

# Developments in Business Simulation & Experiential Exercises, Volume 11, 1984

## SYSTEMATIC INTEGRATION OF SIMULATION METHODS IN A GRADUATE MANAGEMENT CURRICULUM

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### ABSTRACT

This paper is a preliminary report on the manner in which simulation and experiential learning materials could be more systematically integrated with traditional case and analytical materials in a graduate management curriculum. It evaluates a number of specific simulations and exercises of different types, discusses the selection of such materials for use, and explains the rationale for a systematic integration of such learning devices with other materials. The basic rationale is one of pedagogical pluralism. In this regard, theory and practice can be complementary rather than antithetical.

### INTRODUCTION

There has been an increasing emphasis on simulation and experiential methods in graduate management schools. In particular, some use of computer-assisted management games (such as INTOP, MARKSTRAT, the "Harvard game," the "Wharton game," etc.) has become relatively common. At Carnegie-Mellon, the equivalent of three half-semester course modules are allocated to such a management game (with an additional two modules on management functions and strategy). Harvard and Virginia run short-course computer simulations in their integrated first-year curricula. Chicago and Wharton have simulation-oriented courses that can be taken in lieu of the traditional case-oriented business policy course. Generally speaking, however, most graduate management programs are based on either the case method or the analytical paradigm. (Most business policy courses are case-oriented even in an analytical curriculum, which is characteristic of most graduate management programs rather than the case method paradigm).

This paper is a preliminary report on the manner in which simulation and experiential learning materials could be more systematically integrated with traditional case and analytical materials in a graduate management curriculum. Some of the specific simulation and experiential devices which will be reviewed here are already in use; others are in the planning stage for implementation in the near future. The curriculum is that of the two-year professional Master of Business and Public Management (MBPM) degree program at the Jesse H. Jones Graduate School of Administration, Rice University. The issue, of course, is not so much the specific curriculum, but what lessons may be derived from this particular educational experiment for general application to graduate management education. To that end, this paper will evaluate a number of specific simulations and exercises of different types, discuss the selection of such materials for use, and explain the rationale for a systematic integration of simulation and experiential learning devices with analytical and case materials. The particular curriculum is simply a necessary framework for the discussion.

The Rice MBPM curriculum is a systematic effort at blending analytical, case, and simulation-experiential materials into a coherent structure for training future executives. Indeed, we have found ourselves moving further in this direction of pedagogical pluralism rather than adhering to either of the prevailing analytical or case paradigms for graduate management education. How this blending occurs may be of interest to the reader, but requires some understanding of our curricular plan and philosophy.

These propositions (which have evolved rather than being simply implanted) will be briefly explained as a background for review of a number of specific simulations and exercises of different types.

There is a definite case to be made for such pedagogical pluralism. The dominant curricular controversy has long been between the case method and the competing analytical paradigm. In essence, the case method is widely seen as non-theoretical (and therefore somehow non-academic), not leading to new management knowledge, and detracting from "real" (i.e., theory-oriented and academically respectable) research. The analytical approach is pictured as theory-oriented and knowledge-producing, not to mention more efficient as a teaching vehicle. The case method and the analytical approach can be complementary rather than antithetical (and most "analytical" schools employ the case method in business policy courses and parts of the functional courses). Theory and practice mutually interactive and reinforcing. Management solutions are developed in both the academy and the firm. If so, pluralism in teaching and research is a sounder academic strategy than the present situation of competition between "case" and "analysis" schools. The purpose of graduate management education is the preparation of practicing professionals. Decision-making skills, business judgment, and leadership abilities must be developed. This pedagogical pluralism extends to simulation and experiential approaches as well. This argument will be amplified upon subsequently.

### THE NEED FOR A SYSTEMATIC APPROACH

The term "systematic integration" is emphasized here explicitly. Simulation and experiential learning methods (which will be distinguished deliberately from the closely related case method) are now in reasonably wide use. And teaching materials (some of which are reviewed here) for simulation and experiential training exercises have probably never been so fully developed and available as at present. (Hence the ability of a voluntary organization like ABSEL to maintain itself and conduct annual meetings. Academic associations and journals indicate a functioning community of scholars and teachers). But it should also be recognized that the application of such pedagogies is presently haphazard at best in contrast to the more traditional analytical and case types of materials. Simulation and experiential devices are used essentially where individual teachers have developed some interest and are willing to make the effort involved. Carnegie-Mellon's emphasis on the management simulation game is unusual. Simulation and experiential devices are much more commonly and systematically used in business and the military as practical training devices than they are in graduate management education. Sony Corporation of Japan, for example, routinely trains its managers with a table-top international management game, an exercise it has marketed to many other firms in Japan and now in the United States. In-basket and field exercises are a standard practice in military training. It is the academy which lags behind on this dimension of education.

