

## Chapter X

# Modular Web-Based Teaching and Learning Environments as a Way to Improve E-Learning

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### Abstract

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*This chapter can be assigned to the main fields of new and innovative educational paradigms and learning models, innovative modes of teaching and learning based on technological capabilities and strengths and weaknesses of technologies as effective teaching tools. It covers the construction of e-learning materials using a modular design approach in order to meet the technical and didactical requirements for the optimum operation of distance learning scenarios. First, it addresses the development path and substantial deficits of conventional e-learning materials. After this, it gives an overview of the requirements the supplier thinks necessary to develop high quality and state-of-the-art e-learning materials. In the following section, the customer's needs with regard to the e-learning*

*materials will be addressed. Accommodating both parties and securing high quality requires a high flexibility for configuration of a Web-based learning and teaching environment. The next section introduces the respective concept based on modular structures. The content-related design of study modules will be shown with the support of an example taken from the education network WINFOLine.*

## **Introduction**

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In e-learning, teaching materials can be accessed by a large and anonymous group of consumers via modern information technologies without temporal and local restrictions (Girmes, 1999). Successful implementation requires planning of the instruction units' technical and didactical guidelines to fit the learner's anthropogeneous and sociocultural conditions. A balanced combination of the selected contents, intentions, media and methods (Jank and Meyer, 2002) will achieve this. Many existing distance learning scenarios use e-learning pedagogies used for conventional presence teaching. Not only do these pedagogies not utilize the special advantages of the Internet as a distribution channel, they suffer two major deficits. First, conventional teaching materials are only suitable for small target groups and cover only a few learning types. Second, more conventional Computer-Based Trainings (CBT) and Web-Based Trainings (WBT) follow the construction Paradigms of Courseware Engineering. The core ideas of behaviorist teaching methods are hardly suitable for the self-controlled learning processes, because of their linear structure (Dichanz, 1994). These are the main reasons why the effectiveness and success of some traditional e-learning materials has been low (Gruber, Mandl and Renkel-Schwarzer, 2001).

## **Depiction and Evaluation of Conventional E-Learning Materials**

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### **Programmed Learning**

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Computer-based learning environments began in the early 1960s with "programmed learning." These environments focused on instilling factual knowledge with the help of programmed questions (such as fill-in-the-blank exercises and multiple-choice questions), testing, and other simple training exercises. They

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