Towards an adaptation for the web of our authoring tool

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Abstract: - Our authoring system is a rich client, developed with the Graphical Modeling Framework (GMF). We decide to adapt it for the web, in order to expand its use by teachers. We expect that the web version of our authoring tool would help to create a Community of Practice (CoP), interested in pedagogical scripting, which would support its use. In this paper, we discuss the importance of the CoP for teachers, and we introduce the new architecture of our system, which is service oriented.

Keywords: - Authoring system, pedagogical scenario, service oriented architecture, community of practice, learning management system, educational content.

1 Introduction
Cartier & al define the CoP as “a persistent, sustained social network of individuals who share and develop an overlapping knowledge base, set of beliefs, values, history and experiences focused on a common practice and/or mutual enterprise” [1]. Indeed, a teacher may change schools, even if he didn’t have time to joined with his colleagues. Therefore, he will not benefit from their experience feedback. Also, he may encounter difficult situations, to which his colleagues cannot suggest any solution. Thus, in such conditions, a CoP has its place to support the teacher throughout his career [2]. Unlike the United States and Europe, the number of CoP of teachers in Morocco still shy. They result mostly from personal initiatives, and allow teachers to communicate and share digital resources with each others. We want to fill this gap, by encouraging the grouping of teachers, interested in pedagogical scripting, in a CoP around our authoring system. This CoP would ensure the continued use of our system, since it represents a support, adapted to the teachers’ profile. It will also facilitate better sharing of teaching routines.

We begin this paper by presenting the context of our work. Then, we define the two main concepts of our problematic of research: the pedagogical scenario and the authoring system. After, we review some researches on authoring systems, which are also interested in pedagogical scripting. Then, we present the rich client version of our authoring tool, and we end by the web version created using web services.

2 Context of our work
Among the many approaches tested in education, one may wonder how to help the teacher to choose the most suitable approach for the learning situation which he wants to script. Also, if the teacher needs to adapt these approaches to the context of e-learning, is there any tool to support him through this process? These questions are part of a more complex issue which is the support for the design task. This problematic has become, recently, the main theme of research on authoring systems. Our team “Réseaux Informatiques Modélisation & eLearning” (Computer Networks Modeling & eLearning RIME) is among the first to be interested in this line of research. In 2004, Bennani & al [3] present a new vision of authoring systems, where the instructional designer supports the teacher through pedagogical scenario models. This model is extended in 2007 by Khalidi Idrissi & al [4] and resulted in “atelier de production de contenu pédagogique” (workshop for production of educational content APCP), which allows, among others, to create educational content in IMS-LD format. Our research is a continuation of this work, and attempts to create a suitable authoring system for teachers. This system has to allow teachers to create by themselves pedagogical scenarios, and without limiting their creativity.

3 Pedagogical scenario: concept and objective
Known by different names such as: pedagogical sequence, lesson plan or storyboard, the pedagogical scenario has recently acquired great importance in the computer environment of human learning (C.E.H.L.) research community. It allows describing, for a given learning situation, the learning and the support activities, the roles, the target public, the prerequisites, the objectives, as well as the tools and the resources put in disposition for the accomplishment of activities [5]. Teachers use more scripting in learning situations which are learner-centered or involving digital contents.

To understand why we create a pedagogical scenario, we analysed Leclercq [6] and Pernin & al [7] studies. According to Leclercq the purpose of pedagogical scripting depends on three parameters: the mode of training, the level of experience of the designer, and finally his community of practice. In the face-to-face or blended learning situations, we use scripting to improve learners’ practices, to better plan activities, and finally to better determine the pedagogical objectives. In online situations, the pedagogical scenario helps to better express the pedagogical strategies to adopt. Concerning the level of experience of the designer, the goal of pedagogical scripting, for the less experienced, is to enable them to better design their courses. On the other side, the most experienced use scripting in order to improve the student’s learning. Finally, instructional designers try to create adaptable and reusable scenarios, which isn’t the case for teachers. This divergence between teachers’ and instructional designers’ expectations of pedagogical scripting, is analyzed further in Pernin & al [7]. Indeed, they found that for teachers, the pedagogical scripting is used in order to improve the quality of training and of student’s learning; the cost isn’t the most important. While designing a learning environment is more rational for instructional designers; they prefer generic and economic solutions, even if they aren’t the best from a pedagogical perspective. So, we deduce from these studies, that we search through the pedagogical scenario, to better plan learning situations, and to improve student’s learning.

