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GRADUATES' VIEWS ON THE USE OF COMPUTER SIMULATION GAMES VERSUS CASES AS PEDAGOGICAL TOOLS

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ABSTRACT

In this study, recent marketing graduates were surveyed to determine their perception of whether simulations or case analyses better prepared them for their current job. Results indicated that graduates felt that simulations or simulations together with case analyses better prepared them for their job than case analyses alone. Graduates also rated the simulation experience over case analyses in terms of decision making involvement and providing a learning framework.

INTRODUCTION

There has been a long-standing debate among professors as to the future of computer simulations as an effective and efficient pedagogical tool for concepts disseminated in strategy courses (Keeffe, Dyson & Edwards, 1993). Proponents argue that simulations reflect reality and enable students to apply the strategic concepts taught in the course. Opponents argue that simulations are tactical and not strategic, and they do not reflect the reality of the strategic management process due to the lack of soft decision-making inputs. Many of these opponents utilize casework as an alternative tool for applying strategic concepts.

Our preference in utilizing simulations rather than cases in the marketing strategy capstone course at two eastern universities has led us to wonder what recent graduates think about the relative educational value of simulations versus cases. Recent graduates are in a unique position to judge the educational value of simulations versus cases. The marketing strategy course is still salient in their minds and they are currently employed in the "real world". This enables these individuals to evaluate that recent course experience in light of its applicability to their current job.

In the following section, we will briefly review research which has examined simulations and casework as pedagogical tools and also review literature which addresses the external validity of simulations.

LITERATURE REVIEW

The two teaching methods most commonly used in senior-level capstone strategy courses are cases and simulations. The case method was introduced to the classroom at Harvard Business School in the early twenties.

A case "typically is a record of a business issue which actually has been faced by business executives, together with surrounding facts, opinions and prejudices upon which executive decisions had to depend. These real and particularized cases are presented to students for considered analysis, open discussions, and final decision as to the type of action which should be taken" (Gragg, 1951, p. 1).

Simulation games are experiential exercises (usually computer-based) which enable students to compete with each other as members of management teams of simulated companies producing and marketing consumer or industrial goods. In playing the simulation, students acting as management teams make a variety of decisions that have an impact on their company's operations. The model underlying simulations is interactive so that these decisions must be made in response to and in light of, likely actions and reactions of competitors. Participants set objectives, develop strategy to realize these objectives and create operating policies to ensure that operating decisions support the strategy. Participants make periodical operating decisions for one or more functional areas such as finance marketing and production and integrate the decisions for the purpose of meeting the firm's overall goals and aspirations.

In both casework and simulations, students may be asked to participate individually or as a member of a group or management team. The goal of both teaching methods is to provide students with "real life" experience in individual decision making, as well as group decision making and social interaction if groups are used.

A number of internal validity studies were conducted in the early years of business gaming, comparing learning from games with learning from the case method within strategic management-type courses. The studies by Kaufman (1976), McKenney (1962; 1963), Raia (1966), and Wolfe & Guth (1975) found superior results from game-based groups versus case groups either in course grades, performance on concept examinations, or goal setting exercises. Estes and Smith (1979) found superior game-related results in basic management and management ethics courses. Negative findings were reported by Boseman & Schellenberger (1974) and Pearce (1979), but the former study's general course method and reward system was oriented toward casework and the latter study employed case-oriented scoring protocols.

Another area which has been studied is the external validity of gaming. In an alumni survey of opinions about the value of their gaming experience, Kaufman (1976) found that alumni had positive feelings toward the gaming experience, but he did not address learning or comparative career success. Wolfe (1976) found strong associative relationships between successful executive game playing and previous career success and Wolfe & Roberts (1986) found in a 5-year follow-up study that an individual student's game performance was related to that student's subsequent career mobility and career satisfaction. In another 5-year longitudinal study, however, Norris & Snyder (1980) found no association between a student company's game results and subsequent career success when measured by number of promotions, proximity to CEO's of real world companies, or percentage of salary increases obtained. Though the above-cited studies examined the external validity of either simulations or casework, none of these studies compared simulations to casework with respect to external validity.

Another issue of external validity which has seldom been addressed is the question of whether or not simulations actually reflect "real life" settings and whether the types of decisions which are made in the simulation are similar to those made in the job setting.

In a recent study, Hemmasi and Graf (1992) assessed the educational value of simulation gaming in business policy courses, by comparing students' and recent graduates' (termed 'practitioners') perceptions of the effectiveness of simulations in enhancing participants' appreciation of, and skills in, such areas as interpersonal relationships, theory application to real-world problems, planning, decision making/problem solving, conceptualization/integration of business functional issues, and environmental analysis. They also examined whether students and practitioners felt that the skills and concepts learned were or would be helpful in their performance on the job. This is in essence asking whether simulations reflect the real world. These authors found that practitioners, as compared to students: 1) attributed significantly greater overall educational utility to business simulation gaming as a teaching pedagogy, and b) viewed business simulations as particularly more effective in teaching such essential managerial skills as teamwork, planning, and problem solving/decision making.

