

# Chapter XLIII

## Principled Construction and Reuse of Learning Designs

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### ABSTRACT

*This chapter summarizes the work on instructional engineering and educational modeling accomplished since 1992 at the LICEF Research Center of Télé-université by the researchers of the CICE Research Chair. Recent results on learning design modeling and learning objects reusability processes are thoroughly presented using examples drawn from many projects conducted in the last 3 years. These are discussed to uncover the importance of a principled approach for the modeling of learning design and the reuse of learning objects in technology enhanced learning environments. Finally, delivery and dissemination issues are discussed and a summary of on-going and future directions for research is presented.*

### INTRODUCTION

At the end of the 1990s, technology enhanced distance learning developments were driven

by dreams of producing high quality, low cost, online courses for massive delivery, based on the available e-learning platforms. Most of those platforms offer three types of loosely connected

services: communication services such as discussion forums, chats and e-mail; basic information delivery services to present course resources such as documents and syllabi; and management services to help professors keep track of students' participation and products.

In the beginning of the 2000s, it was evident that low cost courses were more difficult to realize than expected unless they reproduced low quality classroom processes. There seemed to be a trade-off between quality and effort. Indeed, developing high quality distance learning courses or course modules remains a complex task. In the design, development, and delivery phases, a range of different actors and disciplines are involved, including instructional designers, media, ergonomic and graphical experts, experts in information and communication technologies, and cognitive scientists. Moreover building, maintaining, and supporting a rich, learner centered distance learning environment is a difficult and expensive task.

Does all this mean that it is impossible to produce high quality, economically viable e-learning? The good news is that advances in research are starting to be transferred into practice, implementing new ways to attain this dream. The key requirements for these advances can be grouped into four complementary dimensions: quality, viability, reusability and dissemination capability.

- Regarding quality issues, we need to center the efforts on pedagogy, sound methodologies, innovative course design processes, instrumentation, and support, while offering powerful and user-friendly technological tools that support the design, development and delivery of rich and flexible e-learning situations.  
This question is addressed in the first section, where the main pedagogical processes

and principles are presented as well as our methodology for learning system engineering quality.

- Regarding viability issues, we need to generalize norms and standards to allow interoperability of the various learning environment components such as the pedagogical method or learning design objects, the learning materials or content objects, and the tools or processing objects. Consolidating repositories of best practices, templates, and course components will allow for faster, and possibly better, course development by re-composition or specialization.  
This question is developed in section 2, which is focused on educational modeling languages and the IMS-LD standard specification. The role of such standards to ensure the viability of delivery methods and tools will be presented.
- Regarding reusability issues, we need to provide quality assurance strategies including both technical and pedagogical high quality criteria. These criteria can be implemented during conception and applied as evaluation instruments after reuse to establish a feedback loop that will assure quality.  
In section 3, we will illustrate the concerns of reusability influencing both learning resources and learning scenarios (both are seen as types of learning objects), through the use of the MOT+LD graphic modeling software.
- Regarding dissemination issues, we need to transfer to actual practice the approaches from the preceding dimensions to the different actors through various strategies, such as training and best practice examples, supporting the emergence of communities of research and practice and their networking, defining clear open intellectual rights management, sharing, and recognition rules.

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