

# **A Comparison of Learning Outcomes in Web-based and Traditional Lecture Format**

## **General Psychology and Introductory Sociology Courses**

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This research was conducted in the Fall of 2004 and addressed three questions:

1. Are there differences in learning outcomes between students in web-based and lecture-based courses?
2. Are there differences in long-term retention of course content between students in web-based courses and lecture-based courses?
3. Is there a difference in student drop-out rate between web-based and lecture-based courses?

The prevailing mantra in the distance learning literature is that there is “no significant difference” in achievement levels when comparing academic performance of students enrolled in the web-based environment versus the traditional lecture-based environment (Collins & Pascarella, 2003; MacGregor, 2002; Russell, 1999). However higher drop-out rates have been reported for web-based courses in comparison to lecture based (e.g., Cheng, Lehman, & Armstrong, 1991). While the literature on web-based literature is expansive, many of the studies have methodological difficulties, such as comparison of web and lecture based courses taught in different semesters or by different instructors. The present study was designed to provide a more systematic comparison of student outcomes in the two learning environments.

A psychology professor and a sociology professor each taught web-based and lecture-based introductory courses in the same semester. The participants in this study were 165 students who enrolled in Sara Brallier’s Introductory Sociology course (SOC 101) during the summer semester or fall semester of 2004 or the summer semester of 2005 and 54 students who enrolled in Robin Gilbert’s Introductory Psychology course during the spring semester of 2005. Eighty-eight student enrolled in the lecture-based SOC 101 course and 77 enrolled in the web-based course. Twenty seven students enrolled in the lecture-based version of PYSC 101 and 27 students enrolled in the web-based version.

The method used to evaluate the first question included the following: A 50-question, multiple-choice knowledge-based pretest was administered at the beginning of the semester to students in each of the classes. At the end of the semester, a posttest was administered. The posttest contained the same 50 multiple-choice questions that had appeared on the pretest. Pretest and posttest scores were calculated by determining the percent of correct answers on each test. An improvement score was then calculated by subtracting the pretest score from the posttest score. An improvement score was recorded for those students who had taken both the pretest and the posttest.

The method used to evaluate the second question included the following: Approximately one semester after completing the Summer 2005 Sociology 101 course or the Spring 2005 Psychology 101 course, students in both learning environments were offered an incentive to take a retention test. The retention test contained the same 50 questions test that had appeared on the pretest and the posttest. A retention score was calculated by determining the percent of correct answers on the retention test.

The method used to evaluate the third question included the following: The percentage of students enrolled in Sociology 101 or Psychology 101 who dropped the course was calculated for each of the two learning environments. Their study showed that students in the web-based courses did not differ from students in the lecture-based courses in terms of mastery of course content as assessed by the improvement scores. Additionally, there was no difference between students in the two learning formats in terms of long term retention of course content. Moreover, there was not a statistically significant difference in drop out rate between the two learning environments. This research supports the assertion of distance-learning educators that well-designed web-based courses can facilitate learning outcomes that are comparable to those found in lecture-based courses.