

# **Simulation Games and Experiential Learning in Action, Volume 2, 1975**

## **INTEGRATING ACROSS FUNCTIONAL AREAS WITH A COMPUTER-ASSISTED CASE**

Daniel W. DeHayes, Jr.  
William C. Perkins  
Indiana University--Bloomington

### **INTRODUCTION**

The last decade has seen many universities striving to achieve three major goals in their undergraduate business programs:

1. the introduction of management science/operations research techniques which the students can apply to various decision settings;
2. the utilization of the computer as a significant tool in the decision- making process; and
3. the integration of various functional areas within the business school curriculum.

Indiana University--Bloomington has made progress in achieving these goals through their integrative core program. In 1972, this program was enhanced by an interesting teaching innovation--a computer-assisted, integrative case-The Gulfways Equipment Company, Inc. In this case exercise, students must develop a one year operating plan for this firm troubled by financial difficulty. A description of the experience and the results of this experiment are the subject matter of this paper.

### **THE INTEGRATIVE CORE PROGRAM**

At Indiana University, each business undergraduate is required to enroll in the Integrative Core Program during his junior year. The first semester includes an introductory course in the functional areas of finance, marketing, and operations. One of the major goals of these courses is to integrate the three functional areas by showing their interrelationships and interdependencies.

During the second semester, the core program includes a course in organizational behavior and a management simulation exercise. These two courses attempt to further reinforce and integrate the principles taught in the three functional areas during the first semester. The Core Program and its prerequisites are summarized in Exhibit 1.

The core program has as its prerequisites introductory courses in accounting, economics, statistics, and computer programming. Students register for the entire set of courses each semester so that his team of four to eight members has a common base and frequent meetings. This small management group is responsible as a group for several assignments and are bound together by common goals.

## Simulation Games and Experiential Learning in Action, Volume 2, 1975

### THE INTEGRATIVE CASE

To help achieve the major goals discussed in the introduction, an integrative case, (Gulfways Equipment Company, Inc.) was written in 1972 and implemented during the Fall term of 1972. The case cuts across the three functional courses and integrates subject matter from these courses *In* one problem setting. It offers the student an opportunity to solve a complex but realistic business problem. It provides the student with experience in utilizing and evaluating the helpfulness of both management science techniques and computers.

Gulfways is a small (1971 sales of \$250,000) manufacturer of scuba diving equipment that finds itself in need of cash for the fiscal year 1972. In order to demonstrate the need for the loan, management must develop a total operating plan for the coming year. The general analysis flow is contained in Exhibit 2. This plan first requires an analysis of their relevant target market segments. This information is used to help forecast sales revenue for the year on a monthly basis. A finished goods inventory policy (in terms of availability) must then be formulated and defended. This policy, the monthly sales forecast, and an analysis of their current inventory position are used to arrive at a production schedule. EOQ analysis is used to settle on a purchasing schedule for the year. Next, a cash flow analysis is developed from the revenue and cost expectations that are implied by the sales forecast and production schedule. Lastly, proforma financial statements must be projected and a letter written to the bankers detailing the analysis and carefully Justifying its rationale and assumptions.

Packaged programs to aid throughout the analysis are provided in both the batch processing and interactive time-sharing modes. Regression analysis, linear programming, and EOQ analysis are used as aids to the students. The student management groups are assigned to one computing mode or the other. The case composes the entire subject matter in all three of the core courses over a two week period. It comprises twelve percent of the grade *In* each course.

### EVALUATION OF THE CASE EXERCISE

Three methods have been used to monitor the evaluation of the case from semester to semester. Specifically, student opinions, faculty opinions and the cost to operate the case (mostly computer cost) have been measured. Exhibits 3 - 6 show the results of the evaluation for the five semesters that the case has been *In* use.

Exhibit 3 shows the results of selected questions from the 32-question student evaluation form. These data are collected approximately one week after the students complete their participation in the case in a discussion section of the finance course. Sample sizes only account for approximately 70% of the students. Exhibit 3 shows the generally favorable reaction by the students. Generally, students feel the case was mentally challenging, did not duplicate material in other courses, and seemed to help *In* learning the subject matter of the three courses involved in the core. The students also feel that they learned a lot from the case and that it facilitated their understanding of the functional areas. Amazingly, approximately 60% of the students feel that the case should be used again. The one surprising response was the consistent lack of positive feeling toward the computer as an educational tool. While several hypotheses could be generated on the reason for little positive response in this area, this subject remains as a question for further study.

## **Simulation Games and Experiential Learning in Action, Volume 2, 1975**

Exhibit 4 shows the trend in the overall evaluation of this case by students. The percentage distribution shows a definite trend toward a more positive evaluation of the case although the case is by no means considered in the same way as the Last Supper.