4 Authoring tool: definition

An authoring tool is any system that enables creating digital learning systems. It is generally intended to designers, novice in software development, with different levels of knowledge of pedagogical strategies and standards. These systems, user-friendly for the most part, generate rich and attractive educational contents, playable by the learning management systems (LMSs). We distinguish two main categories of authoring tools: systems for creating educational contents and systems for pedagogical scripting. Systems for content creation avoid for the user the technological difficulty, related to the creation of digital contents. In these tools, content creation doesn’t include planning course nor choosing appropriate pedagogical strategies. In fact, the pedagogical difficulty of the design is supported by the user. The tools for scripting in turn help to plan courses, and some of them propose scenario models to implement. A part of scripting tools enables to create the pedagogical scenario of a course, and the corresponding educational contents. The others, only allow creating the pedagogical scenario of a course, and attaching to this scenario, the educational contents produced with other authoring tools.

5 Authoring tools: state of the art

Despite the growing number of authoring tools available on the web, their adoption, especially by teachers, remains difficult. This can be explained by their use of complicated educational modelling languages (EMLs) like IMS-LD [8], and their non-implementation of a support mechanism for the design task [9]. This has led many research laboratories to be interested in the problematic of pedagogical scripting, and try to create authoring systems more adapted to teachers. In the following we present some of these tools:

- Genscen’ [10], whose main advantage is its user-friendly graphical interface. It is a classroom with all the actors, objects and tools usually present in this room. The terminology used at the interface was determined from a sample of text scenarios written by teachers, and classroom-based courses.
- REDEEM [11], which is an authoring environment including two applications: authoring tool and intelligent tutor. REDEEM interacts with a catalog of educational contents and allows a teacher, thanks to its authoring tool, to implement his teaching method on any content of this catalog. This adapted content will be presented to students, by the intelligent tutor, in the way specified by the teacher designer.
• Exploragraph [12], which enables to create pedagogical scenarios, according to the Pleiades formalism. It offers a support mechanism for the design task in four levels. The second level consists on proposing scenario models to implement. This mechanism is very interesting as it resolves many issues related to pedagogical scripting. However the lack of an online demo, or screenshots of this mechanism, doesn’t enable us to verify the level of implementation of the support in this tool.

• FLEXO [13], which allows creating two types of courses: course compatible with moodle or with IMS-LD format. The course designed for moodle isn’t encapsulated in a SCORM or IMS-CP packages, but uses various services offered by this LMS: chat, forum, etc.

• ScenEdit [14], which is an authoring tool designed according to the ISiS model (Intentions, Strategies and interactional Situations). The web version currently available enables to create pedagogical scenarios according to a hierarchical tree divided into steps. It isn’t possible to export the scenario created, in any format playable by the LMSs.

These systems are in the early stages; most of them don’t generate packages playable by the LMSs, and are based on EMLs, which are not necessarily easier than IMS-LD (e.g. Pleiades formalism). It is also impossible to verify the implementation of their different support mechanisms for the design task. We note nonetheless that REDEEM is different than other tools, as it allows the creation of intelligent tutoring systems (ITS). We chose to present it to draw attention to the existence of such tools. A well-known article of Murray [15] deals with the ITS authoring systems.

6 Presentation of our tool

Pedagogical scripting plays an important role in promoting e-learning. It must be the starting point of any process of creating online courses. We saw previously that existing authoring systems, for pedagogical scripting, aren’t adapted to teachers. This is why we propose an intuitive authoring system, more suitable to this community. Our system is a graphical editor, with a drag and drop toolbox. It allows the creation of a pedagogical scenario from scratch, or from a scenario model. We choose to provide our system with a base of scenario models to support the teacher designer in the task of scripting. These models respect our meta-model presented in [16]. The teacher can choose a scenario model from this base using a questionnaire. He will then implement this model to obtain his final pedagogical scenario, which can be used in various learning situations: face-to-face, blended or online courses. Once the creation of a scenario completed, the teacher can “pedagogically” validate it. This validation may concern a scenario created or not from a scenario model and it’s based on a set of best practices in teaching, which we grouped in a repository. After the validation, the teacher can export his scenario in IMS-CP format, in order to play it on the LMSs compatible with this standard. The packaging in IMS-CP format can also be done on not validated scenarios. We summarized in figure 1 [fig. 1] the four modules that compose our authoring system:

Fig. 1. The logical architecture of our tool.

