Concept of a Web-based Application for Transforming Learning Patterns into Learning Packages

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Abstract. Educational patterns capture the essence of best practices in teaching in a unified structure to enable easy reuse of successful teaching scenarios. Patterns can be described and collected in digital repositories, enabling the further use of pattern descriptions to integrate teaching scenarios on digital learning platforms. However, between the pattern description in a repository and the presentation as a learning scenario on the learning platform, an interface must enable an individual transformation of the patterns as bridge to the learning platform. The Common Cartridge standard offers a possibility to describe teaching scenarios for virtual learning platforms uniformly on an XML basis as packages. Although there are already several authoring tools for the visual design of Common Cartridges available, an application for converting educational patterns into learning packages is missing. This poster presents the concept and first insights of a tool as a web application that enables teachers to plan, design, use, and reuse digital teaching scenarios from educational patterns. While the development is still in its early stages, this poster presents initial findings and insights into the web application Common Cartridge Builder.

Keywords: common cartridge · web-technology · patterns.

1 Introduction

Computer science teachers often experience that certain instructional approaches have been successful or some methods work well, but these cannot always be shared with other teachers because of individual teaching characteristics. Nevertheless, to capture these practices for reuse, patterns can be used to describe proven teaching strategies. The pattern approach originally comes from architecture [1] and was later applied in education [2] and has been used to describe teaching-learning-scenarios in schools [8, 10, 9], and in tertiary education for technology-enhanced learning [3]. Patterns can also be stored in a pattern repository to build the data basis for reuse in teaching practice or on a learning platform. As shown in Fig. 1, to transform the pattern representation into a real

teaching scenario, an interface is needed, which we introduce as the *Common Cartridge Builder* (CC Builder). Other parts of Fig. 1 are part of the context of several other developments (e.g., pattern mining), but these are not all presented here since this poster is focused on the CC Builder. The CC Builder combines patterns with an intended individual lesson plan.
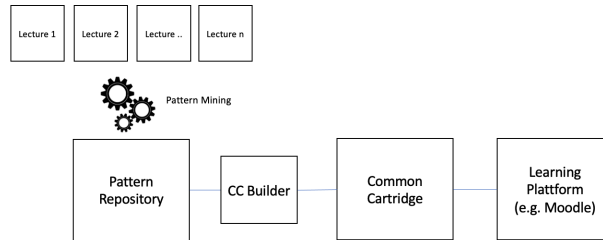
Fig. 1. Overall structure of the approach

The *Common Cartridge (CC)* standard was introduced by the IMS Global Learning Consortium [4] to describe and structure learning objects and content uniformly and platform-independently. A learning object in a virtual learning platform is a set of content and tools aimed at guiding the learning process along with a specific topic and with educational resources employed for technology-supported learning [7]. CC provides high flexibility and has various features, such as embedding Web 2.0 standards and applying assessment tools. It has to be highlighted that all functionalities defined in a CC are represented natively in the virtual learning platform with the corresponding technology. In contrast to the SCORM Standard (Shareable Content Object Reference Model), which allows sharable learning object packaging, delivering, and sequencing [5], CC was designed explicitly to obtain much higher levels of interoperability[1] and offers more flexibility in assessment and web 2.0 standards, content authorization, collaborative forums, outcomes reporting, and accessibility [5]. Considering the CC standard as a framework for learning environment independent course descriptions, the question arises how a XML structure can be created without advanced technical knowledge. *The Learning Components* is a web application that supports by drag and drop the sequencing of learning scenarios and supports the CC standard. The website is available at *http://www.learningcomponents.com*. A commercial tool is *SoftChalk* which supports creating interactive web lessons. The already mentioned *eXe learning designer*, available at *http://exelearning.org* is a downloadable learning scenario creator for SCORM and the CC standard. Many of these applications are still under development, and even some of the essential functionality is still not implemented [6].

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[1] https://www.imsglobal.org/cc/ccfaqs.html

2   Pattern-based Course Package Builder

In this section, we describe the initial concept of the application as a CC builder. In addition to the backend technology of the web-based application, special emphasis was put on user-friendliness, accessibility and flexibility in the screen design. Therefore, the application supports the user in creating learning objects in three steps from the pattern selection to the final CC ZIP archive, including an individual modification of teaching scenarios.

Fig. 2. Web-based CC-Builder application

The following list gives an overview of the functions and pages of the planned CC builder web application more in detail: **1) Selection of initial Pattern**: Based on Alexander's pattern idea, a pattern is first chosen that most closely matches the intention. In Fig. 2, this is depicted in the first step. After the selection of a pattern, a short overview of the selected pattern is shown again. Note that the web application also contains an overview of available patterns. **2) Content**: After the initial pattern is selected, the user fills corresponding data into the form based on the pattern structure. The editor supports learning features, which are included in the CC standard. Hence, the user can add, arrange, edit, and delete objects such as web content, discussion, or assessment. In Fig. 2 it can be seen that this is represented with form fields. **3) Export**: In a final step, the scenario can be exported as CC and downloaded in a ZIP archive, which can be imported to a virtual learning platform.

3   Conclusions and Further Work

This poster presented an initial concept of a web-based application to create learning scenarios for learning platforms based on proven educational patterns. Even though there are already some visual tools for creating CC, we still see the requirement for a suitable tool to easily create CC. This gap identifies the application as the missing link between proven practices for computer science education, the CC standard, and virtual learning environments. As in this poster, we only sketch the idea of the application, the following steps will be aimed at the further development of such a web application. This will involve usability tests and the provision of the project on Github[2].

4   Acknowledgements:

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[2] https://github.com/informatik-phka/ccbuilder