While these authors examined students' and practitioners' perceptions of the effectiveness of simulations as a teaching pedagogy, they did not explore how these individuals perceived simulations versus casework. In this study, we will specifically address this question. The research hypotheses to be tested are presented below.

Hypothesis 1: There is a significant difference between graduates perceptions regarding whether business simulation gaming versus casework better prepared them for the type of decisions they are or will be making in their job setting.

Hypothesis 2: Most students will rate computer simulation games higher than case analyses.

METHODOLOGY

Sample and Data Collection

The sample for the survey was composed of recent marketing graduates (1993 and 1994) from two eastern universities. A requirement for marketing majors at both schools is a senior-level capstone course in marketing. This course typically revolves around case analyses and! or a semester-long computer simulation game. Four different instructors taught this course at school A during the Fall 1992 to Spring 1994 period, two different instructors taught the sections at school B. The specific cases employed varied by professor and semester. The only computer simulation used was *BRANDS: A Marketing Game (Chapman,* 1992). Teams with three to five members played the game for 12 weekly decision rounds, simulating three years of decision making.

In August 1994, 320 questionnaires were mailed to marketing graduates according to the following schedule:

153 questionnaires were returned a response rate of 48%. The questionnaire included a number of single-item classification questions: respondents were queried about their gender, school, date graduated, employment status, and whether they had used cases and! or a computer simulation game in their marketing capstone course. 135 out of 151 (2-non responses) of the respondents were employed. Breakdowns of school, year graduated, and gender show no indication that the sample was not representative:

	Year Graduated		
	1993	1994	
School A	80	80	160
School B	80	80	160
	160	160	320

128 of 146 graduates reported that they had used case analyses in their marketing capstone course, 88 said that their class played a computer simulation game, and 71 reported using both (One reported using neither cases nor a simulation!?):

Year Graduated

	1993	1994	
School A	35	41	76
School B	32	39	71
	67	80	147

(Nonresponse) 6
153

Gender

	Female	Male	
School A	39	38	77
School B	30	44	74
	69	82	151

(Nonresponse) 2
153

Used Cases

Used Computer Simulation	No	Yes	
No	1	57	58
Yes	17	71	88
	18	128	146

(Nonresponse) 7
153

Variables and Measurement

Occupational Preparation. A six-item, seven-point Likert type scale was used to assess respondents' evaluations of how well their capstone course prepared them for their present careers. Exploratory factor analysis using principal components with a varimax rotation indicated that the six course evaluation items were unidimensional, a single factor emerged:

TABLE 1
FACTOR PATTERN

The capstone course...	Factor 1
1. helps me understand the business world.	0.80428
2. has been relevant to my career.	0.80186
3. helps me in my job today.	0.80009
4. has helped me be a better participant in decision making.	0.77371
5. helps me understand my role in my firm.	0.75409
6. was one of the best marketing courses I took.	0.72707

Simulation/Cases Evaluation. Respondents' evaluations of the computer simulation game, if applicable, and the cases they used, if any, were measured using identical fourteen-item, seven-point Likert-type scales. The fourteen items assessing evaluations of the simulation yielded three dimensions:

TABLE 2
ROTATED FACTOR PATTERN

The simulation...	Factor 1	Factor 2	Factor 3
1. illustrated uncertainty in the decision making process	0.82435	.	.
2. provided a dynamic decision making environment	0.78748	.	.
3. developed my appreciation for decision making process	0.71846	.	.
4. got me actively involved in the learning process	0.70366	.	.
5. helped me achieve a higher level of learning	0.67124	0.41220	.
6. developed my ability to respond to a changing world	0.58651	.	.
7. added realism to the course	0.58581	0.54421	.
8. demonstrated how businesses might use simulations	0.55152	0.44434	.
9. helped me develop analytical skills	.	0.88650	.
10. developed my integrative knowledge	.	0.86346	.
11. provided unifying framework for subject material	.	0.71780	.
12. promoted my group skills	0.43565	0.55659	.
13. required too much out-of-class time	.	.	0.87594
14. required too much class time	.	.	0.82181

Respectively, the three dimensions seem to represent:
1) a decision making involvement, 2) a learning component, and 3) a time consumption factor. Discarding the multiply loading items, three evaluative indices were created by summing subjects' scores on items loading on common factors. That is, each subject's scores for items one, two, three, four, and six were summed to yield his/her decision making involvement evaluation, items nine, ten and eleven yield the learning component evaluation and items thirteen and fourteen, the time consumption evaluation. The multiply loading items (5, 7, 8, and 12) were discarded.

Case Analyses Evaluation. To facilitate comparability, items evaluating cases were grouped in a manner identical to that used for simulation evaluations.

Distribution summaries of the variables and estimates of their internal consistency are shown in the Table 3.