Exhibit 5 shows faculty responses to selected questions from a 36-question instrument given approximately one week after case reports are submitted by the student. Faculty generally responded positively to the case exercise. A high proportion consistently felt that the students learned a lot from the case and that the case integrated the course material very well. The faculty were not as pleased with the role of the case in fulfilling the specific course objectives (essential parts), however. Accordingly, the next case is being more carefully planned to specifically emphasize the major teaching objectives of the course and somewhat de-emphasize the integrative aspects of the case. Finally, the faculty seemed to regard the computer's role in the case somewhat more positively than did the students.

Exhibit 6 shows the cost of development and operation of the case. Approximately \$4,000 was required during the summer of 1972 to develop the case, now in its sixth semester of operation. Operating costs other than for faculty time is almost entirely the internal charge made for computing. As can be seen in Exhibit 6, the cost of computing per enrollee has generally been increasing. Two important reasons dictate this trend. First, the charging algorithm for the interactive mode did not include a charge for terminal connect time during the Fall 1972 and Spring 1973 semesters. Therefore, the costs for these two semesters are somewhat understated. Secondly, Fall 1974 marked the introduction of an automated proforma statement generation routine. This capability allowed the students to generate their cash budgets, income statements, and balance sheets through the computer. This program is only available in the batch mode. Exhibit 6 shows the marked increase in the number of batch jobs in Fall 1974, much of which is due to the introduction of this new program.

In summary, experience to date with the case has generally been positive. Some problems certainly remain, the most significant of which is the "institutionalization" of answers to the case. Accordingly, Summer 1975 has been designated as the time to develop a replacement case which will also involve integrating all three functional areas.

