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MANAGING THE DYNAMIC SMALL BUSINESS VIA SIMULATION

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The purpose of this paper is to describe our experience in using a small-business simulation at the University of South Carolina, with special emphasis on the students' performance.

Big business can afford to hire specialists to gather and interpret data for the manager and to perform various Other specialized services. This leaves top management free to look at the broad, total picture and to plan and act accordingly. The small-business manager has to be a jack-of- all-trades, handling total company planning like large-company top management, while coordinating more specific day-to-day problems by gathering and interpreting his own data and performing various activities himself.

College graduates may be employed by a large or a small business; but in almost every case, they enter at the lower levels where they have to handle specific day-to-day problems more or less on their own while coordinating their unit with total company goals, much like the manager of a small business. Therefore, I feel that students can gain more of practical value from managing a simulated small business than they can from managing a simulated large one. I also believe most students can see themselves as top management of a small company trying to borrow \$30,000 from their bank more easily than they can see themselves as top management of a large corporation trying to decide whether to put one million or only one-half million dollars into research this year. At least I have found that in handling written cases the students can relate to small companies much better than they can with big companies.

Even executives of large corporations find it challenging to run a small business where they have to deal with more specific, concrete problems and where the cause-and-effect relationship is so much more simple and direct.

GENERAL BACKGROUND

The simulation we use is Managing A Dynamic Small Business (MADS-Bee), which is our own more complex and versatile version of The Small Business Executive Decision Simulation developed over ten years ago by the University of Texas at Austin. It is a simulation of the management of a small manufacturing company. It has 20 production workers (with a maximum of 29 per shift), one foreman, 2 salesmen, and one clerk. The company manufactures a standard product used in the construction industry. Each decision represents a three-month time period. The number of companies possible in a simulation depends on the capacity of the computer used. We have never used more than 14 companies in one world because we want the students to feel that what they do can have a significant impact on the market.

The product is made in a three-stage production process using three units of the company's only raw material. The computer automatically rush- orders additional raw material if the company does not have enough for scheduled production. The computer also automatically orders additional

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finished goods if sales exceed the company's production plus inventory. All rush orders are at prohibitively high expense to penalize poor planning.

We have used this simulation in all levels of courses over the past seven years from the junior-level basic management course through the Masters-level policy course and the University's Executive Development Program. It has also been used successfully for in-house programs we have conducted for individual companies, and two other colleges have used this simulation for the past year.

GOALS

I tell my students that the "good old country boys" who founded the company five years ago have realized that they are doing a bad job of running the company; so they have turned it over to these intelligent college students majoring in business administration to straighten out for them. They will give them a completely free hand for X quarters, and then the owners will take the company back and run it themselves. Their instructions to the students are very simple: 1) Correct what we have been doing wrong. 2) Don't violate any good business ethics or good management practices. 3) Make us real, real rich.

MARKTING

In managing their company, the students make decisions like they would have to make in real life managing a dynamic small company. They have a standard product selling in a highly competitive market with significant economies of scale possible. They have to develop a pricing strategy and a level for advertising expenses. They have to analyze marketing information to determine the proper number of salesmen they should have, determine a pay policy for salesmen, and determine the amount of expense-account money to allocate.

The administrator determines the price elasticity, which is the key factor for this standard product. But as in the "real world", friendship, a steak dinner, or a bottle of Scotch can offset a price difference with many customers since "Uncle Sam" takes his share of any profits they make anyway. Although the students have been told for years that the "economic man" doesn't exist, many of them have a rude awakening when in the game they actually experience this for the first time. A slightly lower price doesn't bring all customers running to them the first quarter they are lowest. Sales can increase substantially, depending on where the administrator sets the price elasticity; and the greater the price differential, the faster the increase in sales.

Additional concepts can be brought in at more advanced levels in other courses to match subject matter and the capabilities of the students. A second product can be introduced which is an improved version of the original and poses the challenges of new product pricing and old product obsolescence. Companies can bid for contracts to supply the original product, which provides for such concepts as marginal cost analysis and, if the second product has been introduced, strategies for clearing out obsolete products.