The design module is a graphical editor created with GMF eclipse framework. GMF is a combination of the EMF and GEF eclipse frameworks. EMF facilitates the creation and the implementation of structured models. GEF enables to develop rich and interactive graphical editors, using existing models.

We chose GMF in order to create a rich and scalable graphical editor. We used a MySQL database to implement our repository of best practices in teaching. This repository contains rules, formed with the following components:
• The adopted pedagogical strategy.
• The learners’ learning styles
• The referred skills
• The learners’ educational level
• The size of learner group

Thus, each scenario designed with our tool can be analyzed according to these parameters [17]. To expand the use of our editor, we decide to adapt it for the web. This will encourage teachers to adhere to the practices of sharing and reuse, which they aren’t used to [6]. The sharing and reuse practices will save time and effort for teachers, and enable a better capitalization of their experiences.

7 The importance of the adaptation for the web and the community of practice

In [18], Khalidi Idrissi & al present the logical architecture of our team’s platform. It is a service-oriented e-learning platform, including communication services like chat and forum, and design services for the creation of digital contents. This architecture is transforming the role of the LMS from a simple player of digital contents, to a complete learning environment where the teacher can create, integrate and finally monitor his digital courses. Teacher can also use the communication services to contact other teachers. This will, as we have said before, get them used to the practices of sharing and reuse, and encourage the creation of a CoP around our team’s platform, and more especially around our authoring system, as it will represent the design service of this platform. We believe that the CoP approach is the best way to facilitate the adoption of our authoring system by teachers. Indeed, the teacher will find in the community a support adapted to his profile, and scenario models already tested and validated by his colleagues. Thus, we adapt the four modules of our authoring system in web services, which we will integrate in the e-learning platform of our team.

8 Towards a web version of our authoring system

Although there are many repositories of digital resources, like the “espace pédagogique de l’académie de Nantes”, the ÉDUbases, or the BAP, proposing pedagogical scenarios, they don’t answer to our problematic of research. Indeed, scenarios available on these websites are in a textual format, and mostly don’t respect a common template. They aren’t reusable, and cannot be operationalized on a LMS. However, a brief passage on these websites allowed us to identify the teachers’s interest for CoP, as a way of sharing experience: over 7600 resources on the Nantes academy website, 17,000 sheets on the ÉDUbases website, and over 550 activities on the BAP website.

This encouraged us to adapt our authoring system for the web, and open it to the users. The base of scenario models can be provided by users, who can also answer the questions about their scenario models. Concerning the pedagogical validation, we will create a rule service that enables users to enrich the system with best practices in teaching. So, we adapt our authoring system in web services as follows [fig. 2]:

Fig. 2. Service oriented architecture of our authoring system

We prefer to distinguish between the private area of each user, and the public area shared by all the users. Each user has his own base of models and his own repository of best practices in teaching. The user can create a scenario model that he may share or not with the other users. To make his model available for the other members, the user must publish it in the public base of models. Once the creation of a pedagogical scenario completed, the user can validate it according to his own repository

of best practices in teaching. This repository is provided with the rules created by the user himself, through the rule service, or with rules imported from the public repository. This will allow the user to have a full control on the validation process, and to adapt it to his own vision of the pedagogical strategies supported by our tool.

So our system will exist for and by the teacher, who will build a digital reputation that may increases the confidence of other members on his contributions in our system.

9 Conclusion

In this paper, we presented the web version of our authoring tool. It’s a composite application based on 5 web services: design, model, rule, validation and packaging. We adapt our system for the web, in order to create a CoP which will support its use by teachers. For future work, we expect that a group of teachers, from different horizons, can test our system. But we need first to supply our tool with more scenario models. We present in [19] a scenario model of the pedagogy of integration, adapted to the blended learning. We are working to model other pedagogical strategies.

References


