A Teacher Module in an Assistance Tool Software

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Abstract—This communication presents the genesis and the implementation of a Teacher Module, which is included in an Assistance Tool Software (ATS). The aim of the ATS is to help a teacher to design pedagogical devices. For that purpose, a Teacher Module (TM) collects data about the teacher and his/her teaching context. The ATS uses these data to adapt the device to the teaching context and to the teacher’s preferences and needs. The TM is based partly on a teacher model – presented here - for which we did a thorough analysis of the state of the art.

Keywords: teacher module; teacher model, teacher’s preferences, teacher’s need.

I. INTRODUCTION AND CONTEXT

In TEL (Technology Enhanced Learning), we are used to define student models. But we also need teacher models. Our research aims help teachers to integrate new methods and new tools. We handle both assistance in designing and assistance in deploying pedagogical devices. For that, D. Leclet and B. Talon have designed the principles of an Assistance Tool (AT). M. Hérault and M. Rosselle have designed the corresponding software (Assistance Tool piece of Software – ATS) and have partly implemented it. This paper presents the Teacher Module (TM), a component of the ATS. It collects data about the teacher. The ATS uses these data to adapt the device proposed to him/her. This paper is structured in three main sections: we illustrate the context in which the ATS can help teachers through an example. Then we present a synthesis of the state of the art concerning teacher models. Finally, we detail our module.

II. EXAMPLE OF THE USE OF THE TEACHER MODULE

To understand how the TM can help Mr Jones, we’re describing here, his teaching context (TC) for which he uses a pedagogical method and needs to create a device and some characteristics of his person.

The teaching domain. Mr Jones is responsible of a "Web programming" teaching unit. This is the target domain.

The pedagogical method. He uses a pedagogical method (referred later as “the method”). It is based on an active pedagogy that mixes group and project.

The needed devices. In the method, both teacher and students have to create logbooks. Students have to create a logbook, in order to (1) inform the teacher of the progress of their work, (2) give the deliveries, and (3) communicate with one another. Mr Jones has also got a logbook, in order to (1) inform the teacher of the progress of their work, (2) give the deliveries, and (3) communicate with one another. Mr Jones allows the ATS to adapt itself to him in this way:

• Mr Jones has little knowledge about the method. He'd rather process audio information than video information. Thus the ATS would propose a spoken presentation of the method.

• Moreover, for practical work, his group is divided in 5 teams. The ATS would generate the 5 students’ blogs and it includes the links to these blogs in the e-suitcase.

• And finally, Mr Jones wants to use a spreadsheet. The ATS would embed this tool in the toolbox.

III. STATE OF THE ART

To determine which data should be collected in Teacher Module, we did a thorough analysis of the state of the art. We were interested in two complementary points of view: education sciences and IT (Information Technology). The thorough analysis can be read in [5]. From this analysis, we found very interesting elements. We organise them synthetically in “dimensions” as [3] began it (the dimensions that we have added or were already present in [4] are in italic).

The dimensions concern:

• Personal data (e.g. name, surname, email, password),
• Skills (e.g. organize, negotiate, coach, motivate)
• Knowledge (e.g. domain knowledge, pedagogical knowledge, technical knowledge),
• Behaviour (e.g. behaviour of the teacher when managing groups),
• Personality traits (psychological data)
• Experience (e.g. diploma, formation, specialisation,)
IV. THE TEACHER MODULE

The TM collects and handles data about the teacher.

A. Modelling choices

Even if it seems natural to separate data on teacher and teaching, we have seen that, in numerous models, data on the teacher (preferences, psychological traits, etc.) and those on the TC (duration of the unit, number of learners, etc.) are in the same model. In our case, we separate data on the teacher and those on the TC. Indeed, a teacher can handle several TCs. By separating data, we avoid redundancies. Thus, the Teacher Module leans on a Teacher Model and a Teaching Context Model (what is to be taught, in which context, etc.). The latter has not been published yet. In our Teacher Model, a full use of all the dimensions of section III would have been interesting. However, in a pragmatic approach, we have chosen to retain only, in a first version, dimensions that were required in order to do the needed adaptations. We retain dimensions about the teachers’ skills, knowledge, behaviour, preferences (functionalities of the tools he/she’s waiting for), and his/her personality type (which include the selected psychological type). A graphical presentation of this model can be seen in [4-5]. Other dimensions could be added later.

B. Implementation

The implementation language of the ATS is Java (version 1.6). The architecture choices and the structure of the TM are detailed in [5]. In summary, for the client-server architecture, we have on the server side: an application server, a DBMS (Data Base Management System), an ontology, the Jena API, the business logic and the GWT (Google Web Toolkit) graphical interface. On the client side, we have the graphical interface in JavaScript that is tailored to the browser. Client and server sides communicate through the Internet by using RPC (Remote Procedure Call). The teacher interacts with the browser (see [5] for a graphical presentation).

C. Using the Teacher Module in the assistance tool

Here is an illustration of the role of the Teacher Module. First, Mr Jones logs in the ATS. Second, he fills data - handled by the Teacher Module, Mr Jones’s data are stored in an ontology (“profil.owl” file). Third, the ATS consults the TM to select the way it will present the needed information. Fourth, the ATS uses the proposed models to produce a device, which is adapted to the teacher (person and context). This production is based on inferences rules collected from experts. The rules are applied to the ontology.

V. CONCLUSION

In this article, we explained how we help a teacher to deploy a pedagogical method, which is new for him/her. For that, we adapt a device. To that end, colleagues have designed the principles of an AT. The software, that corresponds to the AT is call the Assistant Tool Software (ATS). I’ve contributed to the design and the implementation of the ATS, and especially its Teacher Module. This module is based on a teacher model. The model was built according to information collected in a state of the art done in both education sciences and IT. We propose a generic multi-dimensional teacher model, which gathers collected data in dimensions. We selects a subset of theses dimensions in our TM.

In an early stage, the teacher and the teaching context models led to the setting of two paper forms presented to teachers. The first evaluation of the forms was made in 2009 in order to know whether the teacher can fill it well or not. Then, a first implementation of these forms was made in databases in 2010. In 2011, the forms were developed in Java & GWT and data were stored in an ontology. This implementation allows us to validate the model in a second way, i.e. it is sufficient to be used by the inference motor in order to generate a pedagogical scenario. Afterwards, A first version of The ATS, in which the TM was already completed, has been stabilised and used in October 2011. Now, the ATS is still under development (for other modules) [2]. A presentation of the models and of the ATS, in an ecological environment, is planned at the University Fez in Morocco in spring 2012. Finally, we would evaluate the the multi-dimensional model by applying it in other contexts (colleagues work on a platform that aims to help new teachers and on a social practice community for teachers).

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REFERENCES