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AN INTERACTIVE SIMULATION GAME FOR COMPETITIVE DECISION-MAKING

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ABSTRACT

This paper discusses a simple simulation game being played at Towson State University in the introductory production and operations management course for business students. The game attempts to help the students understand the interactions between various decisions and functions in an organization through a hands-on participatory approach. We discuss some of the salient features of this game. We also explain the mechanics of the game's operation by elaborating on the technical components of the game. The fact that the game serves its purpose is confirmed by its popularity among the students and the effort put into making good decisions.

OVERVIEW

This paper discusses a simulation game being played for the introductory Production and Operations Management class for Business students at Towson State University. The purpose of the game is to encourage hands-on participation by the students and to gain an understanding of the interaction between various decisions and different functions within the organization. It encourages analytical decision-making. The game can be made more or less challenging by varying different parameters and thus adjusting to the students' capabilities and the level at which the course is conducted. In this demonstration, we show how the game is structured. We explain the various modules: the instructor's module and the student module. The computer implementation is briefly explained and the advantages of this set-up are highlighted.

This game is meant to simulate the decisions made by the students in the medium term, i.e., the focus is on decisions similar to those being made in an aggregate planning exercise rather than strategic decisions such as location and layout. However, there are options to add to plant capacity or dispose of plant capacity based on the demand forecasts. One can also borrow long-term loans or pay off existing loans. Most of the decisions made on a period-by-period basis are directly related to medium term planning decisions where the attempt is to match demand and supply. Each student acts as an entrepreneur who is in charge of a company. Three such companies are aggregated to form an industry. Thus, each company has two other competitors within the industry. The companies are of different sizes to emulate reality. Different company sizes imply that all facets of the company, including market share, assets, liabilities, and plant size are different for the three companies. The companies are assumed to be manufacturing a single indistinguishable product. The industry demand is a fixed external factor.

The objective of the game is to maximize long-run profits for the company being managed. Towards this goal, the players in the game make a variety of decisions that have an impact on factors ranging from short term aspects such as cash position and inventory, to plant assets and long term bonds. In the medium run, however, the players have to match supply and demand in a cost-effective manner.

The simulation proceeds for a planning horizon of 10 to 20 periods or quarters depending on the time available during the semester. The students make decisions for each quarter after which they receive the results. The output essentially consists of an income statement, a balance sheet and a section, which contains the evaluation of performance for that quarter. The game performance is evaluated with respect to five aspects: market share, income, cash position, owner's equity and dividends. The students are graded at the end of the semester bas on their cumulative performance on all five performance factors

COMPONENTS OF THE GAME

The game consists of a set of Fortran and *DCL* programs. *DCL*, standing for Digital Command Language, is the language used to communicate with the VMS operating system running on the VAX. There are two basic modules in the game: Student module and Instructor module. The student module provides the basic interface between the student and the game and is the means of entering decisions. It is invoked simply by typing in '*mansim*' at the *DCL* command prompt. The program then prompts the students to input the various decisions. The instructor's module consists of one major *DCL* program, which is the driver program and a set of supporting Fortran programs. This set of programs performs all the tasks necessary for creating a compiled decision file from the individual student decision files, running the program, creating the output files and finally printing the program. However, all these programs have been seamlessly integrated and the fact of different programs working together is transparent to the instructor. The program can be invoked simply by typing '*operate*' at the *DCL* command prompt. The instructor module takes over and presents a user-friendly interface. A question-answer session directs the instructor to enter various parameters of the game. The instructor has a choice of exiting the program at any stage and either re-running the '*operate*' module or running individual components of the program if the instructor so desires.

CONCLUSIONS

We mentioned that this game provides a hands-on, participatory style of learning, which has been found to be very effective. Learning of text book material and concepts discussed in class are expedited through their application to decisions made in the game. Student comments indicate that they are extremely positive about the game. One of the advantages of the game is that it is implemented on a computer that can be accessed via telephone lines. For continuing education classes with students who work full-time, this is a tremendous time-saver, eliminating the need to be physically present on campus at times other than regularly scheduled class times. Such students also tend to have access to computers and modems at work and can easily access their account from their computers at work.

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