### **EXHIBIT 1**

#### **INDIANA UNIVERSITY'S INTEGRATIVE CORE PROGRAM**

**PREREQUISITES: ACCOUNTING, ECONOMICS, STATISTICS, COMPUTERS, MATH, LAW, SOCIOLOGY, PSYCHOLOGY.**

#### **JUNIOR YEAR FIRST SEMESTER**

#### **FUNCTIONAL AREAS:**

- FINANCE**
- MARKETING**
- OPERATIONS**

#### **JUNIOR YEAR SECOND SEMESTER**

- ORGANIZATIONAL BEHAVIOR**
- DECISION SIMULATION**

EXHIBIT 2

GULFWAYS GENERAL FLOW OF ANALYSIS

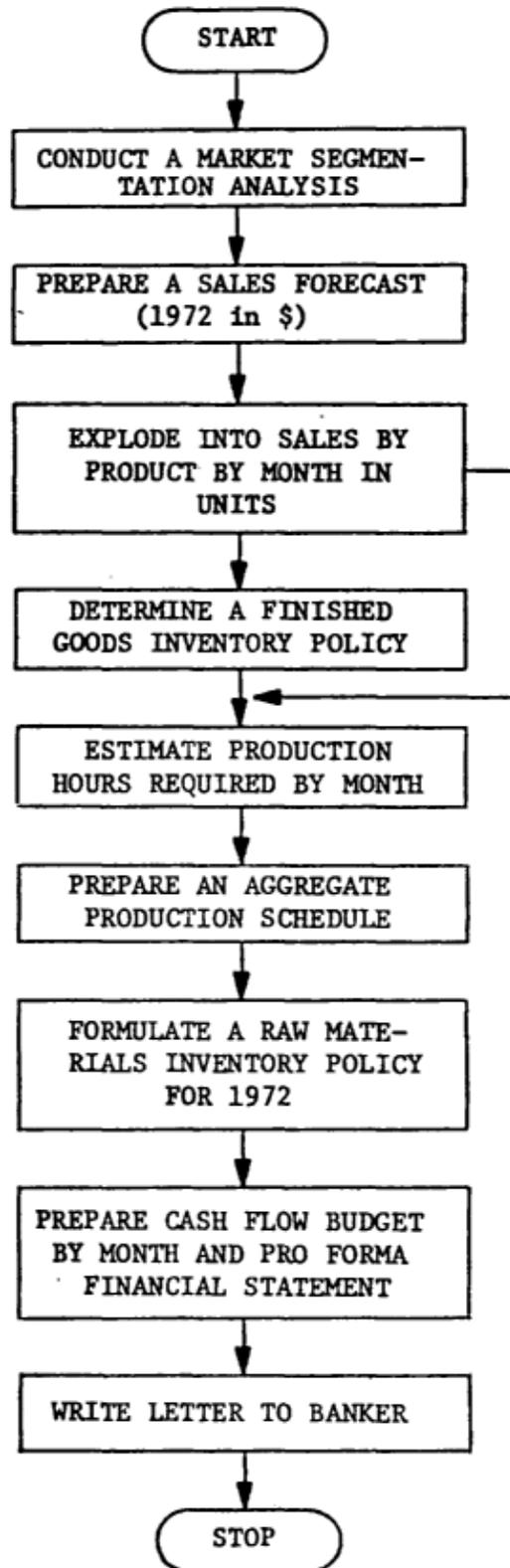


EXHIBIT 3

STUDENT RESPONSES---PERCENT AGREEMENT WITH STATEMENT

QUESTION	FALL, 1972 (450)	SPRING, 1973 (140)	FALL, 1973 (390)	SPRING, 1974 (170)	FALL, 1974 (430)
CASE MENTALLY CHALLENGING	94%	93%	94%	94%	95%
CASE DUPLICATED MATERIAL IN OTHER COURSES	13	15	17	11	13
CASE HELPED TO LEARN SUBJECT MATTER OF COURSES BETTER	61	63	75	81	73
LEARNED A LOT FROM CASE	62	67	72	79	72
CASE FACILITATED UNDERSTAND- ING OF FUNCTIONAL AREAS	75	83	85	75	83
CASE SHOULD BE USED AGAIN	51	61	62	71	62
COMPUTER WAS OF EDUCATIONAL VALUE	48	43	39	44	49

EXHIBIT 4

TREND IN OVERALL STUDENT EVALUATION OF THE CASE

Question: In an overall evaluation of this case, I would rate it as outstanding.

Results:

	<u>FALL, 1972</u>	<u>SPRING, 1973</u>	<u>FALL, 1973</u>	<u>SPRING, 1974</u>	<u>FALL, 1974</u>
No Answer (Number)	11	1	5	6	10
Strongly Disagree	12%	12%	9%	7%	8%
Disagree	25	15	12	11	15
Slightly Disagree	17	19	15	10	13
Neither Agree nor Disagree	11	15	13	15	13
Slightly Agree	25	23	27	28	27
Agree	9	14	20	23	19
Strongly Agree	2	3	4	6	4
Sample Size	451	130	381	166	427

EXHIBIT 5

FACULTY RESPONSES--NUMBER AGREEING WITH THE STATEMENT

<u>QUESTION</u>	<u>FALL, 1972</u> <u>(29)</u>	<u>SPRING, 1973</u> <u>(15)</u>	<u>FALL, 1973</u> <u>(21)</u>	<u>SPRING, 1974</u> <u>(14)</u>	<u>FALL, 1974</u> <u>(20)</u>
CASE DUPLICATED OTHER MATERIAL IN COURSE	2	1	1	0	0
CASE INTEGRATED COURSE MATERIAL WELL	23	12	19	12	19
CASE FACILITATED TEACHING ESSENTIAL PARTS OF COURSE	21	10	13 (3 NA)	7	15
STUDENTS LEARNED A LOT	26	14	20	13	18
CASE HAD A DISRUPTIVE EFFECT ON USUAL TEACHING STYLE AND OBJECTIVES	5	1	3	1	1
COMPUTER EXERCISES WERE OF IMPORTANT EDUCATIONAL VALUE	18	13	15	6	13

# Simulation Games and Experiential Learning in Action, Volume 2, 1975

## EXHIBIT 6

### COST OF DEVELOPMENT AND OPERATION OF CASE

COST OF DEVELOPMENT--SUMMER, 1972	\$3850.
OPERATION--FALL, 1972 600 STUDENTS	
BATCH MODE 1840 JOBS	\$ 340.
INTERACTIVE MODE 530 JOBS	140.
	COMPUTING COST/ENROLLEE = \$ 0.26
OPERATION--SPRING, 1973 300 STUDENTS	
BATCH MODE 600 JOBS	\$ 220.
INTERACTIVE MODE 280 JOBS	90.
	COMPUTING COST/ENROLLEE = \$ 0.38
OPERATION--FALL, 1973 525 STUDENTS	
BATCH MODE 1370 JOBS	\$ 180.
INTERACTIVE MODE 100 JOBS	280.
	COMPUTING COST/ENROLLEE = \$ 0.30
OPERATION--SPRING, 1974 260 STUDENTS	
BATCH MODE 420 JOBS	\$ 55.
INTERACTIVE MODE 140 JOBS	300.
	COMPUTING COST/ENROLLEE = \$ 0.46
OPERATION--FALL, 1974 600 STUDENTS	
BATCH MODE 4200 JOBS	\$ 560.
INTERACTIVE MODE 510 JOBS	360.
	COMPUTING COST/ENROLLEE \$ 0.51