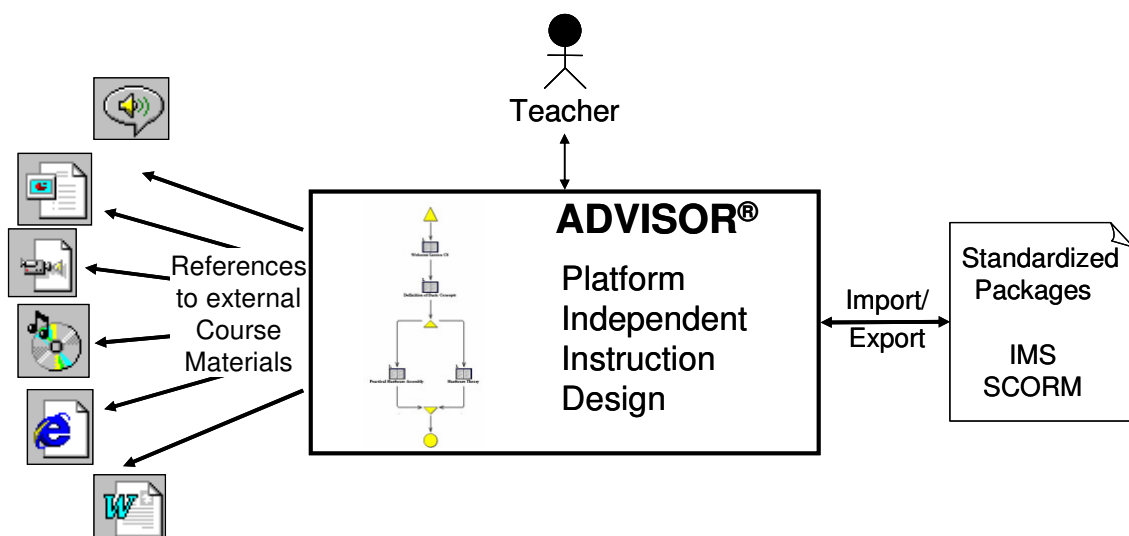


Figure 1: ADVISOR® and its platform independence

For the reusability of courses between LMS one thing is obvious: it hardly exists. LMS offer sophisticated course design functionalities, courses can be well composed, but once the course is part of the LMS, there is no possibility of exporting it – including the structure of the course – and import it into an other LMS.

The relevance of this situation is given by the emerging world-wide co-operation among educational institutes, especially in case of higher education, and the exchange of teachers, for example by the Socrates programme [6]. Giving a guest lecture at another institute using blended-learning components immediately runs into the question of implementing the course into an other platform. This is the one side of the necessity of platform independent instruction design.

The other side derives from the format of the used teaching materials. We are facing times of highly demanded blended learning, which means the necessary usage of ICT-components within teaching. It is easy to imagine that all teachers are good at multimedia programming, of at least that they easily use HTML, but reality shows another picture. Most teachers do not have any multimedia, or not even simple HTML-based resources. There is no budget to buy professionally designed online resources. What teachers have are written lecture notes or books and mostly power-point-based slides for the support of classroom teaching, when starting with blended learning.

When answering the demand of ICT-based teaching, the existing materials are not complying with the possibilities of LMS. Mostly only HTML-based materials are usable by LMS, no other formats are applicable. It takes a lot of expert's knowledge to change existing text- and picture-based materials into online-compliant resources. Besides these requirements, still one question remains: how is the blend within a blended learning course flexibly configured, if material format is strictly depending on the used platform?

2 ADVISOR[®]

The answer lies in platform independent instruction design.

Giving teachers a graphical based, easy-to-use, platform independent tool, they can design their courses without the need to show consideration of the used Learning Management Systems on the one hand, and easily use their existing materials of any format.

Based on this idea such a tool was developed at the University of Vienna within the project eduBITE [7], funded by the Austria Federal Ministry for Education, Science and Culture (bm:bwk) in the past two years. The tool was a further development of a process based education design tool of an EU ESPRIT project called ADVISOR [3].

