INTEGRATING SIMULATIONS: A MODEL FOR BUSINESS POLICY SUCCESS

Alan L. Patz, University of Southern California

ABSTRACT

Management simulations have positive relationship with students attitudes toward the capstone business policy course in addition to, and independent of, the basic course content. Equality important, even though simulations and content are independently related to student satisfaction, both positively related with specific course emphasis on general management decision making More over, an emphasis on general management decision making has positive acceptability relationships the amount and difficulty of quantitative analyses included in the course. These findings, along with several others, define an integrated policy and simulation success model -I

In the design of a business integration focus is the combination management simulations with other course content (Frazer, 1978; 1984). The basic is to determine most powerful methods of simulation usage, where power is defined as a simulation induces enhancement in the degree to which students - learn understand some set of general management concepts. This study does not take issue with such a focus - that it does suggest a somewhat different route to the same pedagogical goals.

Three milestones are important long this First, determine what, if any, course activity and content features kindle an interest in general management. Second, design course these basic sparks of interest. continue relate these fundamentals to the introduction of more complex material. In short, the ultimate plan is to develop a blaze of general management interest using a few basic sparks.

General Hypotheses

such a p plan of course, rests upon the assumption that increased student interest will enhance overall learning whether or not simulations are involved There are several well-known theoretical bases for this assumption (Merchant, 1985). , the key issue for this study is whether or not management simulations and student interest in business policy issues are related. Furthermore, several tests student interest are required if any credibility is to be assigned to empirically derived relationships.

The interest measures in this study are each student's anonymous personal choices. As shown in Figure 1. three dependent variables measure the student's likelihood of choosing the capstone policy course if it were not required if it were an elective, and if the content were charged from general management issues to general issues management. The "not-required" designation means that it would be one of s several policy type courses that would satisfy American Association of Collegiate Schools of Business (AACSB) common body of knowledge (CBE) requirements . "elective" designation means that the course would he independent of-CBK requirements but could be used to satisfy some departmental major or other area of

Figure 1
ABBREVIATED COURSE DESIGN QUESTIONNAIRE

For each of the following course issues-activities, content, and choice--indicate your preference by circling one of the numbers on each seven point scale.

Course Activites

(SIMDIF) Simulation

1	2	3	4	5	6	7
Less Difficult			Same Level			More Difficult

(SIMEMP) Simulation

1	2	3	4	5	6	7
Less Emphasis			Same Level			More Emphasis

Course Content

(CUREMP) Current Emphases

1	2	3	4	5	6	7
Not Good			So-So			Very Good

(DECMKG) Decision Making

1	2	3	4	5	6	7
Less Emphasis			Same Level			More Emphasis

(QNTEMP) Quantitative Analysis

1	2	3	4	5	6	7
Less Emphasis			Same Level			More Emphasis

(QNTDIF) Quantitative Analysis

1	2	3	4	5	6	7
Less Difficult			Same Level			More Difficult

Course Choice
(Dependent Variables--Not So Indicated on Questionnaire)

(CBKALT) If this course were not required, I would:

1	2	3	4	5	6	7
Definitely Avoid It			Maybe Take It			Definitely Take It

(ELECTV) If this course were an elective, I would:

1	2	3	4	5	6	7
Definitely Avoid It			Maybe Take It			Definitely Take It

(ISSMAN) If this course were required but devoted to general issues of management rather than general management issues, I would:

1	2	3	4	5	6	7
Be Very Displeased			Not Care			Be Very Pleased

emphasis requirement. The third dependent variable is discussed in the next section.

These measures are anonymous; that is, they can be connected only to student's other responses to the questions in Figure I not to the specific respondent. Moreover, the measures were taken near the end of the required undergraduate policy course. In other words, the students were familiar with the course content before being asked to make their choices.

Based upon these general considerations, two main hypotheses are considered in this study:

H1: Students who prefer more difficult simulations would be more likely to choose "not- required" or "elective" policy course.

H2: Students who prefer a greater emphasis on simulations would be more likely to choose a "not- required" or "elective" policy course.

Specific Hypotheses

In addition to these general assertions, more specific hypotheses can be stated by relying upon both theory and professional experience. The theoretical basis is the standard social psychological finding that people are more comfortable in familiar rather than unfamiliar problem solving circumstances (Second 1974). Similarly a common finding among policy instructors is that graduates with a few years of actual business experience express a much greater satisfaction with the policy course, in retrospect, than they had as students.

Formally, in of hypotheses, these statements translate to.

H3: Students who prefer either less difficult simulations or a diminished emphasis on them have a higher preference for a course devoted general issues in management rather than general management issues.

H4: Compared to a required policy course, students prefer issues in management course to a general management issues course.

