

# Development In Business Simulation & Experiential Exercises, Volume 18, 1991

## STUDENT ATTITUDES ABOUT POLICY COURSE SIMULATIONS

John B. Washbush, University of Wisconsin-Whitewater  
Jerry J. Gosenpud, University of Wisconsin-Whitewater

### ABSTRACT

The purposes of this study are (1) to describe the use of the Simulation Participation Attitude Scale (SPAS) to measure attitudes of business students toward whole enterprise simulations and (2) to examine student attitude differences associated with exposure to different simulations.

### BACKGROUND

Numerous studies have documented participant attitudes favorable to the use of simulations in academic courses and particularly in business courses (Waggener, 1979; Wolfe, 1985; Williams et al., 1986; McLaughlin and Bryant, 1987). Additionally, Hergert and Hergert (1990) have concluded that student perceptions of simulation usefulness can be linked to the factors of course structure, student characteristics, game effort and performance, and game parameters. The question of attitude sets particular to specific simulations is an open question.

The present researchers began this study with the concern that, in their own courses, they should explore the attitudinal efficacy of using different simulations as complementary activities to case analysis and formal lecture. This task seemed appropriate if for no other reason than to evaluate sets of learning activities in an attempt to improve student acceptance and, perhaps, student motivation. Both researchers routinely incorporate whole enterprise simulations in their administrative policy courses and have recently used the games Micromatic (Hinton & Smith, 1985) and Stratplan (Scott & Strickland, 1985). We were therefore interested in comparing student perceptions of each simulation.

These simulations are run on microcomputers and are both intended for use in learning environments such as are found in business major administrative policy courses, and they are sufficiently complex for undergraduates. Micromatic requires more detailed analysis and planning in the functional areas (particularly production and operations) than does Stratplan. Micromatic is focused at the business level while Stratplan has more of a corporate level perspective. Therefore, Micromatic more specifically reflects the decision demands of the functional areas (accounting, finance, marketing, production) the typical undergraduate student is exposed to in common core courses. On the other hand, Stratplan is more specifically integrated with theoretical approaches to business strategy and policy. In both games students make as many as 60+ decisions per round with decisions recorded on floppy disks which are processed by the game administrator. Stratplan allows a maximum of 6 companies per industry while Micromatic permits as many as 15. The run length of Stratplan is a maximum of 10 decision rounds (10 years); that of Micromatic is considerably higher, with a practical maximum of about 12 decisions rounds (12 quarters).

Micromatic is played on a simulated quarter-to-quarter basis with a single product, three-area scenario. Typical student decisions include advertising mix, sales force size and distribution, selling price, product improvements, workforce size, material orders, production scheduling and distribution,

plant capacity and efficiency investments, environmental information requests, capital budgeting, and cash management.

Stratplan offers a two-product environment with three marketing areas, the game can also be internationalized, and it is played on a year-to-year basis. Typical student decisions include advertising expenditures, sales force size and distribution, selling prices, product improvements, sales branch numbers, sales commissions, production scheduling and distribution, plant capacity and efficiency investments, capital budgeting, and cash management.

### RESEARCH DESIGN

#### Research Questions

This study attempted to evaluate student attitudes toward the use of whole enterprise simulations in undergraduate business major administrative policy courses by answering two questions:

- (1) What are student attitudes toward the use of simulations in policy courses?
- (2) Are there any differences in attitudes of students depending on the game used?

These questions were used to construct the following research hypotheses:

- H1: Students have neutral attitudes toward the use of simulations in policy courses.
- H2: Student attitudes toward the use of simulations are independent of the game played.
- H3: Student attitudes toward the use of simulations are independent of student major.
- H4: There is no association between student attitudes toward the use of simulations and simulation performance.

Hypothesis 2 is the central focus of this study. The other hypotheses are important because they could help explain variations in attitude, especially if attitudes did not vary across games played.

#### Population and Sample

The population for this study is all students enrolled in undergraduate business degree programs that are accredited by or conform to the curriculum guidance of the American Assembly of College Schools of Business (AACSB).

The sample used for this study was comprised of three sections of undergraduate business students, enrolled in the Administrative Policy capstone course, at a medium-sized mid-western university with a large, accredited business college. The study was completed

## Development In Business Simulation & Experiential Exercises, Volume 18, 1991

during the spring 1990 semester. The three sections were all taught by the same instructor (Instructor A) and contained 101 students (33, 34, and 34 students respectively), including 59 males and 42 females. To evaluate possible instructor differences and influences, two additional sections (ii - 32, 26) taught by the other researcher (Instructor B) were examined using the attitude survey.

