Chapter 16

Customisation of Internet Multimedia Information Systems Design Through User Modelling

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ABSTRACT

Internet multimedia information systems have become widespread in business and educational settings. However, much remains to be identified about how different users perceive such systems. Therefore, it is essential to build robust user models to illustrate how multimedia features are experienced by different users. Multimedia research suggests cognitive and interpersonal styles have a significant effect on the users' navigation patterns and interaction behaviour. In particular, gender difference, prior knowledge, and cognitive styles have been extensively examined in previous studies. The findings of the research review that has been done as part of this chapter are classified into three themes: (a) content information and presentation, (b) information space navigation and accessibility, and (c) user interfaces and support. A user model is then developed as a result of the analysis of the findings. Finally, implications for the design of Internet multimedia information systems are discussed.

INTRODUCTION

The freedom offered by Internet multimedia information systems often comes with a price. The most reported negative effects are "getting lost in hyperspace" and "cognitive overload" (McDonald & Spencer, 2000). Not all users appreciate the freedom of interaction and wealth of information that Internet multimedia information systems provide. Such importance has been highlighted by previous research, which indicates that users with different cognitive and interpersonal styles experience different problems and require different navigational support in Internet multimedia information systems (e.g., Ford & Chen, 2000).

It is, therefore, essential to build a robust user model by understanding the needs of users with different cognitive and interpersonal styles (Ford, 2000). Such a user model can help the designers to develop Internet multimedia information systems that can accommodate a wide range of cognitive and interpersonal styles. The paper aims to examine the application of user modelling for customising the design of Internet multimedia information systems. At first, it discusses the importance of cognitive and interpersonal styles and how differences in these influence user-interaction with Internet multimedia systems. The evidence is then analysed under three common themes: (a) content information and presentation, (b) information space navigation and accessibility and (c) user interfaces and support. Finally, a user model is developed that is comprised of three user profiles—requirements, system, and personal—that can be used in customising the design of Internet multimedia information systems.

BACKGROUND

In the past ten years, many studies have found that cognitive and interpersonal styles had significant effects on the use of information systems. Such differences include gender differences (Ford & Miller, 1996), prior knowledge (Ford & Chen, 2000), and cognitive styles (Shih & Gamon, 1999).

For gender differences, previous research showed that males have higher abilities and interest in computers than females (Busch, 1995). Koch (1994) examines the effects of gender differences on the use of technology in the classroom. She points out that many girls in school show little interest for computers. "They are socialized to view technology and technically literate people as belonging to a particular culture—the hacker culture"—which is comprised primarily of men. She also describes that women "may also see the world of technology as precise and unforgiving, often lacking in creativity and having little connection to people."

Users' prior knowledge includes previous understanding of the content area and levels of system experience appropriate to the program. A number of studies compared the differences between users with high prior knowledge and those with low prior knowledge. Table 1 classifies the familiarity with computer systems and system requirements for these two groups.

Cognitive style is an individual's preferred and habitual approach to organising and representing information (Riding & Rayner, 1998). Among the various dimensions of cognitive styles, Witkin's Field Dependence has emerged as one of the most widely studied cognitive styles with the computer-based applications (Witkin, Moore, Goodenough, & Cox, 1977). This is because it reflects how well a user is able to restructure information based on

Table 1: Prior knowledge and system requirement
(Adapted from Shneiderman, Byrd, Croft, 1997)

	Familiarity	Requirements
Low prior knowledge	Applying little specialised training to use the system. They use the interface that supports the primary functions.	Such users need an orderly structure, visible landmarks, reversibility, and safety during the processes of interacting with computer systems.
High prior knowledge	Possessing the capability to use most of the system's features. They can get the point quickly and in a straight way.	Such users demand shortcuts or macros to speed-repeated tasks and extensive services to satisfy their varied needs.

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