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ASCERTAINING PERFORMANCE VARIABLES FOR USE IN DETERMINING STUDENTS' GRADES IN COURSES EMPLOYING A BUSINESS SIMULATION

Walter J. Wheatley, The University of West Florida
Raid W. Amin, The University of West Florida
E. Nick Maddox, Stetson University
Chantele T. VanderLinde, The University of West Florida

INTRODUCTION

Presently, educators utilizing business simulations, are faced with many decisions to make in regards to simulation selection, computer support, decision support systems, spread sheet packages, and a host of other important aspects related to the simulation experience. One of these decisions that falls in the other important aspects category, is the selection of the business simulation performance variables to be used to determine the students grades. A comprehensive review of the gaming literature revealed that the number of variables employed in the past by a variety of simulation researchers is quite extensive. The question of which performance variables to enter into research models is not one of a trivial nature. No where in the literature is there sufficient evidence to suggest which performance variables are the most robust in determining simulation performance. Even the once very popular DuPont profitability formula which incorporates ROA and ROS has come under strong scrutiny in today's dynamic business environment.

Thus the purpose of this study was to better understand what variables, or combination of variables, that account for the major portion of variation in student performance in business simulations. The eight performance variables that were chosen for this study were selected because of their frequency of use in prior studies. Furthermore, since many simulations are started up in an in—process mode or are continued over more than one semester, the positive percent of change in these variables were included in the research design. Thus the study examined a total of sixteen simulation performance variables. These variables and their corresponding positive percent of change used in the study are sales, net income, ROS, ROE, ROA, dividends, market share, and stock value.

RESEARCH DESIGN

Sample Population

Data were collected from 142 graduate students seeking a Masters of Business Administration degree from a medium, South-eastern university. Students enrolling in the graduate capstone course Business Policy and Planning took part in the research project and were organized into groups of, on average, 7 students per team thus yielding a sample of 19 teams.

The Simulation

The simulation employed in this research project is a modified version of the original Carnegie--Mellon game. It is one of the most complex simulations of business enterprises in a competitive industry known to exist today. It is designed to provide students with a compressed and integrative, but realistic experience in the management and operations of a medium sized, multinational, publicly held corporation. In this two semester, intensive course, the students are exposed to the problems, uncertainties, stress and opportunities, which arise in managing a company for a simulated period of two v ears.

RESULTS

Thus, this research project was an attempt to examine as many vital simulation performance variables as possible that would contribute to the overall, long-term health of an on—going business enterprise. Then an attempt was made to see if a simple yet valid model could be developed to assist instructors in evaluating student performance. The model obtained from this study indicates strong evidence that the most important measure of simulation performance is a ratio reflecting an adequate profit return on investment such as ROA and/or ROE. This finding, serendipitous or not, is consistent with the simulation literature. The second most important set of simulation performance variables suggested by the model is absolute amounts of sales and net income. This combination implies that it is the quantity of these amounts that are important and as they rise simultaneously the implicit result would be a **%** positive change in ROS that was important in the first factor. However, it is apparent that the vastness of the sales and net income must be considered together and just not ROS by itself. Finally, to accomplish the above, strong market share growth is important.

Like all research, this one too has its boundaries and limitations. Different simulations have different algorithms that generate the sensitivity of simulated variables. The fact that the simulation employed in this study is an on—going simulation probably has some bearing on the results. And obviously the extensive private sector experience of the authors may have some unknown bearings on the interpretations of the findings. However, due to the large number of students involved in this study, their very mature and experienced demographics, the complexity of the Cargnie—Mellon simulation, and the extensive amount of analysis that was put into this research project, the result should be reasonably valid.

Thus assuming that this study was a valid one, then it is important to note that it is the combination of these factors that allowed this model to fit the data being analyzed so well and to provide for its robust performance predicting capability. Thus it is suggested that a return on investment ratio, ROA and/or ROE, absolute amounts of sales and net income, and the amount of market share growth be utilized in combination to better evaluate students performance in business simulations.