TABLE 3
SCALE MEANS, STANDARD DEVIATIONS, AND CRONBACH ALPHAS

Variable	N	N miss	Mean	Std Dev	Range	Alpha
Occupational Preparation	145	8	4.00	7.01	-18 to 17	.864
Simulation Evaluations:						
Decision Making Involvement	89	64	8.82	4.75	-10 to 15	.865
Learning Framework	91	62	4.56	3.04	-9 to 9	.855
Time Required	90	63	(-2.17)	2.79	-6 to 6	.708
Case Analyses Evaluations:						
Decision Making Involvement	127	26	4.96	6.19	-15 to 15	.904
Learning Framework	128	25	3.45	3.48	-9 to 9	.820
Time Required	127	26	(-1.22)	3.21	-6 to 6	.764

Data Analysis

Hypothesis One. To explore the first hypothesis, which method offered the best occupational preparation, the sample was split into three groups according to whether respondents had used cases and/or a simulation in their marketing capstone course (see Table 4). The mean for the 'cases only' group is considerably lower than the means for the other groups:

TABLE 4
OCCUPATIONAL PREPARATION RATINGS OF RESPONDENT GROUPS

Group	N	Mean	SD
Used Cases Only	55	6.05	7.71
Used a Simulation Only	17	9.00	6.86
Used Both Cases and a Simulation	68	9.28	6.21

An ANOVA indicates that the difference between the means of the 'cases only' group and the other two is significant at the $p < 0.05$ level.

Hypothesis Two. Our second hypothesis suggests that most graduates would rate simulations higher than case analyses. We investigated the ratings of the 71 students who had indicated that they had used both cases and a simulation in their capstone-marketing course. We compared their ratings of cases and simulation on each of the three evaluative scales: decision-making involvement, learning framework, and time required.

TABLE 5
TEACHING METHOD RATED HIGHER BY RESPONDENTS

Decision Making Involvement:	
Rated Simulation Higher	52
Rated Cases Higher	8
Learning Framework:	
Rated Simulation Higher	37
Rated Cases Higher	13
Time Required:	
Rated Simulation Higher	24
Rated Cases Higher	30

As can be seen from the table an overwhelming majority rated the computer simulation higher than case analyses for illustrating an active decision making environment and for providing a learning framework. Testing against null hypotheses of equal numbers rating each teaching method as better, we can conclude that most of our respondents rated the simulation higher than cases at a significance level of $p < 0.005$ ($x^2 = 32.3$ and $x^2 = 11.5$ with 1 df, respectively). Though more respondents rated cases higher than simulation for time requirements, the ratio was not significantly different from 50/50 ($x^2 = 0.67$).

RESULTS AND DISCUSSION

Our results indicate that using a computer simulation was well received by former marketing students. Those who participated in a simulation in their capstone course rated the course higher in terms of occupational preparation. Further, those respondents who used both case analyses and a simulation rated the simulation higher for providing an active decision making environment as well as for providing a framework for learning course concepts.

A final observation worth noting regards the factor patterns observed for the evaluations of case analyses and simulation. As explained above, the factor analysis of the fourteen items evaluating the simulation yielded three dimensions. Based on these dimensions multi-item scales were generated for both the simulation and cases. This procedure was used to ensure comparability of evaluations of cases versus simulation.

Interestingly, an exploratory factor analysis of respondents' evaluations of cases yields only two distinct dimensions. One factor is a 'time required' dimension identical to the one for the simulation. The other twelve items load strongly together (see Table 6).

TABLE 6
ROTATED FACTOR PATTERN

	Factor 1	Factor 2
The cases...		
1. developed my appreciation for the decision making process	0.81027	.
2. developed my ability to respond to a changing world	0.81026	.
3. got me actively involved in the learning process	0.80721	.
4. provided a dynamic decision making environment	0.80456	.
5. helped me achieve a higher level of learning	0.78177	.
6. added realism to the course	0.77968	.
7. developed my integrative knowledge	0.77943	.
8. helped me develop analytical skills	0.75990	.
9. illustrated uncertainty in the decision making process	0.72200	.
10. provided unifying framework for subject material	0.69454	.
11. demonstrated how businesses might use simulations	0.58068	.
12. promoted my group skills	0.53057	.
13. required too much out-of-class time	.	0.87461
14. required too much class time	.	0.87352

Thus, respondents appear to have viewed the simulation experience differently from the case analyses. The underlying dimensionality of their perceptions was different. The simulation experience may have had an extra 'depth' to it.

Limitations of the Study

Response Bias. An obvious confounding factor was bias caused by identifying the investigators in the cover letter to the survey respondents. Several former students wrote personal greetings on the returned questionnaires. Since the investigators' students participated in simulations in their courses, this general good will may have been reflected in their ratings of simulations.

Investigator Bias. Finally, since both investigators are dedicated users of computer simulations, there may be a general bias designed into the present study.

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