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The students experience the uncertainties of marketing as the small businessman faces them without a staff of experts to gather and interpret data for him. He has to answer such questions as “What price should we charge?” “Just how effective is advertising?” “How effective are my salesmen?” The students have the information from which to determine how many salesmen they really need; and I constantly encourage them to use it, but few other than graduate students ever do. They have two salesmen where they only need one, but almost nobody ever fires a salesman, whereas at least 25% of the companies hire a third or even a fourth salesman.

PRODUCTION

Since most students have no concept of production facilities or methods, the production process has been simplified to merely determining how much they want to produce and making sure they have the machines, workers, and raw materials. There are no interruptions to production, but there is the potential of a delay in receiving raw materials. They may operate 4, 5, 6 or 7 “C” machines with significant economies for large-scale operations. The machines may be in any of 4 different production categories with different costs for equipment and with substantial productivity differences. Each machine declines in productivity each year.

This situation gives the company the potential of several different production costs per unit depending on the category and age of each machine. A fairly simple production-expense analysis quickly shows which machine gives the lowest production costs, and the students are encouraged to do this analysis, but most never do; thereby giving the advantage to those few who do.

The company’s problems are complicated by the fact that they already have a finished goods inventory equal to almost three months’ production and, not surprisingly, they are short on working capital. The students’ problems are, first of all, to recognize that they have the problem and, secondly, to do something about it. Most students do recognize the problem; but over the years, it is amazing how many students never even recognize that this is their problem even when they have borrowed all the bank will let them have and are still running huge overdrafts at big penalties. Often the students complicate their problem by becoming so blinded by big savings per unit possible in large-volume purchases of raw materials that they commit the company to a year-long contract for twice as many raw materials as they could possibly use without doubling their share of the market.

Recognizing the problem is a lot simpler than solving it. The company is already operating at the minimum level of machines. Production can only be reduced by reducing the workweek. There is a provision in the union contract that if the workweek falls below 32 hours per week, the production workers must be paid \$2.25 per hour for each hour less than 32 hours per week.

A common practice is for students to cut the workweek immediately upon taking over as the new management. While this may look good on the “bottom line” of the profit and loss statement, it raises havoc with worker morale and willingness to cooperate with the new management. It is hard to convince workers that the new management has much regard for the workforce when

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in its first communications with the workforce the new management tells them it is putting them on a short paycheck.

Some students, including graduate students on occasion, have been so callous as to buy additional machines and hire additional workers to get the advantages of large-scale economies of production, at the same time putting all the workers on a short paycheck to reduce inventory. The computer is not equipped to handle personnel situations like this in our simulation. I handle normal situations by merely including them in my final evaluation of the students' performance. Extreme situations I handle administratively by telling the company that X number of production workers have quit in protest. This brings the point home to them in an emphatic way that workers are people and management has to solve its problems with due concern for the impact on peoples' lives.

The administrator can make additional workers easy or difficult to recruit, trained and efficient or untrained and inefficient, to create a sense of realism to match the quality of the company's management or to promote or to discourage rapid growth. Students usually accept whatever the employment situation is as being realistic under the specific conditions.

FINANCE

Many of the everyday and long-range finance problems facing the manager of a dynamic small business also confront the students in this simulation.

Working Capital

With their working capital tied up in finished goods inventory and a high seasonality variance, the company faces a cash crisis in the second quarter. The students are not aware of this unless they prepare a cash- flow projection (specific forms and instructions are in their manuals). In all courses, I urge the students to carefully plan for a year in advance and to prepare budgeted cash flows for this period so they can see the logical results of their plans.

In the junior-level course about 15% of the students fail to predict the cash crisis. About 75% of the senior-level and all of the graduate students do predict the cash crisis and take action to increase working capital. Some cut prices to move out the surplus inventory, some cut back the workweek to reduce production, and some merely borrow money without taking any corrective action.

As the banker, I establish a credit limit that is adequate if sound planning is done. The loan procedure can be as simple as merely telling the bank how much is needed for how long or a complete cash flow can be required. High penalties for bank overdrafts encourage students to do careful cash planning. In their loan applications the students must project their cash flow for the loan quarter and for all repayment quarters before I will grant the loan. If the company is projecting increasing their share of the market, they must explain specifically what they are going to do to take business away from their competitors. Generally the students are quite conservative in forecasting the impact of their actions.