The first step is to distinguish more explicitly the principal teaching methods. This paper argues that the analytical approach to management education is theory based and oriented to teaching foundation skills with wide application (including the func-

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tional areas of management practice). By contrast, the case method, while based more on instances of practice (students study specific situations and problems), is still oriented to foundation skills (how to be a general manager). While it is true that particular cases may be oriented to functional concerns or specific issues, the sum effect of the case method in the keystone area of business policy is oriented to preparation for general management. Both should be distinguished from simulation-experiential methods. Computer simulations are typically based on some analytical model of competitive reality which is applied by students to a specific scenario. Experiential materials are most often used to teach group dynamics and organizational interaction; they are practice-oriented exercises. The classification offered here is, of course, not intended to be a hard and fast one. Undoubtedly the classification can be criticized. The point of this classification is to highlight certain critical dimensions of what the paper has characterized as pedagogical pluralism. The classification is at this stage a necessarily rough and ready one.

FIGURE 1  
PROPOSED CLASSIFICATION  
OF TEACHING METHODS

	Based On	
	THEORY	PRACTICE
FOUNDATION SKILLS	Analytical	Case
APPLICATION OF SKILLS	Simulation	Experiential

Oriented  
Toward

The timing for more systematic use of simulation and experiential learning methods may be fortuitous if grasped decisively. Consider that the traditional MBA curriculum (on either the analytical paradigm like Stanford or the case paradigm like Harvard) has recently been the object of considerable criticism in the popular press [3], [5]. The gist of that criticism seems to boil down to the allegation that MBA graduates are not being sufficiently prepared for the realistic practice of management in actual organizations composed of people and operating in a highly competitive global economy in which human skills, cultural sensitivity, and business-government relations are increasingly important. Among the specific charges leveled against the traditional curriculum are that: (1) MBA training is oriented to analysis and optimization with perfect information rather than to what may be called "dirty" decision making under realistic conditions of uncertainty, risk, and disagreement; (2) MBAs are oriented to short-term financial performance (both individual and organizational) rather than investment in long-term growth (allegedly unlike the Japanese);

(3) MBAs are not oriented to competition in the international marketplace; (4) they need better communication and interpersonal skills; and (5) the traditional MBA curriculum may not be relevant to many current business problems which are social, legal, and political in origin.

This statement should not be taken to imply that simulation and experiential pedagogy can (or should) replace either the analytical or the case method. On the contrary, simulation and

experiential devices are inherently (but properly) supplementary to the analytical and case approaches. (As mentioned earlier, the Rice MBPM curriculum is based increasingly on an evolving synthesis of analytical, case, and simulation-experiential materials). Non-traditional pedagogies may play a larger and more systematic role in addressing the criticisms of the traditional MBA curriculum listed above. Simulation and experiential materials may be highly adaptable to those types of issues.

These criticisms reflect a growing concern that tomorrow's executives need a broader education along a number of dimensions in a more competitive global economy. The allegations made in the popular press are overstated. They were advanced largely to explain the poor performance of the U.S. economy in recent years. This performance cannot be laid conveniently at the doorstep of MBA training. American business long operated in a profitable and protected domestic market. Our recent difficulties are largely the result of dramatic changes in resource scarcities (especially oil and strategic minerals) and technological leadership (shifting to Japan and Western Europe). Success breeds complacency in business, government, and academia. The challenge of global competition--to which our organizations and academies have not adjusted--is now upon us. Nevertheless, business schools need to respond more directly to this challenge in the preparation of present MBA students. The Japanese, by contrast, have had to secure external resources and markets based on nothing more than management ability and labor productivity. The Sony Management Game (which the author has played) has now been used by literally hundreds of Japanese companies to teach their managers about global price strategy based on break-even and contribution analysis to achieve market dominance and scale economies through volume and cost control. We have not faced that harsh economic and resource environment in the past. International trade has become increasingly important to the U.S. economy, with exports and imports rising from 10 percent of GNP in 1960 to 22 percent in 1979 [4]. The U.S. share of total world exports fell from 18 percent in 1970 to 14 percent in 1979, with its share of manufactured exports falling from 21 to 17 percent [4].