The following picture shows the basic idea of ADVISOR[®] as a mediator between resources and LMS:

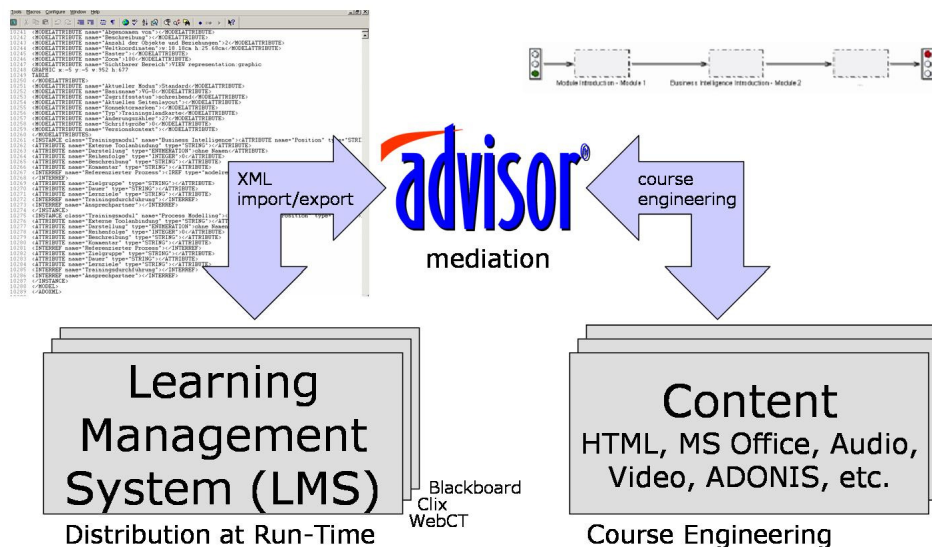


Figure 2: ADVISOR® as a mediator

A mediator between resources and LMS has to fulfil several functionalities:

- It has to provide an interface for existing teaching resources regardless of its format.
- It has to support teachers by the design of their courses, using the existing resources.
- The design has to be independent of any expert’s knowledge in multimedia programming, and so best to be done in a graphical way.
- There must be different levels of granularity, since it is up to the teacher, how exact and detailed he/she wishes to design the course – a connection of the levels by referencing is necessary.
- A standard based export interface is necessary in order to guarantee the independence of LMS and warrant the reusability of the courseware.

As mentioned before these conceptual ideas have been realized by the University of Vienna in the tool ADVISOR®. The tool provides following features in order to create platform independent, reusable courseware:

- Graphical courseware design on different hierarchies – from course map to learning object usage [8]
- Instruction design functionality by structuring learning objects of any format and learning activities in order to create lessons [1]
- Content management for the reusability of teaching materials
- Standard format (IMS [9], SCORM[10]) exporting of courseware on any level – courses, modules, lessons, learning objects – for the reuse in any standard compliant LMS

3 The Instruction Design Method eduWeaver

These basic requirements are met with the tool ADVISOR®. But the tool has one more advantage – there is no specific instruction design method defined. So teachers are not forced to learn something completely new, in case that they have already used a specific method for doing course design. The tool is a so called meta-modelling platform, providing several basic functionalities as described in chapter 2, and is absolutely open for defining any method for instruction design [4].

However an open platform without a method is not ready to use, so the University of Vienna, in cooperation with the University of Klagenfurt, the University of Applied Sciences of Vorarlberg, the University of Applied Sciences Joanneum Kapfenberg and the University of Applied Sciences of Wr. Neustadt developed within the project eduBITE [7] the instruction design method eduWeaver [11], that's main focus is the reusability of resources and the platform independent design of courseware. This method has been implemented on the meta-modelling platform ADVISOR®.

Following picture shows a general overview of the modelling method eduWeaver and the interdependencies between the different modelling levels regarding the granularity of the course:

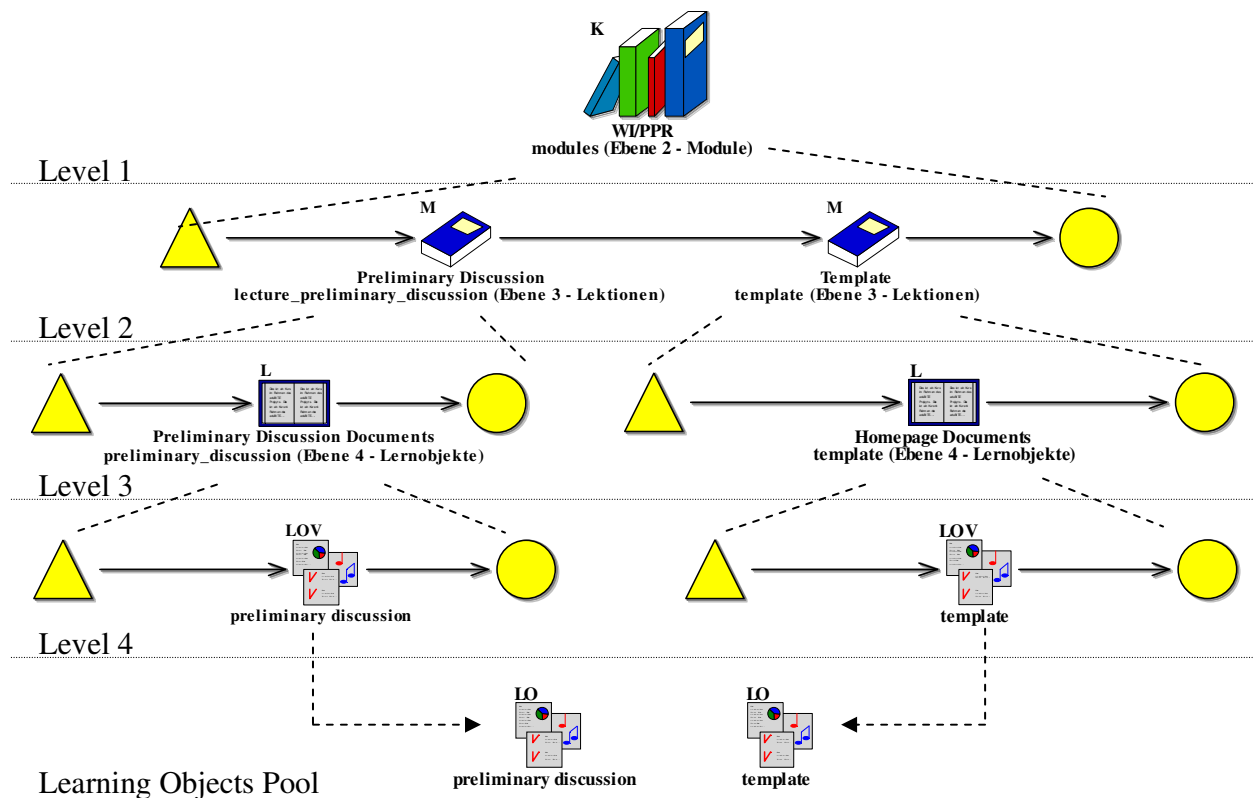


Figure 3: Schematic overview of the method eduWeaver

eduWeaver offers 4 modelling levels consisting of the model types course overview, course, module, lesson and the learning object pool. These model types are hierarchically linked to each other by internal references that allow a “zoom” into the course on different granularity levels.

On modelling level one, the highest level of abstraction, a course overview can be defined as a map of independent courses. On level two modules of a course can be defined representing thematically coherent learning units and their meaningful order of sequence building a teaching process with possibly several different paths.

Going deeper into courseware system modelling on level three lessons are modelled describing what happens in a module. Lessons correspond to one unit of about 45 or 90 minutes of learning time.

Splitting the lessons into the smallest possible units the designer comes to the fourth modelling level, the level of lessons. Here the learning objects 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.

4 Platform Independent Courseware Reuse

As discussed in the introduction one of the main problems teachers face nowadays is the dependence of courseware on the LMS it is used within. Given a platform independent conceptual modeling method, such as ADVISOR[®] does, the designed courses might be easily distributed through any LMS. This has the advantage, that once the modeling and design work is done, a teacher can provide the course at different schools having different LMS or in case that the school buys a new platform, a change is immediately done, by just importing the course into the new system, without the need to do a lot customizing work.

Figure 4 shows these steps starting by the modeled course, the creation of IMS Content Package and the result after importing the package into the LMS WebCT.