H5: Compared to either a "not-required" or an "elective" policy course, students prefer a general issues in management to general management issues course.

H6: Higher preferences for a general issues in management course are associated with lower preferences for emphases on general management decision making and quantitative analyses.

H7: Higher preference for a general issues in management course are associated with a lower preference for either a "not-required" or "elective" policy course.

This last hypothesis needs a word of explanation, especially in relation to H5. That is, it is entirely possible for students to prefer a general issues in management course without having such preference related in way to a "not-required or "elective" general management issues course choice. In fact, this distinction is important, as will he noted later.

METHOD

A 22-item questionnaire was administered to 110 undergraduates registered in four sections of the CBK-type policy course required during the senior year of the business curriculum. The questionnaire is part of a continuing effort to improve the course, and the nine items reproduced in Figure 1 pertain to this study on integrating simulations. Neither the item symbols, such as SIMDIF for the simulation difficulty question, nor the dependent variable designations appeared on the forms that were used.

Due to constraints peculiar to one of the four sections, a simulation was not employed during the semester and the 20 students in the section became a control group for the study. All of the remaining 90 students participated in simulation (Keys & Leftwich, 1985), and all 110 students completed the questionnaire within a two-week period lust prior to the end of the semester. In brief, the students were familiar with the course and all simulation exercises were complete before the questionnaire was administered.

Experimental Design

In order to control for possible major field of study effects, the sample of 90 was divided into three groups denoted as follows: (a) ACC for the fifteen Accounting majors; (b) DMM for the collection of three Decision Systems. nine Managementandeighteen Marketing majors; and (c) FBE for the forty-five Finance and Business Economics majors. Moreover, these frequencies of 15/30/45 for ACC/DMM/FBE respectively are proportional and allow for the routine employment of an analysis of variance with unequal sample sizes. Only one FBE questionnaire had to be discarded in order to achieve proportional frequencies.

With each student assigned to a Major, :he basic paradigm for analyzing the questionnaire results became the popular mixed design. Departmental Major is the between subjects variable, and items or Questions on the questionnaire is the within subjects variable (Myers, , 1972).

Control Group

The control group of three Accounting, two Decision Systems. seven Marketing, and eight Finance majors was not subdivided. It was compared to the entire experimental group of 90 on a question-by-question masis using simple or one way analyses of variance. No significant differences were found.

Also, correlational analyses for the control group exhibited a pattern similar to the entire experimental group. With a smaller sample size, there were fewer significant correlations, but the pattern of significant result was a subset of the

significant results in the experimental group. Both of these results are mentioned in this section in order to minimize further references to the control. group in the remainder of this paper

RESULTS

Analysis of variance results are shown in Table 1. Only the main within subjects effect, Questions, is significant. Departmental Major and none of the interactions, including differences among Question responses between Majors, are statistically significant. Therefore, the previously mentioned one way analyses of variance comparing experimental

Table 1

OVERALL QUESTIONNAIRE RESULTS
Analysis of Variance

Source	df	MS	F
Between Ss			
Major	2	11.16	2.10
Ss/Major	87	5.31	
Within Ss			
Questions	8	17.11	12.13*
Major/Questions	16	1.59	1.13
Ss/Questions/Major	696	1.41	

*p < .001

Item Analysis

Question	Mean	Comparison*	Test Ratio
SIMDIF	4.311	4.161	1.13
SIMEMP	3.922	4.210	-2.17
CUREMP	4.344	4.157	1.41
DECMKG	4.878	4.090	5.94**
QNTEMP	4.011	4.199	-1.41
QUADIF	4.022	4.197	-1.32
CBKALT	3.600	4.250	-4.90**
ELECTV	3.744	4.232	-3.68
ISSMAN	4.767	4.104	4.99**

*The comparison score for each question mean is the average of the eight other mean scores.
**p < .05 using the Scheffe S-method.

Table 2

ITEM RELATIONSHIPS
Simple Correlations

	SIMEMP	CUREMP	DECMKG	QNTEMP	QNTDIF	CBKALT	ELECTV	ISSMAN
SIMDIF	.495††	.029	.370††	.171	.285††	.220*	.259*	-.136
SIMEMP		.043	.125	.088	.151	.130	.168	-.065
CUREMP			.296†	.116	.108	.556††	.574††	.058
DECMKG				.402††	.441††	.163	.245*	.089
QNTEMP					.752††	.140	.296†	.052
QNTDIF						.207	.324†	.049
CBKALT							.799††	.080
ELECTV								.082

*p < .05
†p < .01
††p < .001

Multiple Correlations

	CBKALT		ELECTV	
	Beta	t	Beta	t
SIMDIF	.21*	2.02*	.211	2.04*
SIMEMP	-.00?	-0.09	.019	0.20
CUREMP	.580	6.35**	.573	6.63**
DECMKG	-.153	-1.42	-.123	-1.21
QNTEMP	-.036	-0.26	.094	0.75
QNTDIF	.178	1.28	.183	1.41

*p < .05
**p < .001

and control subjects suffice to indicate equivalent responses in both groups.

