

Designing a distance course based on learning activities

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In this paper, we investigate the process of teaching in order to develop models representing the teacher's mental activity and capacity of adaptation in complex teaching situations. The work presented here is an attempt to explore an expert teacher's model of thinking and teaching during a typical activity. That is, computerize the teacher's knowledge and professional competences, in order to apply this model in an e-learning situation.

Based on these models, a system will be designed to explore and implement an expert teacher's model of thinking and teaching. It will assist teachers in their teaching tasks and improve learning activities in an e-learning environment.

Keywords e-learning; expert model; pedagogy; teaching activity

1. Introduction

Internet is used more and more as a support in teaching and training. With the emergence of this new orientation of teaching, grows a new way of teaching and consequently a new pedagogy that we will call "e-pedagogy". Therefore, appear difficulties of designing and developing pedagogical contents, which are the more adapted to this new way of teaching and learning.

Whereas the development of traditional contents is based only on experiment, the development of e-learning contents is based not only on the experiment but also introduced a double complexity:

- the contents convey a new original method of information representation, that is the information, is not linear any more. It is based on multimedia tools to communicate it;
- contents imply new pedagogical uses: it is not possible to use contents established for face to face teaching situations within an e-learning environment.

The study presented here is an attempt to explore an expert teacher's model of thinking and teaching during a typical activity. That is, computerize the teacher's knowledge and professional competences.

The goal of the system that will be performed on the base of this model is to assist teachers in the development of e-learning contents, as well as in their activities of teaching.

In this paper, we initially expose the research orientations and the main objectives of our work. Second, we present the methodology adapted to attempt to achieve these objectives, as well as the use cases diagram representing the different functionalities of the system that will be implemented on the base of the proposed methodology.

2. Research orientations

In his work, a teacher fulfils two related and complementary functions:

- A didactic function of structuring and managing of contents,
- A pedagogical function of management and interactive regulation of events in a teaching situation.

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Our research relates to the design of a system that will help and guide teachers in fulfilling these two complementary functions. This system is based on the expert-teacher model in the achievement of its teaching activities.

This research has two objectives: provide teachers with models and tools allowing them to develop the needed pedagogy in producing learning resources and assist them in their tutoring activities.

During the elaboration of distance courses, teacher can encounter several pedagogical difficulties related to:

- sequential presentation of concepts, in order to facilitate their comprehension with the learning process,
- possibility of defining alternate pedagogical scenario allowing the learner to personalize its course and adapt it to his profile,
- possibility of proposing a guidance to learners during the learning process,
- the way of adding definitions, illustrations and/or exercises at the best time within the course.

To face these difficulties, we propose a system which will assist teachers in order to overcome these difficulties and to reach pedagogical objectives aimed by the instructional content.

Before determining functionalities of our system and in order to emphasize the contribution of our work, a study related to existing authoring tools was done [1], [3]. The result of this bibliographic study is that, although these tools reduce technical constraints, they do not provide a pedagogical support of quality. In other words, they do not provide contents which take into account the pedagogical aspect and expertise of teaching. That is why we were fixed an objective which consists in proposing to the user a system enabling him to realize on-line contents based on the teacher's activities, his competencies and his expertise in the development of pedagogical contents.

The system stresses two principal points [4], [5], [9]:

- Pedagogical structuring: it relates to teacher's pedagogy involved to have quality of presentation and structuring of the pedagogical support. In deed, content structuring must reveal the principal logical relations between the various elements of the course,
- Teaching environment: it concerns recommendations related to the way of presentation of activities content, as well as the most appropriate and relevant instructional multimedia relative to these activities within a distant learning environment, as for example teaching activities suggested to learners and tools allowing the communication, the evaluation and the follow-up of learners during the training process.

This system offers within the training process the following advantages:

- The teacher is brought to the have an active, responsible and motivated behavior in the activity of development of pedagogical supports for distance learning. In fact the system will allow him to have a retrospective vision toward his traditional teaching methods, and consequently improve and adapt these practices in a distance learning environment,
- The learner will be more assisted, as he is in a face to face learning environment.
- In the training process, the information will no more presented as a linear one (different sights and levels of abstractions for the same concept). The system will be used as a teaching guide and a tutor.

3. Methodology

Based on an expert-teacher's model, the system implements pedagogical contents which can be integrated in an e-learning platform.

To achieve our objectives, we assume that contents are structured around several units of learning. The concept of 'unit of learning' (also called 'unit of study' or 'unit of instruction') [6] is central to this case. It is the smallest unit providing learning events for learners, satisfying one or more interrelated learning objectives [7]. This means that a unit of study can not be broken down to its component parts without loosing its semantic and pragmatic meaning and its effectiveness towards the attainment of learning objectives. Units of learning can be in all types, sorts and sizes: a course; a study program; a workshop; a practical; a lesson [8].

