Chapter XIV
Visual Modeling of Collaborative Learning Processes:
Uses, Desired Properties, and Approaches

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ABSTRACT

The modeling of learning processes and its use in computer-supported learning scenarios attracted attention in a wide variety of research fields in the last years, e.g., in Web-based education, computer supported collaboration scripts, and intelligent tutoring systems (ITS). Most of the discussion is either focused on the conceptual level of instructional design for exchange between designers or on the automated execution of predefined designs and learning scripts. In this chapter we will elaborate on the whole spectrum of different uses that visual learning models provide for teachers, learners, and researchers. Based on our discussions in an international research project on computer-supported collaboration scripts we identify desired properties for such modeling languages especially considering the needs of the practitioners. Finally we propose MoCoLADe (model for collaborative learning activity design), an exemplary approach of a visual language for collaborative learning processes that was designed according to the presented principles.

INTRODUCTION

The modeling of learning processes attracted attention in a wide variety of research fields in the last years, e.g., in Web-based education, computer supported collaboration scripts, and intelligent tutoring systems (ITS). While in former times, especially in ITS, proprietary notations or hard-coded process models were used, the adoption of EML into the IMS/LD standard (IMS Learning Design Specification, 2003 and Chapter XV of this handbook) contributed to re-usability of specified learning processes. Yet it also brought up intensive discussion about expressiveness (Hernandez et al., 2004), notational aspects (Miao et al., 2005) and the intelligibility for the practitioner (Dalziel, 2006), i.e., teachers and researchers with non-technical background. This book discusses a wide spectrum of facets of instructional design, from foundational issues of graphical languages to concrete language proposals. Most of the approaches make specific assumptions about the user groups and their goals: from our survey of existing approaches we identified mainly either a "pure design" perspective, i.e.,, having a language as a means of expression towards other experts and practitioners, or a "system oriented" perspective that aims at automatable execution of formalized learning.

In the following sections we will describe a broader spectrum of the different uses that explicit learning models provide for teachers, learners, and researchers, and will refer to possible solutions and means for how systems can support these uses.

Based on our research in a European project on computer-supported scripting of collaborative activities, we identify desired properties for such modeling languages especially considering the needs of the practitioners. These considerations resulted in an exemplary approach that was designed according to the presented principles. The resulting VIDL called MoCoLADe (model for collaborative learning activity design) and its implementation as an authoring tool for ID is described briefly at the end of the chapter.

APPLICATION CONTEXTS OF ID LANGUAGES

The specification of learning processes using an instructional design language may have a broad variety of purposes for both the designer and also the system. Some educational designers use it as a note-taking tool for lesson planning, some for discussion with colleagues and some expect these models to be executed automatically within a customized computer-based learning environment. With this in mind, we want to explore and elaborate on the different motivations designers might have and potential functionalities a run-time system may provide based on a given learning process specification.

In Botturi, Derntl, Boot & Figl (2006) the space of exploration is spanned by the dimensions of *communication* and *creativity*: The communication dimension ranges from *reflective*, i.e., mainly used for personal consideration, to *communicative*, i.e., the exchange with other persons. The creativity dimension ranges from *generative*, i.e., meant for production and refinement, to *finalist*, i.e., the fixed description of a design for formal use.

In our exploration we will use the degree of "*informedness*" on the part of the computer system necessary to provide supportive functionality as an important aspect: we see a continuum from complete "uninformedness" of the system and exclusive interpretation on the user's side up to quite high requirements of interpreting/understanding the learning processes within the system. We will begin our discussion with the user perspective and then proceed with the usage of formalized process models for ID-facilitated computer-supported learning.