With the exception of simulation exposure, the three experimental sections were identically structured, were exposed to the same instructional and case materials, and were similarly managed and graded. Each section consisted of 10 student groups (3-4 students), groups being formed by student self-selection. One section used Micromatic in all groups throughout a 12-week period. In the second section each student group used Micromatic for 6 weeks and Stratplan for 6 weeks. The third section's groups used only Stratplan for 12 weeks. In each section, students played for six weeks, were graded on simulation performance, and then commenced a new round of simulation play, with modified market growth scenarios, for the second six weeks. The two comparison sections used only Stratplan for 10 weeks of play, one maintaining a group format throughout play, the other beginning in-group format but shifting to individual play at the mid-point.

### Instrumentation

A survey questionnaire called the Simulation Participation Attitude Scale (SPAS) was developed by the principal researcher and was administered at the end of the semester following completion of simulation play. The original SPAS used a summated Likert-scale format and consisted of 55 statements to which students responded according to their feelings by Indicating their agreement and strength. Item-to-total score Pearson correlations were computed for item analysis purposes. Using a technique outlined by Guilford (1965), total instrument reliability was

Calculated by using the mean item-test correlation as an estimate of the mean item intercorrelation in the Spearman-Brown formula. Filler Items and several items having low or negative correlations, and one item containing a potentially confusing spelling error, were removed. The statistical reliability of the instrument in final form was estimated at .894 (entire instrument reliability, without items removed, was estimated at .843).

### Analysis of Data

Data analysis was conducted using Minitab release 7.2 on a microcomputer. Total attitude-scale scores were compiled and mean item scores were computed on a section-by-section basis. Oneway analysis of variance (ANOVA) was conducted on total attitude-scale scores. Regression analysis was performed comparing simulation attitude-scale scores to simulation performance grades. Descriptive statistics were also calculated for the two sections of students taught by the second researcher and ANOVA was additionally performed on data from all five sections.

## FINDINGS

Hi: Students have neutral attitudes toward the use of simulations in policy courses.

Hypothesis 1 was tested by computing mean item scores for each experimental group. The mean item scores were examined by t-test to determine whether they were significantly greater than 3.5 (a neutral response score). In all cases the group mean item scores were positive and significantly greater than 3.5. Hypothesis 1 was rejected. The finding of positive attitudes expressed by students is consistent with previous research findings. Table 1 summarizes these data for Instructor A's three experimental groups and Instructor's B's comparison groups.

TABLE 1  
MEAN TOTAL AND ITEM SCORES BY GROUP  
SIGNIFICANCE TESTS OF MEAN ITEM SCORES

Inst	Simulation	Mean Total Scores(Std Dev)	Mean Item Scores (Std Dev)	t-ratio
A	All Micromatic	169.06 (12.59)	4.696 (.035)	19.65~
	Micromatic- Stratplan	163.18 (10.21)	4.533 (.284)	21.23~
	All Stratplan	156.53 (16.79)	4.348 (.466)	10.60**
B	All Stratplan	152.64 (12.70)	4.240 (.353)	11.87~
	All Statplan	155.90 (20.73)	4.331 (.567)	

\*\* p <= .001

## Development In Business Simulation & Experiential Exercises, Volume 18, 1991

H2: Student attitude toward the use of simulations are independent of the game played.

Hypothesis 2 was tested by performing a one-way analysis of variance (ANOVA) of total attitude scores by group. The analysis was performed once on the experimental groups and once on all five groups including the comparison groups. A significant F score was found in both cases with the highest group mean attitude scores occurring in the all-Micromatic group, the next highest in the group which used both Micromatic and Stratplan, and the lowest in the all Stratplan groups. Hypothesis 2 was rejected. More positive student attitudes were associated with the playing of the Micromatic simulation as compared to the Stratplan simulation. Table 2 summarizes these data for the three experimental groups and the two comparison groups.

H3: Student attitudes toward the use of simulations are independent of student major.

Hypothesis 3 was tested by performing one-way ANOVA of total attitude scores by major. The analysis was performed once on the experimental groups and once on all five groups. No significant F scores resulted in either case. Hypothesis 3 was not rejected. Student attitudes were not associated with undergraduate major. Table 3 summarizes these data for the three experimental groups and the two comparison groups.

