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APPLICATION OF THEORY AND OF COMPUTERIZED GRADING IN MANAGEMENT SIMULATION

Charles R. Scott, Jr., University of Alabama

This paper presents two aspects of the use of our simulation, Tempomatic IV¹, in our business policy course at the University of Alabama. One aspect is the use of the game for the application of theory presented in prior courses. The second aspect involves a computerized evaluation system for the teams. These two aspects appear unrelated but will be related at the end of the paper.

We started using a version of our simulation about 15 years ago in an undergraduate business policy course for which the student received two semester hours credit. (We use the simulation in a three- hour graduate course also. This paper is concerned only with its undergraduate use.) We had, prior to that time, used cases, readings, class presentations and class discussions for the policy course. None of these methods, some of us felt, served as a true capstone course for the undergraduate student in business. The work appeared to be merely a continuation of previous course work. Our first introduction of the simulation had been on an outside class basis as few of the faculty at that point had accepted the game as a teaching tool. Students who wanted to play the game came outside class hours. Following this early experimentation, we were able to include the game in course work for some of the majors, and this coming fall, 1974, we will have, for the first time, all last term seniors in the school involved in the game through enrollment in the policy course.

Along with the simulation, we have, at intervals, tried using cases, outside readings, book reports, and class presentations and discussions. In fact, during the years we tried many combinations, but none proved very satisfactory. The simulation took more and more of the students' time as they became interested in competing against others in the class. Consequently, they did poorly in the other component areas of the class. Part of this could be attributed to the students' lack of training in case analysis and part to their neglect of the assigned reading material. However, most of this imbalance could be attributed to the excitement, and consequent time investment, which the simulation generated.

We felt that the simulation had proved itself as a productive teaching method, but that we needed to get it out of the realm of just a game. We needed to develop in the students the analytical ability required for decision making and for translating the theory they had received in other courses into practice.

¹ Scott, Charles R. and Strickland, Alonzo J., Tempomatic IV, A Business Management Simulation (Boston, Massachusetts: Houghton Mifflin Company, 1974).

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I do not know what others have found in regard to students' retention of content from courses taken prior to policy courses. We have found it to be low. We find that students, even those with the expected mastery of the content and high retention, lack the skills to apply what they have learned in their courses in economics, accounting, marketing, personnel, and production. Additionally, until recently, not all students have taken courses in all of the areas needed, such as production and industrial relations. As a consequence, the students do not initially make the analyses necessary for good decisions.

After trying many approaches, we have designed the policy course so that all of the students' time is related to the game. We spend about half of the time in class running the game and the other half applying the theory from the appropriate disciplines to the game. Let us examine the half spent applying the theory to the game.

We spend class time going over combinations of the following topics:

- (1) corporate organization and strategy
- (2) financial and management reporting
- (3) marketing forecasting techniques
- (4) inventory analysis
- (5) financial analysis
- (6) debt equity financing
- (7) profit-volume analysis
- (8) labor contract negotiations
- (9) capital budgeting and present value analysis

Some other topics we have included are scheduling, cost analysis, cash flow analysis, and sales promotion analysis.

We try to guard against a reteaching of these topics. The students have already had specialists teaching them in each of the disciplines, and I, for one, am not capable of covering all of these topics as well as the specialists can. To avoid the tendency merely to reteach, we work hard to try to guide the students in their application of theory and content. Inside class the students are asked to evaluate the past data presented in the manual. The application is practiced outside of class time through the preparation of team topical reports and through weekly decision making. Students often have to return to their texts in previous courses for review of content or to strengthen their understanding of what they were taught.

Let me use some examples of some of the topic coverage in more detail.

We usually start with corporate organization and strategy. Methods of organizing teams, methods of making team decisions, and strategies are discussed. The account of past policies of the

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company presented in the student manual provides the environment for the company. These policies and the past financial records are reviewed together to determine what strategies have been followed. Then, teams are given time to determine their methods of organizing and their strategies before they submit their plans. Later in the term, each team is asked to evaluate its activities and to show how it has followed and how it has deviated from its plans.

For the financial analyses, we spend most of the time with financial ratios and their meaning. In class, the students are asked for methods of determining the financial situation of the company at the start of play. Usually, the responses are slow. Initial discussions have interested many students to return to their finance and accounting texts. The ratios are computed for the company's past and trends are often plotted. The ratios appear to take on a practical meaning to them. In particular, the amount of accounts receivable is large in our game based on a fixed long collection period. This usually results in a high current ratio which the students have difficulty explaining.

The computer has been programmed to compute and print some of the financial ratios for all teams each quarter, a decision period. We post these for all teams to see and evaluate. Each team is required to turn in a report on the financial situation of its company after the present management has been running the company for a number of decision periods. Some of this financial analysis is used at the end of the course when the students make their presentations to a board of directors.

The profit volume analysis is one of the most revealing experiences for the students. All previous analysis has been with static figures. Their initial calculations for the break-even point for the company's past are fantastic. Class discussion has elicited many questions and discussions. Their reports usually show improved sets of calculations for the individual teams.

Labor negotiations are real life in the sense that the instructor plays the role of the union and presents union demands to the company in writing after the class has discussed the topic. The students must then negotiate a new contract either on a company by company basis or industry wide basis. The companies live with the contract in later decisions.

Let me illustrate this by using a session I was involved with last fall. Dr. Strickland was teaching the course. Several days prior to the negotiation session, representatives from a class came to me to ask if I would act as a mediator in their class. I accepted. The class period started with the reading of the union demands. After a short disorganized session, I sent the union representative out, gathered the company representatives together and prodded them to develop some counter proposals. The next session was much better organized. However, a second conference of company representatives was required before they could present a reasonably

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organized basis for negotiations. Many times we have had a professor who teaches collective bargaining participate. He has given the class added insight into the bargaining process.

The introduction of these topic discussion sessions and of reports using the simulation as a basis has changed the course so that, we feel, decision making is improved and the students are applying their prior coursework. We see an increased use of the tools they have been given and have had to review.

Now let us move to the second aspect: the computerized evaluation system we have devised for Tempomatic. With each printing of the results of the decisions, the computer prints, by industry, financial information about each company, company standings in various categories, and team grades. We post for all to see selected portions of this information, including the grades.

A team grade is based on how well the company does in a number of categories - sales dollar volume, income before taxes, return on sales, return on assets and stock market price. The categories can be weighted as the instructor desires; we weight the income before taxes as 70% of the above grade.

At first, I objected to using a computerized evaluation system as I felt the students would by-pass the learning process to concentrate on the short term and expediency. This does not appear to be so for two reasons. First, the students know they will be quizzed by a board of directors of businessmen at the end of the term. Second, the students had been using several measures of their own choice such as the stock price and did not know our measuring stick.

The grading system has provided the students with a clear definition of how they are graded. It is not dependent on the judgment of the instructor. We have observed that the students now do more evaluation of their companies to improve their performances. Also, they are informed that this grade is for only part of the course grade for each. We use peer evaluation, reports, exams and the presentation to the board for about 70 to 80 percent of the final grade.

We feel the computerized evaluation has resulted in better analysis and decision making.