### THE RICE MBPM CURRICULUM

An earlier paper by the author published in *Interfaces* addresses part of these criticisms by offering a concrete example of "Redesigning the MBA Curriculum." That paper argues that the traditional MBA curriculum has focused on analytical training in management science (i.e., decision models for optimization) and the functional activities of finance, marketing, production, and personnel. Strategy formulation and organizational leadership are taught largely by the case method. Cases serve as "decision-forcing" situations to which analytical and functional knowledge is brought to bear. The AACSB common body of knowledge is thus composed of three components. First, there are foundation courses covering management science (economics, quantitative methods, accounting) and organization theory. Second, there are functional courses covering finance, marketing, production, and human resources management. Third, there are one or more capstone courses in business policy which are intended to integrate "analysis and policy determination at the overall management level." The revised AACSB accreditation standards emphasize program quality rather than inputs and the international dimension, ethical issues, and the social, legal and political environment of business.

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The Master of Business and Public Management (MBPM) curriculum at Rice University is structured as a partial solution to some of the problems in the traditional MBA curriculum. For the purposes of this paper, three major points should be observed. First, the functional areas are integrated with the analytical disciplines rather than being free standing. Second, explicit attention is directed to the political and legal environment of business [6]. Third, a pluralistic pedagogy is embraced. The required coursework is roughly divided between the case and analytical approaches, with simulation and experiential materials being increasingly integrated into the existing courses. Our interest here is on the latter dimensions. Figure 2 shows a proposed

FIGURE 2  
PROPOSED PLAN FOR SYSTEMATIC INTEGRATION  
OF SIMULATION AND EXPERIENTIAL  
COMPONENTS IN THE RICE MBPM CURRICULUM

<u>Predominantly Analytical Method with Case Applications</u>	
<u>Fall Semester</u>	<u>Spring Semester</u>
FIRST YEAR	
Financial Accounting (3)	Managerial Accounting/MIS (3)
Managerial Economics and Marketing I (3)	Managerial Economics and Marketing II (3) <sup>2</sup>
Organization Theory (3)	Managerial Accounting and Finance (3)
Statistics (3) <sup>1</sup>	Operations Research/ Production and Operations Management (3) <sup>4,5</sup>
	Managerial Economics Laboratory (1) <sup>5</sup>
	Computer Applications (NC)
Legal Analysis and Processes I (3) <sup>6</sup>	Legal Analysis and Processes II (3) <sup>11</sup>
SECOND YEAR	
<u>Predominantly Case Method</u>	
Business Policy I (3) <sup>7,8</sup>	Business Policy II (3) <sup>12,13,14</sup>
Management Game <sup>9</sup>	Management Game <sup>9</sup>
Governmental Processes (3) <sup>10</sup>	Governmental Processes (13) <sup>15</sup>
	Managerial Communications Credit (1)
Dean's Seminar (1)	Dean's Seminar (1)
Elective Courses (9)	Elective Courses (9)

(1), (3), or (9) indicates semester credit hours.

1-15 are simulation and experiential components detailed further in Figure 3.

plan for systematic integration of simulation and experiential components in the Rice MBPM curriculum that is already well underway. The objective is to add greater scope for application of the principles derived from analytical and case materials. This approach is, of course, continuously evolving; so that this particular report is really more of a "snapshot" at a specific time point in that evolution. Nevertheless, it should give the reader a good idea of the general nature of the effort at more systematic integration of simulation and experiential materials.

### SIMULATION AND EXPERIENTIAL MATERIALS

At present, we are planning use of four major simulations (denoted S below) together with a major experiential exercise and some ten other experiential exercises (denoted E below). The major simulations are the "Multivariate Marketing Exercise" (#1 in Figures 2 and 3), the MARKSTRAT game (#2), and the "Swift Shoe Company (#4)--all taught in the first-year curriculum to expose students to the practical realities of marketing and production/operations management; and the INTOP game which runs year long to link the four business policy and governmental processes case-method seminars in the second year curriculum. INTOP (#9) focuses on international strategy formulation, functional integration (marketing, production and inventory, finance, accounting, research and development), and business-government relations. The major experiential exercise concerns "Far Flung Frammisses, Incorporated" (#11), a paper company used in the first-year Legal Analysis and Processes course sequence to teach both legal principles and communication skills.