In the instruction process, the learner works toward certain outcomes by performing more or less structured learning and/or support activities within an environment. The environment consists of the appropriate learning objects and services to be used during the performance of the activities.

Activities can be assembled into activity-structures. A structure can model a sequence or a selection of activities. In a sequence, a learner has to complete the different activities in the structure in the order provided. In a selection, a learner may select a given number of activities from the set provided in the activity-structure. Environments can contain two basic types [7]:

- Learning objects: these are classified in the following types: knowledge-objects, tool-objects and test-objects,
- Services: a service relates to a concrete service facility available at runtime. Examples of a Service include a discussion forum, chat rooms, monitoring tools, search facilities, etc.

In order to be able to codify content, one needs a so called 'binding' which complies with the specification stated above. In learning technology, the most bindings are XML bindings. Thus, the system starts by breaking up the initial course and releasing the different activities constituting the course. This step leads to a marked XML document.

Then, pedagogical activities released in the previously step are represented according to the metadata standard LOM [11], in order to have structured contents.

The next step consists on separating, interactively with the teacher, learning activities from support activities. Each learning activity is relative to a new concept. The concept thus identified is underlined to constitute a hypertext link. It will also be added in a database of concepts. In addition, our system has also a database containing frequently asked questions of the students, which can be used to identify the learning activities from contents.

The specifications presented above are schematized by the use cases diagram given in Fig. 1.

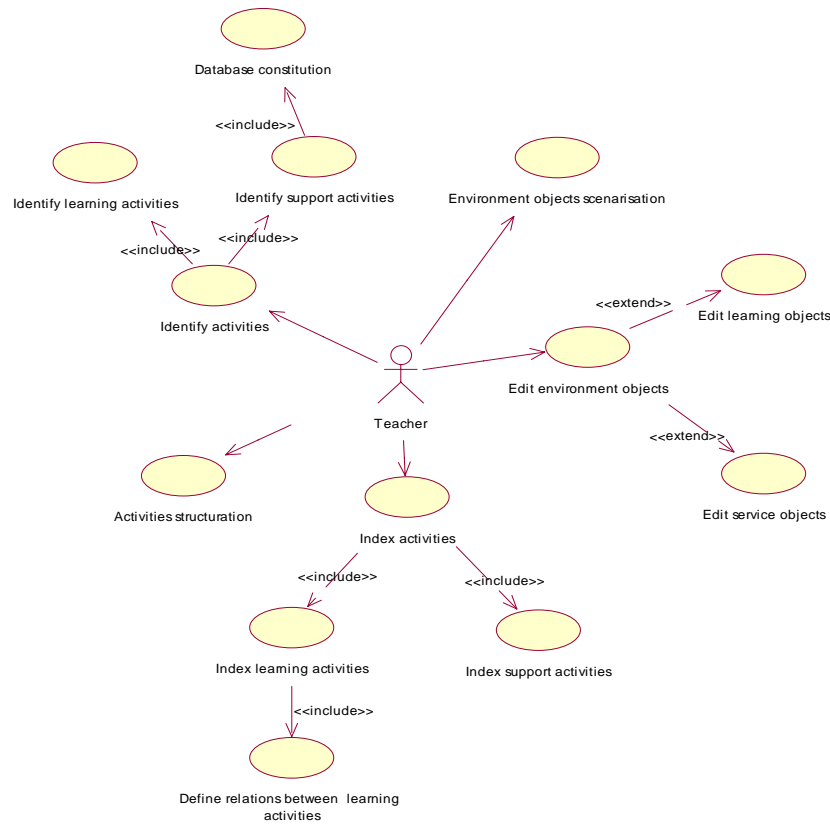


Fig. 1 Use cases diagram

4. Conclusion

The idea that e-learning is nothing more than providing structured content (as it is done in face-to-face) and adding some communication or groupware facilities to this, is not true. In fact, this new way of teaching raises difficulties related to the elaboration of learning content and support tools. A new type of pedagogy, that can be called e-pedagogy, has emerged.

Until now, e-learning applications have given little attention to pedagogy as compared to face-to-face learning. The aim of this work is to define a model, from an expert-teacher point of view, describing the content and process of instruction within units of learning from a pedagogical perspective. On the basis of this model, a system that will help teachers in modelling, logical structuring, scripting and presenting their pedagogical contents is being implemented.

5. References

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