Chapter 7
An Integrated Framework for Personalized T-Learning

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ABSTRACT

Broadcasting interactive learning applications through the digital TV promises to open new pedagogical perspectives given the wide penetration of the medium. This case deals with an open, flexible learning oriented technological framework for interactive digital TV. The framework is divided into two main parts: the production side, where the course is created and the client side, where it is presented on interactive digital television (iDTV) through an interactive learning environment. The course production is supported by an ad-hoc designed authoring tool, which has been thought for a use by pedagogical experts, while the runtime user interaction on iDTV is managed by a Course Multimedia Player. Experimental television learning (t-learning) courses were created by pedagogical experts and served as an important test and evaluation bench for the framework.

BACKGROUND

Television has had a long history of performing an educational function for the mass audience, broadcasting edutainment, documentaries and news as well as educational programmes. The arrival of interactive television has the potential to expand the power of the medium by providing interactive learning opportunities. TV-based interactive education promises a huge potential due to its ability

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to support interactivity while compensating for the low penetration of Internet-enabled computers in comparison with the penetration of a TV in a household. "T-learning" was the new term, which introduced for the definition of TV-based interactive learning (Aarreniemi-Jokipelto, 2005).

Interactive learning services (usually known as e-learning) have provided important solutions and advantages, in particular for Intelligent Tutoring Systems (Shute and Psotka, 1996; Wenger, 1987) that provide personalized support to users, lowering the typical barriers of space, time and availability of contents and services for learning. In this context, t-learning may provide a further specific contribution, thanks to the pervasivity and popularity of TV (especially among a demographic that is not keen on using computers), and exploit typical traditional TV features, such as relaxed and easy use, mix of education and entertainment, media driven proposal of contents, important role of authors/directors in the preparation/delivery of contents.

In this section we will present the history of television as an educational medium and the technologies of the digital interactive TV (iDTV). Subsequently, in the next sections, the methodology for designing t-learning services will be discussed and a personalized technological framework for t-learning will be described and evaluated.

History of TV as an Educational Medium

The use of television as a learning device has a long history since its potential as a learning tool was almost immediately recognized. The first attempts to employ television for educational purposes are reported back to 1930s, when the State University of Iowa prepared the first televised educational programmes. Less than a decade later, elementary and secondary schools used commercial TV educational programs (Leslie, 1980). As the penetration of TV at home was increasing, more learning services were provided. By 1960 more than 50 educational stations were operating in the USA, and by the beginning of the 1960s and the 1970s the development of educational TV was further accelerated by the launching of communication satellites and the growth of cable TV. However, the overall quality of the educational programs produced at that time was mediocre, since most of them focused only on presenting lectures.

Traditional television broadcasts provided only one way information transmission with no possibility to interact immediately with the instructor or a remote co-learner. In the next years, technological developments helped to overcome some of these limitations. One of the first attempts to engage viewers and to add interactivity to educational TV was "Winky Dink and You", which is considered to be the first interactive program. During the 1970s, a number of interactive television experiments were organized, including projects targeting to education and training. In the next few years many different services were developed including combination of TV and telephone line (Jack & Tsatsoulin, 2002) to deliver text and graphic data to the TV screen, as well as cable interactive services that supported quiz answering with the remote control.

During the 1980s and before the advent of personal computers, TV sets were often used as precursors of online service terminals. At the same time telecommunication technologies and infrastructures were developing rapidly and provided more interactivity in media applications both at home and in school. These new technological devices required better interactive skills from users. Increased user literacy, in turn, paved the way for more interactive projects during the 1990s. Most of them were short-lived, mainly because the technology that was required to implement them was too costly for average consumers. Some companies attempted to simplify user technologies and offer cheaper services; while others diversified their products (Carey, 1996).

The latest technological developments promised to enhance realism of instructional programs