

# Chapter X

## The DEKOR System: Personalization of Guided Access to Open Repositories

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### ABSTRACT

*Due to the wide diversity of learning styles and learner characteristics, delivering learning material from modern ICT-based learning must also be conducted in a diverse manner rather than with a “one-fits-all” approach. By focusing on content aspects, the majority of adaptive Web-based educational systems are only able to deal with closed repositories and therefore only pre-defined content alternatives for limited learner characteristics are manageable. One possible solution is to enable and technologically support students’ freedom to select appropriate learning content of their own choice. The WWW as an extensive repository of diverse content has gained considerable interest as an open-ended learning environment, but most students cannot cope well with such open accessibility. To overcome this, the authors have started research towards a system of personalized access to open repositories. In this book chapter, they introduce the evolution of their linked approaches and discuss the findings in the context of learner characteristics.*

### INTRODUCTION

Modern society has become significantly more globalized and knowledge-driven in recent de-

cades. Consequently, modern citizens have high expectations for their ever-changing society. Keeping pace with changes and effectively dealing with knowledge is vital for the success in this

modern environment, and continued learning and training are therefore also fundamental for today's human beings. According to Bransford et al. (2000), the objectives of and expectations for the learning process have changed dramatically from repetitive learning to learning with understanding to move towards being independent in the learning process, strengthen meta-cognitive skills and link knowledge acquired in cultural context. In order to meet the requirements of educational goals for the 21<sup>st</sup> century, several aspects of learner-centered, knowledge-centered and assessment-centered environments must be considered. In this context, information and communication technology (ICT) can be very useful in educational setting such as in general schools, universities and in vocational education centers.

By further focusing on the knowledge aspects or more precisely on the learning content within the learning process, it is commonly agreed that from modern ICT-based learning settings much more is expected than simply delivering learning material to students in a "one-fits-all" approach. Learning activities and learning content must be well-tailored to (1) the *individual needs* of the students including the knowledge or competence state, preferred learning style, motivation, problem-specific and cultural context, (2) *group aspects* such as student-student and teacher-student interactions and collaborations, (3) *teaching objectives* including didactic concepts and (4) *environmental aspects* such as physical learning environment and front-end devices. (Germanakos et al., 2007; Gütl, 2007b; Hodges, 2004) There is no doubt, however, that it is time consuming and expensive to prepare such personalized learning activities or to focus specifically on the learning content. To overcome this problem, some approaches have been developed such as reusable learning content (Conlan et al., 2002) and collaborative content creation (Kortemeyer, 1999). Despite the existence of such interesting approaches, the great variety of individual needs can hardly be met and the ever-changing knowledge in the

subject domain will lead to a Sisyphean task in keeping pace with this situation. (Thyagarajan & Nayak, 2007).

To overcome the situation stated so far, we have developed the Dynamic E-learning Knowledge Repository System (*DEKOR System*). The initial idea was motivated by the goal to supplement e-learning systems lacking personalization features with a background repository of resources that are automatically compiled for different knowledge levels by means of an information retrieval system. The first proof of concept was described in (Dietinger et al., 1998) and developed into a first prototype called *E-Help System* (García-Barrios et al., 2004). The findings from implementation and evaluation of E-Help led to a second prototype called Concept-based Context-Modeling System (*CO2 System*) which provides students with content from different types of information sources based on the learning context (Safran et al., 2006). Further enhancements led to our DEKOR system, which delivers personalized content from different sources based on user and group information (Gütl, 2007).

In this book chapter we want to outline the three systems mentioned above and explore the extent to which they can support different cognitive and learning styles.

## BACKGROUND

Tailored learning and teaching activities can hardly be considered as new concepts developed in our modern knowledge society. Such concepts can be traced back to at least 4<sup>th</sup> century BC. In those days, adapted instructions were seen as a primary success factor. To give another example, tutoring given by adaptive instructions was a common method of education until the mid-1800s (Park & Lee, 2003). In the 20<sup>th</sup> century, instructional design and technology emerged, enabling the analysis of learning and performance problems to improve the learning process in diverse learning

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