TABLE 2  
ONEWAY ANALYSIS OF VARIANCE OF TOTAL  
ATTITUDE SCORES BY GROUP

Groups	Simulation Played	Mean Scores	F
Experimental			
1 (33)	Micromatic Only	169.06	7.25**
2 (34)	Micromatic/Stratplan	163.18	
3 (34)	Stratplan Only	156.53	
All			
1 (33)	Micromatic Only	169.06	6.44**
2 (34)	Micromatic/Stratplan	163.18	
3 (34)	Stratplan Only	156.53	
4 (32)	Stratplan Only (group)	152.64	
5 (26)	Stratplan Only (group to individual)	155.90	

\*\* p < .001

TABLE 3  
ONEWAY ANALYSIS OF VARIANCE OF TOTAL  
ATTITUDE SCORES BY MAJOR

Groups	Undergraduate Major	Mean	Std Dev	F
Experimental				
N=101	Accounting (19)	165.95	16.46	0.89*
	Finance (21)	163.76	10.84	
	Economics (2)	153.50	19.09	
	Mgt Computer Sys (5)	167.60	14.64	
	General Business (6)	163.00	9.82	
	Production/Opa (2)	156.25	10.96	
	General Management (6)	156.58	14.17	
	Personnel/HRN (6)	173.17	10.50	
	Office Admin (1)	171.00	0.00	
	Marketing (29)	159.72	16.84	
	Financial Planning (4)	160.00	5.23	
All				
N=159	Accounting (36)	159.43	15.84	
	Finance (35)	164.23	13.72	
	Economics (2)	153.50	19.09	
	Mgt Computer Sys (5)	167.60	14.64	
	General Business (14)	158.79	13.72	
	Production/Ops (4)	153.37	10.55	
	General Management (8)	155.31	12.21	
	Personnel/HRN (13)	159.46	24.02	
	Office Admin (1)	171.00	0.00	
	Marketing (37)	156.53	16.66	
	Financial Planning (4)	160.00	5.23	

\* Not significant

## Development In Business Simulation & Experiential Exercises, Volume 18, 1991

- H4 There is no association between student attitudes toward the use of simulations and simulation performance.

Hypothesis 4 was tested for experimental groups by performing linear regression of simulation performance grades on total attitude scores and then regressing total attitude scores on simulation performance grades. The simulation performance grades used were those assigned by the instructor at the 6-week (weeks 1-6) and 12-week (weeks 7-12) periods of play. These grades were awarded on a group basis, with each person in a group receiving the same simulation performance grade. Grades were determined by ranking the teams on a continuous scale (70-100) using the following factor weights:

### Micromatic

Sales	20%
Income After Taxes	40%
Earnings Per Share	20%
Return on Sales	5%
Return on Assets	5%
Return on Equity	5%
Stock Price	5%

### Stratplan

Market Share	20%
Profits	40%
Share Holder Value	20%
Total Assets	6.6%
Return on Investment	6.7%
Stock Price	6.7%

For the regression performed with simulation grades awarded at the 6-week point, no significant regression coefficients resulted and no variance explanation occurred. For those performed with grades awarded for the second six weeks of play, significant regression coefficients and substantial variance explanation was found. Thus, there was a positive relationship between second-round simulation performance and attitudes (and vice-versa). The relationship between simulation performance and attitudes is consistent with the findings of Wolfe (1985). Additionally, it is not possible to assert causality between attitude and performance or performance and attitude. Hypothesis 4 was rejected. Table 4 summarizes these data for the experimental groups.

## DISCUSSION

The most students favor of important displayed Micromatic finding of this study is that significant attitude differences in over Stratplan. While it is not possible to assert causality, speculate on possible causal Stratplan, Wolfe and Nielson Stratplan is inconsistent in functional area detail. The decisions apply to marketing pertaining to production and For example, game players do it is reasonable to factors. In a review of (1987) noted that its handling of firm majority of detailed variables while those finance are very general. not have to consider

TABLE 4  
LINEAR REGRESSION OF SIMULATION PERFORMANCE  
GRADES AND TOTAL ATTITUDE SCORES FOR  
EXPERIMENTAL GROUPS

Regression	Coefficient	t-ratio	Adj R <sup>2</sup> (%)
6-week grade on total attitude score	.03823	.86*	0.00
Total attitude score on 6-week grade	.19240	.86*	0.00
12-week grade on total attitude score	.17855	3.69**	11.20
Total attitude score on 6-week grade			

\* Not Significant

\*\*  $p < .01$

## Development In Business Simulation & Experiential Exercises, Volume 18, 1991

capacity change lead times, they do not purchase and manage raw materials and work-in-process inventories, they do not directly manage the workforce, and they do not differentiate between bonds and loans.

On the other hand, Micromatic players must manage all these types of practical, concrete details and more. Micromatic is therefore more balanced in analytic demands and decision specifics required in the functional areas of marketing, finance, and production. Also, the concrete nature of Micromatic analyses and decision making permits easier accounting analysis and more precise cost and income projections.

Thus, there appear to be two explanations for the presence of more positive attitudes expressed by Micromatic players. First, that game is more consistent with the demands that can be made on the learning experiences of students who have progressed through the traditional functional common core of business subjects. Secondly, Stratplan requires more abstract, corporate-level analyses and decisions, concepts less familiar to business undergraduates.

