Chapter IV
Cognitive Styles and Design
Interactions in Web-Based
Education

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ABSTRACT

Online education has experienced phenomenal growth, but some researchers and practitioners, as well as some students, have raised serious questions about the efficacy of online education. The research literature shows a clear division between those who maintain that the quality of online education is at least on par with traditional classroom education, while another body is more dubious about that conclusion. In this chapter, we will examine some of the personal and situational variables that confound these findings—both positive and negative, and suggest that media and their interactions with individual learning styles and instructor educational philosophies need to be taken into account in the design and delivery of online education.

INTRODUCTION

The ease with which information can be distributed over the Internet to a large number of recipients has vastly expanded the reach of education and information access (Giannakouloupoulos, & Kodellas, 2005). Consequently, there has been an explosion of online educational programs as well as in the proportion of students who are studying online (Harasim, 2001). A significant body of research, over the years, has asserted the notion that student performance is equivalent between those enrolled in online education compared to students taught in a traditional classroom (c.f. Arbaugh, 2000; Blackley & Curran-Smith, 1998; Freeman & Capper, 1999; Johnson, Aragon, Shaik & Palma-Rivas, 2000; Maki, Maki, Patterson & Whittaker, 2000). However, the difficulty found in studies such as these is the extrapolation of performance across student populations, who in
most of these cases are not randomly selected or assigned to study groups. This presents a variety of research design and control issues including variations in subject matter, student abilities and other important factors that would affect the conclusions. As an example, students who attend traditional classrooms are usually younger and have less “world knowledge” and experience than those who take online courses (Harasim, 2001; Lake, 2008).

Not only do student demographics and maturation characteristics tend to vary between student populations, but also there are differential characteristics among instructors and instructional styles, teaching philosophies, and designs. For instance, Maki, et al. (2000) conducted a two-year quasi-experimental study of undergraduate students and concluded that students in the online sections of an introductory psychology course assimilated more information as measured by content questions and performed better on examinations than those in the classroom. However, this study, as with most of the others, along with the lack of randomization, failed to account for important instructor and instructional differences.

Some studies have attempted to control for these instructor and instructional differences by having the same instructor teach both the online and proximal groups, yet at same time, the instructor has also been the researcher—raising issues of bias, or used an instructor who applied dissimilar instructional designs between the two modes, making a valid comparison impossible.

In addition to the contamination from the research design problems, there are also a number of personal and situational variables that impact the findings and yet are rarely if ever controlled in the research designs or analyses, such as class sizes, types of technologies used in the instruction, student learning styles, the degree of student involvement, and the type of subject matter taught such as whether the materials require domain specific or domain general skills and knowledge (Bailey & Iqbal, 2007; Bangert, 2008; Martinez-Torres, Marin, Garcia, Vazquez, Oliva, & Torres, 2008; Oliver, & Moore, 2008; Workman, 2004).

Furthermore, the motivations of students taking classes online versus in the more traditional classroom may differ. While both online and traditional students are primarily concerned with subsequent employment opportunities and in the educational experience (Lake, 2008), one of the most significant attractions for students studying online is, first, convenience, followed by flexibility, beyond that of educational quality or learning outcomes (Kariya, 2003).

On the other hand, studies (e.g. Broadbent & Shane, 2008) have shown for example that students who enroll in traditional classroom programs tend to be more interested in the social learning experience, prefer observational modeling in the learning process, and feel that social interaction with peers, which develops spontaneously in proximal settings, lends to the learning transfer. Traditional students are also more attracted to the prestige or reputation of an academic institute, followed by desires for a campus experience such as attending sports events, social-friendship opportunities and interactions, or belonging to an academic or Greek society (Lake, 2008). It is within the interacting variables where disparities in student performance between online and traditional learning are found.

This is not to say the online education is certainly less effective than classroom learning, or vice versa, but rather that they are not simply interchangeable. The extant research findings touting equality are suspect. Online instructors need to be mindful of important differences and many situational and individual variables in play in order to create a rich and effective online learning environment and experience for students (Roca & Gagne, 2008). In this chapter, we will focus specifically on a set of key interactions among technology mediation, student learning styles, and instructional philosophies and design approaches that can affect online learning outcomes.