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Equipment

The second major finance area relates to equipment. The simulation provides several possible investment alternatives for equipment. Each involves a different amount of investment and results in a different level of productivity. Since machine cost, operating expenses and productivity are clearly known, the analysis of the rate of return or the payback period is very simple. It also provides an excellent example of how different criteria will give different answers as “best”, because the machine that gives the greatest total dollar profit also gives the lowest rate of return on the investment (36% more investment to get 13% more output).

At the junior level most students do not do any analysis. At the senior level, about half the teams will upgrade their equipment; and about half of those will do it intelligently. At the graduate level almost all teams upgrade their equipment, and most of them do it intelligently.

Other Finance

Occasionally students who have overloaded their company with raw materials and face a disastrous cash crisis will recognize the possibility of holding a “distress sale” at which they offer their surplus raw materials to their competitors at attractive prices. Sometimes the selling students price the materials at a substantial loss; but other students in the same crisis situation price the materials at an attractive price still high enough to make a windfall profit as a middleman, thereby not only generating the needed cash but also making additional profits.

Companies that liquidate excessive inventories have surplus cash. Most students just let the cash lie in the bank, but a few with initiative look for ways to invest the surplus. Those that ask me about it are told that they can invest in 90-day Treasury notes. These are usually the students who have been making the most intelligent decisions in the other aspects of the game.

COLLECTIVE BARGAINING

After the graduate students have managed their companies for eight quarters so that they are thoroughly emotionally involved in “their” companies, I sometimes put on my hat as union president and present them with a list of demands for a new contract. The contract demands paid holidays, vacations, health and life insurance protection, a retirement program, and a guaranteed annual income (any other demands the administrator might choose could be included). The role of the union negotiator can be played by a real union representative, students in a course involving collective bargaining, the professor, or anyone designated by him.

Their reactions are amazing. In the textbook cases they analyze in this and other courses, these graduate students are always quick to point out where management has failed its responsibilities to its employees. In some of these cases, my personal opinion is that the company has been much more than generous. These same graduate students have been running their

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business game companies for eight weeks without even the most elementary fringe benefits. Their employees have no paid holidays, no vacations, no retirement plan, no health care, and no life insurance protection.

And what happens when the union raises these issues? The students start figuring the costs of each of these benefits for which the company gets no additional production and invariably react just as business management does in the real world--they fight every dollar of every benefit just as if it were their own money. And the inconsistency of their actions never occurs to them until I point it out later. It is so much easier to manage someone else's business and to be socially responsible with someone else's money.

STUDENT INTERACTIONS

All of these many facets of managing their small firm require substantial interaction among team members. It is impossible to know exactly what occurs in these decision meetings, but feedback over the years shows definite patterns.

In the past I have required that team-member composition represent a balance among the business functional areas where possible. Careful checking of the quality of the teams' decisions did not show them to be any better than the decisions of teams simply allowed to select their own members. Simulations in which some teams were balanced and others were not, have consistently shown that there is no significant difference in the performance of the teams. Therefore, I now let the students choose their own team members.

Group cohesiveness varies greatly between groups and is based on a variety of factors. For some factors it is hard to tell what is cause and what is effect, as discussed below.

Very few teams have been composed of people who were close friends at the time the team was formed. I have the students fill out schedule charts showing class time, work time, and free time. It is somewhat like a scavenger hunt to see the students going around in class trying to put together teams of members who have the same free time they have. I then can watch as the groups evolve over the semester.

In class some team members choose to sit near each other, while other teams' members continue to sit in the scattered locations they had before the teams were formed. I see the members of some teams together in the halls or for coffee or lunch, while I rarely see others together other than when they are working on their decisions. Some teams always come as complete teams with all or most members present to turn in decisions, apply for loans, ask questions about the simulation, etc. Other teams have only one individual represent the team for such things.

The factors that normally affect group cohesiveness can be seen at work in the business game teams. Although some teams of four members develop strong cohesiveness, groups of three seem better able to do it, even though three is supposed. to be a more unstable number.