FIGURE 3  
GUIDE TO MAJOR SIMULATION AND  
EXPERIENTIAL COMPONENTS PLANNED  
FOR THE RICE MBPM CURRICULUM

1. "Multivariate Marketing Exercise" (5)

This computer-assisted simulation introduces product design, attribute evaluation, marketing research, and budgeting for marketing activities.

Developed by Professor Randy Batsell, Jones Graduate School of Administration, Rice University, for internal use.

2. "Marketing Strategy Game" (MARKSTRAT) (5)

This computer-assisted simulation is a full marketing game involving product selection, production, pricing, and promotion in a single country. It focuses attention on the basic marketing activities and is in wide use.

Jean-Claude Larreche and Hubert Gatignon, MARKSTRAT: A Marketing Strategy Game (Palo Alto, Calif.: Scientific Press, 1977).

3. "Production and Inventory Control Game" (E)

In this exercise, players act as a production control manager. The purpose is to illustrate the effect of scheduling on the plant, the warehouse, and sales. The player seeks to develop a strategy that will minimize total cost in light of an uncertain pattern of future shipments generated by a Monte Carlo procedure.

Yale School of Management.

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4. "The Swift Shoe Company" (5)
 

After seeing the basic principles at work in the "Production and Inventory Control Game," the student can proceed to operation of "The Swift Shoe Company" computer-assisted simulation. This firm makes two models of running shoes in six factories with distribution through 16 warehouses. The student serves successively as a warehouse manager, warehouse inventory manager, corporate traffic manager, and factory, production manager.

Craig G. Harms and Stanley W. Huff, The Swift Shoe Company (Neptune Beach, Florida: Harms Publishing, 1982).

Craig G. Harms and Stanley W. Huff, "The Harms Shoe Company: Development of a Computer Model for the Classroom," Decision Sciences, Vol. 12 (October 1981), pp. 670-689.
5. "Energy International" (E)
 

A committee of general managers must select a general manager for a new Brazilian plant from among seven applicants in a timed group exercise.

J. William Pfeiffer and John E. Jones (eds.), The 1972 Annual Handbook for Group Facilitators (La Jolla, Calif.: University Associates Publishers, 1972).
6. "The Arbitration Game" (E)
 

This exercise is built around an arbitration hearing into the dismissal of a company employee. Students play the roles of company, union, and arbitration board representatives.

Louis V. Imundo, The Arbitration Game (Cincinnati: South-Western Publishing, 1982).
7. "Looking Glass" (E)
 

This is a half-day in-basket exercise in which students serve as the management team of a manufacturing company. The exercise adds the group and organizational dynamics missing in the computer-assisted simulations by which marketing and production activities are illustrated.

Michael M. Lombardo, Morgan W. McCall, and David I. DeVries, Looking Glass (Glenview, Ill.: Scott, Foresman, 1983).
8. "Price Adjustment Negotiation" (E)
 

An existing price and supply contract between two companies is violated; and a new agreement must be negotiated.
9. "International Operations Simulation" (INTOP) (5)
 

This is a computer-assisted simulation of a multinational firm that can operate with multiple products in the U.S., Western Europe, and Brazil. INTOP is in wide use and comparable to the Harvard or Wharton games.

Hans B. Thorelli, Robert L. Graves, and Lloyd T. Howells, INTOP: International Operations Simulation (New York: Free Press, 1963).
10. "Missiles in Cuba" (E)
 

Players simulate the functioning of the Executive Committee of the National Security Council during the October 1962 Cuban missile crisis. Decisions are based on actual declassified CIA intelligence reports.

Dan Caldwell, "Missiles in Cuba: A Decision-Making Game," HBS Case Services No. 9-379-736.
11. "Far Flung Frammisses, Incorporated" (E)
 

A corporation is simulated on paper in an annual report, 10-K report, and proxy statement. Legal issues in the evolution of the company are highlighted and used as a basis for communications training.

Developed by Professor George Greanias, Jones Graduate School of Administration, Rice University, for internal use.
12. "The Office Automation Game" (E)
 

The manager of office automation in a large organization must get information systems evolving toward an integrated network during a half to full-day game.

The Office Automation Game (Ridgefield, Conn.: N. Dean Meyer and Associates, 1983).
13. "Townsford Company" (E)
 

This exercise concerns a management-labor contract negotiation involving wages, benefits, and work conditions.