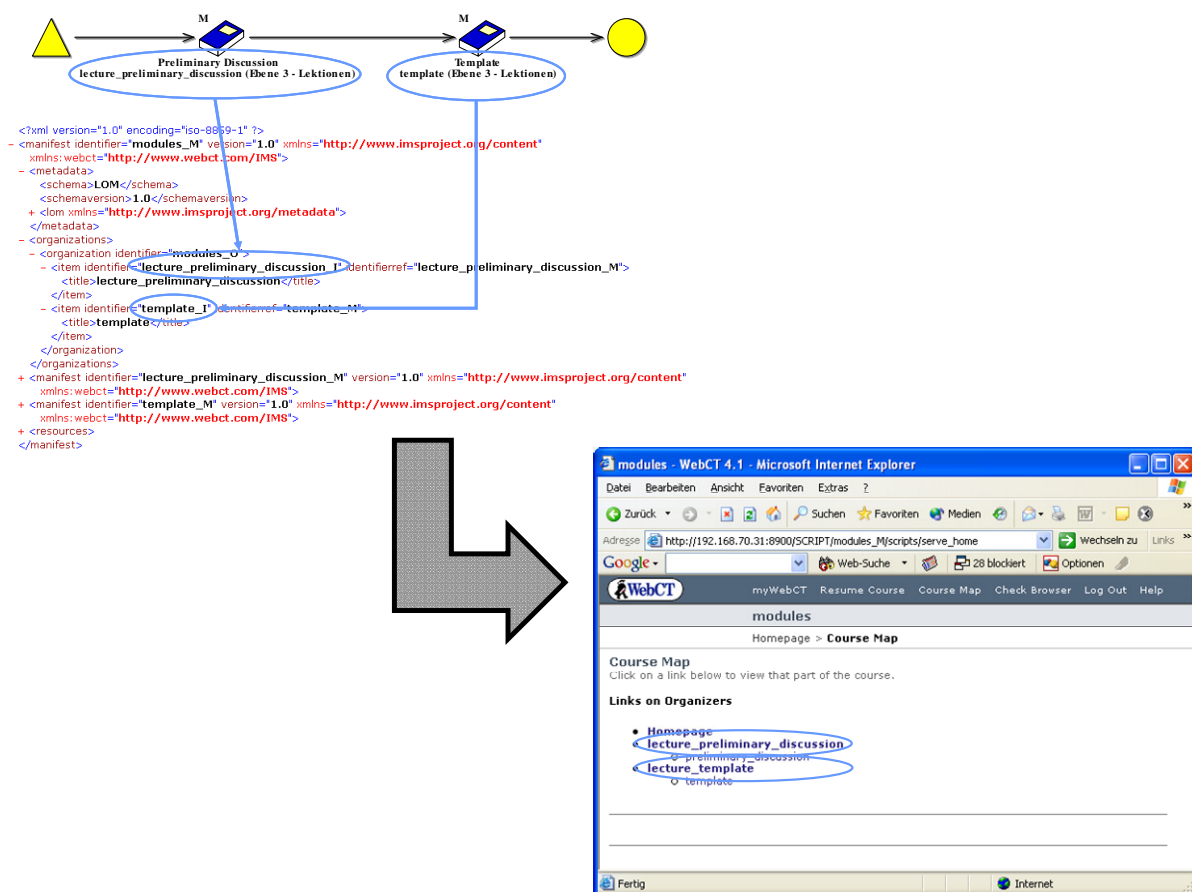


Figure 4: Steps of transforming the modeled scenario into IMS Content Packages and of exporting it into an LMS.

ADVISOR[®] does not only provide the standard IMS Content Package but also the SCORM format, since many popular LMS have an interface of this standard (Moodle, WebCT Vista, etc.).

5 Summary

This paper focused on answering the question, why is platform independence the main challenge to be met while offering blended learning to students. This question was approached from two sides – the offered resources must be free of format restrictions, to be easily used by teachers, and the designed courseware must be easily reused in and independent of any learning management system (LMS). So a mediation tool between existing resources and LMS is necessary. The conceptual idea and requirements to such a tool were introduced and the implementation of these ideas by the existing meta-modelling tool ADVISOR® was described. Further a specific instruction design modelling method, the method eduWeaver, was introduced in detail. Finally a practical example of the reuse of a whole course designed in ADVISOR®, using the standard IMS Content Package was shown.

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Author(s):

Dimitris Karagiannis, o.Univ.-Prof. Dr.
Judit Kotauczek, Mag.
University of Vienna,
Faculty of Computer Science
Institute of Knowledge and Business Engineering
Bruenner Str. 72
A-1210 Vienna, Austria
Phone: +43 1 4277 39581
Fax: +43 1 4277 39584
E-Mail: [dkljudit]@dke.univie.ac.at