Chapter 15

Web-Based Learning: Is It Working? A Comparison of Student Performance and Achievement in Web-Based Courses and Their In-Classroom Counterparts

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In an in-depth study of Internet and classroom students’ test grades and assignment grades spanning three semesters, it was found that there is a significant difference in achievement and performance for these two types of course delivery. Although there were not significant differences in the final grades for two of the three levels of computer information systems students in CMS 1010, CMS 2010, and CMS 3270 at Metropolitan State College of Denver, there were significant differences between classroom students and Internet students when the authors examined performance—as measured by eight homework assignments and achievement—as measured by test scores. Reinforcing what many studies have found, the distribution of final grades among eighteen classes (nine Internet delivered and nine classroom delivered) did not differ significantly, but how those grades were earned did differ for two of the three sets. Internet students did better on the exams, with significant
differences at all three levels. When performance was compared, there was a significant difference for the junior set of data. Classroom students performed better on the hands-on homework assignments for this level. The upper level course student averages differed significantly in both achievement and performance measures. The three courses examined all had the same instructor for Internet and classroom sections; all had exactly the same tests and assignments for their particular course; all three courses had a hands-on skills component.

The authors caution against generalizing about all Internet-delivered courses from the results of this study. It appears that there are significant differences in online learning experiences when one delves more deeply into how mastery of material is obtained. The sample size of 302 students provided a rich data set which showed variances according to gender, class level, past experience with Internet delivered courses, and even age. T tests were performed on three sets of matched pairs of students. The authors believe the findings support the theory that Internet delivered distance education courses require different design. More importantly, however, this research demonstrates that Web courses are working. As more research is done on achievement and performance in Internet-delivered classes, and as our instructional design for Web courses is refined, we will find the best way to design these distance education courses.

**INTRODUCTION**

Are web-based courses working? In the last five years, the number of classes offered via the Internet rather than in the traditional classroom setting has grown exponentially. Web-delivered courses began as basically a collection of text-based pages of information—albeit nicely formatted. Many of the courses quickly progressed to graphical and even multimedia dependent pages as the World Wide Web became more sophisticated and higher speed modems and widespread access became commonplace. Web-based classes are the newest variation of distance education, which has been around for decades. Web-delivered distance education is distinctive in several ways: the course is presented on dynamic web pages, meaning the course is often changed throughout the weeks of the term; interactive multimedia on the Web pages offers greatly enhanced student involvement; and due to the asynchronous and synchronous communication capabilities of state-of-the-art web-based classes, there is often as much, or more, teacher-student communication than in the traditional classroom-delivered course (McGinnis, Marold, and Monroe, 1998). These elements are not part of the older, more traditional distance education environment, such as the correspondence course (Larsen and Helms, 1996). The promise of “electronic tutelage,” or using com-
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