PREDICTING STUDENT PERFORMANCE IN ONLINE COURSES

James M. Henson, Craig School of Business California State University, Fresno, 5245 N. Backer M/S PB7, Fresno, CA 93740
Ojoung Kwon, Craig School of Business California State University, Fresno, 5245 N. Backer M/S PB7, Fresno, CA 93740

ABSTRACT

Online courses are become more predominant in higher education, and that has prompted efforts to measure their effectiveness when compared to traditional face-to-face classes. In many cases, those efforts have prompted studies that would compare one mode of instruction such as a face-to-face class to another mode of presentation such as an online class or a mixed mode (hybrid) class. While these activities have merit, some research has indicated that the GPA of the student is actually the most predominant predictor of performance when comparing those two modes of instruction. Consequently, a comparison of the various modes of instruction (online versus face-to-face or hybrid) might prove more meaningful if the analysis controlled for the student's GPA prior to entering the class under consideration.

BACKGROUND

The preliminary literature review has included studies that sought to understand the factors that determine performance in this type of course. It is also expected that the broader literature review will include research that has focused on the relative effectiveness of the different modes of instruction such as online versus face-to-face. Cacciamani et.al [1] discussed knowledge building, while Dziuban & Moskal [2] employed the end-of-term student evaluation of instruction as a method of evaluating the various modes of instruction. Hatcher, Henson, and LaRosa [3] compared two alternative methods of teaching information systems concepts in online courses and found little difference in the outcomes. A study by Taylor and Ku [4] sought to measure active learning based on eight design principles. They found that active learning was highly correlated with the student's perception of the quality of the course.

This research has built upon previous studies and utilizes an extensive pool of data from comparable sections of the same senior-level Management Information Systems course in a school of business. This has provided 515 cases with a mixture of online and face-to-face presentations by two different instructors over a time-span of 4 years. (There are no truly hybrid classes available for this analysis.) The content of the courses are essentially comparable over all of the sections.

TABLE 1
Distribution of Class Sections

Mode	Professor 0	Professor 1	Total
Face-to-Face (0)	4	2	6
Web-Based (1)	3	6	9
Total	7	8	15

METHODOLOGY

Linear Regression was used as a means of developing an equation that would predict performance in the course based upon several measurable independent variables. Overall performance in the course was measured as a percentage of the total points available. The independent variables included the student's GPA at the start of the class along with two binary variables. One binary variable represented each the two instructors available, and the other indicated whether the class utilized an online or face-to-face mode of instruction. The analysis also included all the available combinations of two of the three independent variables as well as the use of each independent variable as a single predictor variable.

The underlying research question involved a consideration of the actual impact that the mode of instruction (online versus face-to-face) has on the expected performance in a class with or without GPA as an intervening variable. This research is not intended to develop a model for the prediction of student performance in a class based on various independent variables since there is no attempt to locate and incorporate all of the factors that would be appropriate for that endeavor. Instead, this study was designed to simply examine the relationships between a subset of relevant independent variables in order to evaluate their effectiveness as predictor variables in regards to the actual performance in this particular course. The overall objective was to develop a better understanding of the relationships among those variable with GPA as the primary focus. Mode of instruction was a secondary focus.

PRELIMINARY RESULTS

The analysis of the data indicated that the inclusion of all three independent variables provided the most accurate regression results with an adjusted R^2 of 0.416. Using only the mode of instruction for the model had an adjusted R^2 of 0.101. The various combinations of GPA with the other two variables provided results between these two adjusted R^2 values. It has often been assumed that the performance in a Web-based class would be significantly lower than that of a face-to-face class if all other factors were equal. However, in this study the mode of instruction had the lowest R^2 when considered as a single predictor variable (0.101). It also provided for the least reduction in R^2 when it was removed from the analysis.

REFERENCES

[1] Cacciamani, S., Cesareni, D., Martini, F., Ferrini, T., & Fujita, N. Influence of participation, facilitator styles, and metacognitive reflection on knowledge building in online university courses. *Computers & Education,* 2012, 58(3), 874-884.

[2] Dziuban, C., & Moskal, P. A course is a course is a course: Factor invariance in student evaluation of online, blended and face-to-face learning environments. *The Internet and Higher Education,* 2011, 14(4), 236-241.

[3] Hatcher, M., Henson, J., LaRosa, P. Learning information systems concepts: A comparison of student perceptions in a Web-based setting versus a traditional classroom setting. *The International Journal of Learning*, 2010, 17(5), 399-406.

[4] Taylor, J. E., & Ku, H. (2011). Measuring active learning to predict course quality. *Performance Improvement Quarterly*, 2011, 24(1), 31-48.