Chapter 15

ITERATIVE DESIGN OF LEARNING PROCESSES

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Abstract: The aim of this work is to bring together the traditional way of teaching and working using a computer-supported environment. This means, increasing the flexibility of the learning processes application, giving instructors the chance to introduce variations on runtime. Besides, learning processes are refined through its use, by making permanent the modifications which have shown to improve the learners' performance on the different learning objectives. This approach is similar to the one followed for the development of user interfaces, where the interface design is obtained by an iterative process of prototyping, testing, analyzing and refining. This chapter describes the lifecycle of the iterative design of learning processes and proposes an architecture for implementing its runtime stages for processes described by means of the IMS Learning Design specification.

Key words: Learning Design, adaptation, runtime, iterative.

1. INTRODUCTION

When describing an educational process it is not always possible to know all its elements properties at design time. Many of them as, for instance, the ones related to synchronization and temporization of the activities cannot always be established before the proper execution of the learning process begins.

On the other hand, regardless of how careful and precisely a learning process has been defined, its application to actual educational settings is all but rigid, since it is very difficult to foresee all the potential reactions from
learners. In practice, teachers take the learning process as a starting base, not to be followed blindly. They observe the evolution of the learners during its execution, introduce the appropriate adaptations afterwards in order to solve specific problems, reinforce the learning of some particular concepts and, more generally, guarantee the achievement of the original learning objectives. Furthermore, the adaptations proven to improve the original process results will be part of future applications. Due to the above, the learning process is traditionally refined through its use.

This work aims at increasing the degree of freedom of the teachers when applying a learning process on a computer-supported environment, offering the instructors the possibility to introduce modifications in the learning process definition during its proper execution. Those adaptive actions introduced could be evaluated against their original goal, measuring its influence on the learning objective achievement and, accordingly, giving the teacher a chance to automatically include them in the original process. This way, instructors would imitate the way teachers work in real life: the gain obtained by the use of the process is kept within the process and, at the same time, is also used to refine it.

The rest of the paper is organized as follows. First, the iterative design of learning process lifecycle will be defined, describing the purpose and characteristics of each of its different stages. Next, notations for the specification of the process evaluations and adaptations will be provided. Following, the architecture of a system able to implement the runtime phases of the iterative composition of an IMS Learning Design (IMS Global Learning Consortium, 2003) specified process will be outlined. The paper will conclude with an example of the whole late modeling process and the presentation of some conclusions and future work lines.

2. ITERATIVE DESIGN OF LEARNING PROCESS

The application of a learning process is in practice quite flexible as it is not possible to foresee all the potential reactions from the learners. Instructors take the learning process as a basis, and after observing the learner reactions, they may response providing extra examples, explanations to reinforce particular concepts, repeating activities, tuning the time-limits for completion of the assessments, etc. However, the more the instructors play the course, the less adaptation are required to be applied as the process is refined through its use. The experience gained from prior plays is comprised within the process definition and a wider range of learner reaction response is captured. This means that the course model definition does not