Chapter 1.16
Measuring Effectiveness in Online Instruction

Louis B. Swartz
Robert Morris University, USA

Michele T. Cole
Robert Morris University, USA

Daniel J. Shelley
Robert Morris University, USA

INTRODUCTION

To remain competitive, expand access to education, and meet the needs of students, institutions of higher education are offering larger numbers of online courses. As online instruction increases, educational institutions, students and society need to make sure that online courses and programs are as effective as traditional classroom courses and educational programs. To address this need, this paper focuses on the question, "Are online courses and programs as effective as those taught in the classroom?"

Numerous authors have addressed the question of the effectiveness of online classes (Keegan, D., 1996; Russell, T., 1999; Schulman, A.H. and Sims, R.L., 1999; Harasim, L. 2000; Ryan, R.C. 2000; Rivera, J.C. and Rice, M.L., 2002; Bernard, R.M., et al, 2004; Frantz, P.L. and Wilson, A.H., 2004; Suanpang, P., Petocz, P. and Kalceff, W., 2004;

Fjermestad, Hiltz, S. and Zhang, Y. 2005; Weaver-Kaulis, A. and Crutsinger, C., 2006). Most studies center on student satisfaction and/or student learning. The studies have produced mixed results.

This paper provides a summary of a number of important studies on the effectiveness of online courses and educational programs. It synthesizes the results from the studies and presents possible reasons for the differences in findings. It concludes with a discussion of future trends and suggestions for areas of further study.

BACKGROUND

Several studies of effectiveness of online learning appear in the literature. Thomas Russell's *The No Significant Difference Phenomenon*, published in 1999 summarized 355 research reports, papers and summaries on the subject of online versus traditional learning. He found no significant difference in grades, satisfaction or effectiveness when "e-

learning" was compared to traditional teaching. Other studies have supported Russell's findings. Taking additional factors into consideration, Navarro & Shoemaker (2000) found little or no difference between online and classroom learning when such issues as race, gender, technological and academic backgrounds, and socioeconomic status were taken into account.

Rivera and Rice (2002) reported that while several studies (including Russell's 1999 work) have demonstrated that online and traditional courses were comparable with regard to the cognitive factors (learning, performance and achievement), the same could not be demonstrated consistently with online learning with regard to student and instructor perceptions and satisfaction. Rivera and Rice did a comparative evaluation of one course offered in three formats, online, traditional classroom and web-enhanced classroom. Using questionnaires to evaluate student satisfaction, grades to evaluate student performance, and discussion and anecdotal references to evaluate instructor satisfaction with teaching online, Rivera and Rice compared the efficacy of the three class formats. They found that the exam score averages were close in all three formats, thus supporting the finding by others that online and traditional classroom courses are comparable with regard to a particular cognitive factor, student performance.

However, their results showed significant differences in levels of satisfaction among all three formats, including the hybrid (onland with an online component). The 100% online web-based instruction was the least satisfactory to students. As the authors point out in their discussion of instructors experiences with the different formats, there are a number of factors that might be influencing results, such as the students' comfort level with technology, varying level of instructional support and instructors' familiarity with the course material delivery platform.

Rivera and Rice's results illustrate the need to improve the technology and course delivery aspects of online instruction in order to improve

student satisfaction. Their study also points out the need for research methodology that can uncover the answer to the question of effectiveness of online education.

Fjermestad, Hiltz and Zhang (2005) reviewed thirty in a data base of over 100 published empirical studies of asynchronous learning networks (ALN) which compared the process and outcomes of online and classroom course delivery. The authors looked at access, faculty and student satisfaction, student learning and cost effectiveness. With regard to student learning, their results were consistent with other studies that found online instruction to be equal to or better than face-to-face instruction. With regard to student satisfaction, the results were mixed, with the "no significant difference" being the overall conclusion (p.48). They conclude with the observation that more methodologically rigorous studies need to be done before the "Which is better" question can be answered. (p. 49)

Arbaugh and Hiltz (2005) discussed the difficulty in reaching definitive conclusions when measuring learning because of variations in measurement tools and methodologies. The majority of the published work to date has found that either there were no significant differences between the two delivery vehicles or that if there were significant differences between the two, learning was greater in the online format. Arbaugh and Hilz examined the variety of tools used to measure learning, including grades, collaborative exams, projects and portfolios, course outcomes, as well as attitudinal surveys to measure satisfaction with the learning process. From their review of quantitative methodologies used to measure learning and satisfaction, the authors conclude that for such studies to be useful they need to be more rigorous investigations of learning effectiveness, employing more "valid and pedagogically sound" methodologies (p. 97).

Clearly, there are obvious, basic differences between courses which are taught entirely in an online format and those which are taught entirely

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