Chapter III
The Effects of Human Factors on the Use of Web-Based Instruction

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ABSTRACT

Web-based instruction is prevalent in educational settings. However, many issues still remain to be investigated. In particular, it is still open about how human factors influence learners' performance and perception in Web-based instruction. In this vein, the study presented in this chapter investigates this issue in a Web-based instructional program, which was applied to teach students how to use HyperText Markup Language (HTML) in a United Kingdom (UK) university. Sixty-one master's degree students participated in this study. There were a number of interesting findings. Students' task achievements were affected by the levels of their previous system experience. On the other hand, the Post-Test and Gain scores were positively influenced by their perceptions and attitudes toward the Web-based instructional program. The implications of these findings are discussed.

INTRODUCTION

Web-based instruction is prevalent in educational settings. The value of Web-based instruction lies in the capabilities of hypermedia, which permit significant flexibility in the delivery of non-linear course material (Khalifa & Lam, 2002). Students are allowed to learn in their own way—to determine their own path through the material available (Barua, 2001)—and to learn things at their own pace (Chen, 2002). However, the freedom offered by Web-based instructional programs may come with a problem, because flexibility increases complexity (Ellis & Kurniawan, 2000). Learners are forced to determine their own learning strategies and, therefore, will differ in their perceptions

and approaches to learning. In particular, some learners who lack the skills of independent learning may find this difficult and become confused (Last, O'Donnell, & Kelly, 2001), so they may forget what they have already covered, and miss important information (McDonald, Stodel, Farres, Breithaupt, & Gabriel, 2001). This suggests that not all students will appreciate the flexibility and freedom offered by the Web and that human factors, therefore, are important issues to be considered in the development of Web-based instruction programs.

In this vein, the study reported in this chapter aims to investigate how human factors influence students' reactions to a Web-based instruction program. The chapter begins by building a theoretical framework to present the relationships between Web-based instructional programs and individual differences. It then describes an empirical study of students' learning experiences in a Web-based instructional program. Subsequently, the design implications are discussed based on the findings of this empirical study.

THEORECTICAL FRAMEWORK

Web-Based Instruction

Over recent years, the World Wide Web (Web) has been becoming a useful tool for information distribution (Sridharan, 2004). In particular, there is an increase in use of the Web for instruction (Evans, 2004). Web-based instruction provides a number of advantages, among which dynamic interaction and flexible schedule are two key items. In terms of dynamic interaction, Web-based instruction presents an enormous amount of information through various interconnections that offer students a rich exploration environment. The development of Web-based instruction provides learners with many opportunities to explore, discover and learn in theory according to their individual needs. Students can create individualized learning paths to reach the desired goals, move at their own speed and retrieve additional information as needed (Hui & Cheung, 1999). There is a shift away from didactic instruction to discovery of information (Smaldino, 1999). This approach is in line with the constructivist philosophy of learning, where the learner is encouraged to interact with the environment to construct individual knowledge structure (McDonald et al., 2001).

With regard to flexible schedule, Web-based instruction allows learners to read course content through a computer network at any time and at different places (Chang, Henriquez, Honey, Light, Moeller, & Ross, 1998). Burton and Goldsmith (2002) found that such a flexible schedule makes Web-based instruction appealing to students, including the convenience of not having to be on campus during the week, to easily arrange personal commitments and to take courses around work schedules. This type of learning may be particularly beneficial to individuals who live in remote places (Daugherty, 1998). Individuals living in remote areas can have access to the same course content as those living in big cities. This is why many educators have tried to develop a distance learning program on the Web. As pointed out by Clark and Lyon (1999), Web-based instruction has been predicted to be the future of all types of distance learning programs.

However, these advantages may come with a price. Power and Roth (1999) reported that Web-based instruction is more dynamic and flexible than other learning material, but it creates new challenges related to the effect on learners' comprehension. Ng and Gunstrone (2002) indicated that although students had positive perceptions to self-based learning provided by Web-based instruction, the unstructured nature of the Web made some students need more time to search information. Quintana (1996) stated that while students gained the advantage of flexibility in time, pace and distance with Web-based instruction, many students, on the other hand, felt isolated,