Both the simple and multiple correlation analyses in Table 2 indicate several significant results. More important, they form a pattern that is the main theme of this paper. For now, simply note that ISSMAN, the question concerned with general issues in management as opposed to general management issues, does not have any significant correlations.

Hypothesis Testing

Of the two general hypotheses, Hi is confirmed and H2 is not. Referring to Table 2, SIMDIF has positive correlations with both CBKALT and ELECTV. SIMEMP, however, has no significant correlations with any of the three dependent variables, even though ft has significant positive correlation with SPIDIF. in short, students who prefer more difficult simulations would be more likely to choose a not-required or elective policy course, but the effect of a greater emphasis on simulations is inconclusive.

Also, ISSMAN's aforementioned lack of correlations with anything leads to a rejection of hypotheses H3, H6, and H7. Any preference for a general issues in management course is not related in anything else. This includes all the hypothesized relationships with simulation difficulty (SIMDIF), , simulation emphasis (SIMEMP) , emphases on general management decision making (DECMKG) and quantitative analyses (QNTEMP) quantitative analysis difficulty (QNTDIF) the not-required or elective policy course choices (c.BKALT and ELECTV)

As shown in Table 1, students do express a preference for a general issues in management course. The average response for ISSMAN is 4.767 versus the combined average of 3.672 for CBKALT and ELECTV. This confirms H5. Similarly, the ISSMAN average response is significantly higher than the course current emphases (CUREMP = .344) on general management issues. This confirms.

However, the tact that ISSMAN does not correlate with anything requires a more careful analysis fo the relationships that are significant. That is, other more important factors may be operating.

Data Snooping

For example, the simple correlations of ELECTV with SIMDIF, CUREMP, DECMKG, QNTEMP, and QNTDIF suggest that all of these factors are important regarding student choices. However, a multiple correlation indicates that like CBKALT only SIMDIF and CUREMP are important to ELECTV. This is summarized at the bottom of Table 2 with both the beta coefficients (McNenar, 1969) and t-ratios. That is, both simulation difficulty (SIMDIF) and, as expected, a course emphasis in general management issues (CUREMP) show positive correlations with the choice of a not-required or elective policy course. Moreover, SIMDIF and CUREMP are independent influences since the are not correlated.

Equally important, since CBKALT and ELECTV are correlated, r = = .799. The choice of a not-required or elective policy course can be considered equivalent. All of this is shown on the lower portion of Figure 2 with CUREMP and SIMDIF showing independent reari with the CBKALT. CBKALT, in turn, has a positive relationship with ELECTV; likewise, SIMDIF positive relationship with

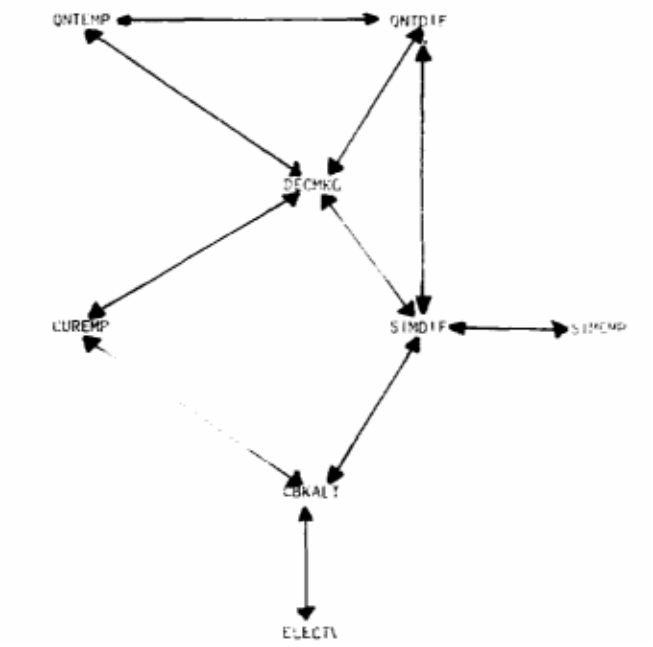
SIMEMP. In fact, the remarkable aspect of Figure 2 is that all of the correlations indicated by bi-directional arrows are positive.

Most surprising, however, is the central effect of a course emphasis on general management decision making, DECMKG. As noted in Table I.. it has the highest average response, 4.878, and it is statistical higher than the average for all other questions, eyen when applying the stringent Scheffe (1959) S-method test.