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Groups that are doing well in the game have much greater cohesiveness than those teams doing badly (which is cause, and which is effect?). Often when the semester is over a member of a team, which has done badly, complains that the other members of his team would never do any work. On each decision the students are required to list the names of every student on the team and their relative participation in that quarter's decision making. Sometimes these reports verify that some students were not doing any work, but often the reports indicate that each member was participating fully (whom do you believe?).

No educational device is going to appeal to everyone. Some students consider the simulation merely a lot of work that must be done, and they do as little as possible to get by. This is especially true in the junior- level basic management course which all students are required to take regardless of their major field of interest. For these students there is no competition and any group cohesiveness develops around some other focal point (personalities, mutual suffering, etc.). Most students do enter actively into the spirit of competition, however, and it brings them together as a team. Much friendly rivalry exists between teams, and I sometimes hear students from competing teams trying to mislead each other about what their companies are planning to do. I also occasionally hear students on non-competing teams in different simulations working together to help each other. But it is very rare that I hear members of directly competing teams helping each other.

Within a team there often is conflict as members disagree on the best strategies. This intra-group competition is divisive. When two strong personalities clash, it can be very divisive. Sometimes a weak third member becomes the key man whose vote decides the issue.

SUMMARY AND CONCLUSIONS

MADS-Bee is a simulation of small companies manufacturing a product used in the construction industry, with the seasonal variation typical of that industry. Students have to make decisions regarding the production, marketing and finance functions of their company. The simulation is interactive in that all companies are competing with identical products for a limited market.

Flexibility is a key concept of M&DS-Bee. The manual is written for the basic junior-level introductory management course common to the "core curriculum" of most schools of business administration. At this level MADS-Bee serves two vital functions: It breathes life into the concepts of short-term and long-range planning, budgeting, strategy, policies, etc. that sound so common-sense and dull as the student reads them in the textbook. Secondly, it dynamically illustrates the interrelationships and creates an interest in learning production, marketing, finance, accounting for managerial use, and other subjects the student is taking concurrently or will be taking soon.

In actual companies, short workweeks (and paychecks) result in labor turnover, with hiring and training costs and ruined raw material. Various kinds of mismanagement also result in lower mora~a and productivity in the

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workforce. The administrator can introduce these factors in MAIDS-Bee. Companies with surplus funds can be permitted to invest in Treasury Notes, and companies with an over-supply of raw materials can be permitted to sell them to other companies through auctions, sealed bids, etc.

At the graduate level, MAIDS-Bee has proven to be an excellent vehicle for realistic collective bargaining as the union presents its demands. The simulation has been an integral part in the University of South Carolina Executive Development Program for many years. Executives from all types and sizes of business firms have found it realistic and challenging.

The administrator has complete control of price elasticity, which can be changed from one semester to the next to vary the effect of certain strategies and still be quite realistic. The administrator also has complete control of economic conditions, which he can vary at any time. This permits the administrator to have the companies operating in prosperous times one semester and in the throes of a recession in another semester.

Managing the dynamic small business via simulation has been a proven success for seven years. It has brought the concepts of the textbooks to life by putting the students into a small company they can relate to, with problems of a magnitude that do not overwhelm them, and to which they can apply the textbook concepts. It is interesting to note the improved performance in higher levels of courses by students who have never played this game before at the lower levels. They must be learning something in their coursework.

The simulation has also served as a small-group laboratory in human relations, and the students have reacted as small groups do everywhere.

In anonymous evaluations of the courses over a period of many years, the students have been strong in their feeling that the simulation was a valuable learning experience and one of the most interesting parts of each course.

The simulation is written entirely in FORTRAN IV and occupies approximately 30K bytes of core, without overlays, using the IBM 360/65G compiler. The program can be run without modification, using the WATFIV compiler, and experience has shown that it will run on virtually every major medium and large-scale system by simply adding appropriate job control cards. Compilation and modification is speeded by virtue of the fact that the program uses no sub-routines; and for installations wishing to run the program on a smaller computer, a logical break occurs before the various financial statements are printed, allowing easy conversion. Installations using other than 132-column printers will find that easy modification will produce standard terminal-width output.