Douglas T. Hall, Donald O. Brown, Roy J. Lewicki, and Francine S. Hall, Experiences in Management in addition to Organizational Behavior (New York: John Wiley, 1982 [2nd ed.]), ch. 24, "Collective Bargaining and Labor Management Relations," pp. 145-151.
14. "New Truck Exercise" (E)
 

A group of managers must determine the allocation of a new vehicle.

N. R. F. Maier and L. F. Zerfoss, "MRP: A Technique for Training Large Groups of Supervisors and Its Potential Use in Social Research," Human Relations, Vol. 5 (1952), pp. 177-186.
15. "Spenders and Guardians" (E)
 

An operating agency and a budget agency must agree to a recommended budget for a specific set of programs. Each participant is assigned a specific role in a seven-person game.

Sandford F. Borins and David A. Good, Spenders and Guardians: A Budgetary Game of Mutual Adjustment (Toronto: Case Program in Canadian Public Administration, Institute of Public Administration, 1977).

Group dynamics and organizational skills are taught using a variety of experiential exercises largely in the second-year case seminars on business policy and governmental processes. "Looking Glass" (#7) is an in-basket exercise in which students run a manufacturing company for about 4 1/2 hours. Similarly "The Office Automation Game" (#12) and The Arbitration Game" (#6) take students through the typical

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organizational problems of determining information systems policy and deciding an arbitration case about a discharged employee suffering from alcoholism. "Energy International" (#5) concerns the selection of a plant manager. "Missiles in Cuba" (#10) is different in nature. It reflects the PM (Public Management) side in our MBPM curriculum. It is a paper simulation of the functioning of the Executive Committee of the National Security Council created by President Kennedy as an advisory body to handle the Cuban missile crisis of October 1962. The players make decisions based on available intelligence reports (declassified from actual CIA documents). We also strongly emphasize practical experience in negotiations: the exercises on price adjustment (#8), "Townsend Company" (#13), "New Truck" (#14), and "Spenders and Guardians" (#15) are oriented to this purpose. The latter exercise concerns the politics of public sector budgeting and resource allocation.

The "Frammisses" (#11) exercise is used in our Legal Analysis and Processes sequence [2]. Few management schools require courses in the law; those that do most typically lift such offerings almost directly from traditional business law courses focusing on the "black letter" law of contracts, torts, and commercial/partnership transactions. Our course sequence, designed for the manager rather than the lawyer, focuses on understanding the fundamentals of legal analysis, sources of law, legal processes, legal advice, and the legal implications of typical business decisions. "Frammisses" is a paper model corporation existing only in a fictional annual report, 10-K report, and proxy statement to shareholders. Students are called on to argue orally and in writing about a variety of legal issues that must be confronted in the evolution of the Frammisses operations.

The students are introduced to two mythical entrepreneurs just starting out in their own business (initially organized as a partnership). Through a series of case studies, the students are introduced to the basic legal considerations that go into the creation of any business. They are also encouraged to see the interplay among decisions that must be made on legal questions confronting a business and the full scope of managerial problems with which the corporation will likely be simultaneously engaged. For instance, the complexities of capital structure and financing are approached from both the legal standpoint and from the viewpoint of providing a workable situation in which people of potentially divergent viewpoints and temperment can achieve a common goal.

This initial concentration on the legal problems of small business provides an excellent introduction to the more difficult issues confronting the model corporation. By focusing on just two entrepreneurs and their legal problems, the attention of the student is placed on the human element implicit in even the most arcane legal issue. Studying a smaller business enterprise first also educates the students in the rudiments of legal organization and capital structure. This exposure is absolutely necessary if the student is to deal comfortably with the source documents on which the study of the model corporation is based.

At the conclusion of the case studies on the small business, the enterprise is "acquired" by the Frammisses international corporation, which is a publicly held firm. In being introduced to the model international corporation, the student does not receive narrative or case material of the traditional sort. Instead, all information about the corporation is conveyed through a series of original source documents prepared by the instructor. The most important of these are the fictitious annual report to shareholders, the fictitious annual report on Form 10-K as filed with the Securities and Exchange Commission, and the fictitious proxy statement issued in preparation for the annual meeting of the shareholders. These materials are complete in every respect and include all of the financial information

required by the SEC. These three documents provide the basic information upon which the balance of the legal examination is based. Introduction of the model corporation approach has facilitated restructuring of the associated lectures and case materials. Rather than being organized along the lines of traditional law school topics such as torts, contracts, labor law, and antitrust, the materials are presented from the manager's point of view. The approach has been to analyze the different relationships in which any manager engages, and then to examine the legal implications of those relationships.

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