Upon reviewing Table 2, DECMKG or a course emphasis on general management decision raking, has positive correlations with both current course emphases, (QNTEMP, and simulation difficulty, SIMDIF. Also, the table indicates that DECMKG has positive correlations with both the emphasis on, UNTEMP difficulty of, QNTDIF, quantitative analyses. These latter variables. QNTEMP QNTDIF, are positively correlated with each other. Refer again to Table 2 and Figure 2

Figure 2

A SIMULATION INTEGRATION MODEL



DISCUSSION

Figure 2, in fact, is the model for integrating simulations in the business policy course, question, it needs to he tested in different environments with graduate as well as undergraduate students. Different kinds of simulations need to be tested in addition to different purposes behind the capstone business policy course.

Nevertheless, the large sample results diagrammed in Figure 2 cannot be ignored. Management simulations do have a positive relationship with student attitudes toward the business policy course in addition to, and independent of, the basic course content. Equally important, in emphasis on general management decision making central to this relationship as well as t emphasis n and difficulty of quantitative analyses included in the course.

This emphasis on general management decision making, however, is nor a diffuse directive to be concerned with, say, behavioral or statistical decision theories. Instead, it points to a clear focus on the kinds of decisions important in simulations: industry and company demand forecasts, production scheduling and capacity, operating and cash budgets, profit planning, and financing (Scott & Strickland, In more complex simulations, decisions issues revolve around tariffs, foreign exchange and tax rates, and differential interest rind labor rates (Thorelli Grayes, 1964).

Different theoretical bases, including behavioral Harrison, 1981) and statistical decision Holloway, concepts. will apply--especially in the group decision making sessions that are a mainstay of most simulation exercises. Most important, and this appears to be the key message of the data summarized in sure the policy classroom itself has to be integrated.

It is not enough to ask students to tolerate a simulation because its decision problems are very- similar to the ones discussed in lectures and illustrated in cases. Mere allusions to simulation and “real-world" competitive similarities are insufficient. Likewise, a qualitative lecture that is cut of context. e.g., a cash flow discussion that is only remotely relate to case and simulation exercises, misses the integration target.

In order to integrate simulations, quantitative analyses, decision making, and cases in the policy course, , of these moments have to make sense with respect to each other. As the data indicate, the current course emphases (CUKEMP) and difficult simulations (SIMDIF) are fine provided that they can he related a meaningful was to the decisions that general managers have to make (DECMKG) and the specific analyses that the decision process QNTEMP and QNTDIF)

CONCLUSIONS

Clearly, these integration demands place a heavy burden in the individual policy instruction. It simply is not easy to integrate case materials with simulations and lectures. of the same vein, it never easy to produce real general managers. The interest has to be kindled somewhere, and the policy course is the place to begin.

Also the effort begins with satisfying the customer rather than some arbitrary measure of accomplishment relaxed standards. in fact, referring again to professional experience, satisfied customers tend to accept the most stringent performance appraisals. They are simply trying to match the exp established by well- integrated course.

In short, as stated at the beginning, the activities and content of the policy course can be used to generate an interest in general management. Furthermore, the course can be designed to enhance such an interest and direct it at an exploration of more complex materials. last, simulations are an internal part of this effort.

REFERENCES

Frazer, J. Ronald (1978), "Educational Values of Simulation Gaming, ABSEL Conference Proceedings, 269-275.

Harrison, E. Frank (198]), The Managerial Decision Making Process (2d ed.), Boston: Houghton- Mifflin.

Holloway, Charles A. (1979), Decision Making Under Uncertainty: Models and Choices. Englewood Cliffs, NJ: Prentice-Hall.

Keys, Bernard and Howard Leftwich (1985). The Executive Simulation (3d ed.), Dubuque,: A: Kendal 1/Hunt.

Klein, Ronald D. (1984), "Adding International Business to the Core Program via the Simulation Game," Journal International Business Studies, 15 (No. 1), 151-159.

McNemar, Quinn (1969), Psychological Statistics (4th ed.), New York: Wiley.

Merchant, Kenneth A. (1985)., Control in Business Organizations, Boston: Pitman.

Myers, , Jerome) , Fundamentals of Experimental Design 2d ed.) Boston: Allyn and Bacon.

Scheffe, H. (1959), The Analysis of Variance, New York: Wiley.

Scott, Timothy W, and Alonzo J. Strickland III (1985), Micromatic: A Management Simulation, Boston: Houghton-Mifflin.

Second, Paul F. and Carl U. Backman (1974), Social Psychology (2d ed.), New York: McGraw-Hill.

Thorelli, Hans B. and Robert L. (raves (1964). International Operations Simulation, New York: The Free Press.