We suspect that the issue is rooted in students' perceptions of the degree of congruence between academic experience and their valid expectations of soon finding employment as managers of functional, concrete responsibilities. The abstractness of Stratplan, however, may be more appropriate for and comfortable to graduate students who have substantial functional-area managerial experience.

The fact that systematic differences were independent of academic major suggests that the game itself was a major factor in influencing student attitudes toward the use of whole enterprise simulations in administrative policy courses. Additionally, these data suggest a performance-attitude-motivation link. In the Micromatic-only section, simulation performance grades for the second 6 weeks of play were higher than those for the other two experimental sections. Although these differences were not statistically significant, we suspect that higher Micromatic grades (i.e., better simulation performance) improved attitudes, influenced motivation, and enriched the learning environment.

### APPENDIX

Listed below are the statements in the final form of the Simulation Participation Attitude Scale (SPAS). Complete instrument copies may be obtained from:

John Washbush  
Management Department  
University of Wisconsin-Whitewater  
Whitewater, WI 53190  
(414) 472-5457

1. Business policy courses should NOT use management simulations.
2. It is important to learn how to analyze practical business problems and make decisions to solve them.
3. It is NOT important to take responsibility for decisions one makes in business.
4. I am more easily motivated to be involved in a simulation than a text case.
5. Simulations should focus on strategic variables.

6. Simulations should effectively integrate the core courses of the business major.
7. Simulations should include financial details such as cash management decisions, negotiating the conditions under which capital is raised, and capital structure.
8. Business policy courses should focus more on top-level management problems.
9. Business simulations should NOT group students in teams, rather students should play alone.
10. I liked playing the simulation.
11. I have NOT been adequately prepared for the kinds of analysis required to make simulation decisions.
12. I would have rather done more case analyses and NOT have spent so much time making simulation decisions.
13. Simulation decisions are easier to make after gaining several rounds of experience.
14. Our simulation decision sessions were dominated by one or two team members.
15. Playing the simulation did NOT help me gain a better understanding of the complexity of business decision making.
16. I feel better prepared to accept managerial responsibilities as a result of my simulation experience.
17. It is important to be aware of and involved in day to day operational details of a company.
18. A manager can get into trouble by NOT knowing how to make marketing decisions.
19. A manager can get into trouble by NOT knowing how to make accounting decisions.
20. A manager can get into trouble by NOT knowing how to make finance decisions.
21. A manager can get into trouble by NOT knowing how to make operations decisions.
22. Inventory management is important to business effectiveness.
23. I understand the importance of effectively managing cash.
24. I understand the importance of effectively managing inventory.
25. I understand the importance of effectively managing the size and training of the work force.
26. Costs can be more important to profitability than sales volume.
27. I understand financial leverage and its implications for earnings per share.
28. I understand operating leverage and its implications for effective cost control.
29. I learned a lot about things outside my major.
30. I do NOT like simulations in which there are many specific details to evaluate and manage.
31. I like simulations where the problems are at the strategic level.
32. Making a business work effectively requires the cooperative efforts of people with differing skills.
33. I know why my company finished where it did.
34. Top managers do NOT need a rounded exposure to marketing, accounting, finance, and operations.
35. After several decisions the simulation was NO LONGER challenging.
36. After several decisions the simulation was NO LONGER fun.
37. I feel that I could NOT effectively continue playing the simulation alone.

## **Development In Business Simulation & Experiential Exercises, Volume 18, 1991**

- Guilford, J.P. (1965) Fundamental Statistics in Psychology and Education New York: McGraw-Hill.
- Hergert, M., and Hergert, R. (1990) "Factors Affecting Student Perceptions of Learning in a Business Policy Game", Developments in Business Simulations & Experiential Exercises, 17, 92-96.
- Hinton, R.W. & Smith, D.C. (1985) Stratplan Englewood Cliffs, NJ: Prentice-Hall.
- McLaughlin, F.S. & Bryant, G.M. (1987) "A Comparison of Student Perceptions With Accepted Expectations for Business Simulations", Developments in Business Simulations & Experiential Exercises, 14, 135-137.
- Scott, T.W. & Strickland, A.J. (1985) Micromatic: A Management Simulation. Boston, MA: Houghton Mifflin
- Waggener, H.A. (1979) "Simulation vs. Cases vs. Text: An Analysis of Student Opinion", Journal of Experiential Learning and Simulation, 1, 113-118.
- Williams, R.H., McCandless, P.H., Robb, D.A., & Williams, S.A. (1986) "Changing Attitudes with Identification Theory", Simulation & Games, 17, 25-43.
- Wolfe, J. (1985) "The Teaching Effectiveness of Games in Collegiate Business Courses", Simulation & Games, 16, 251-288.
- Wolfe, J. & Nielson, G. (1987) "Business Game Review: Stratplan", Simulation & Games, 18, 153-159.