AN EXPLORATORY INVESTIGATION OF STUDENT PERCEPTIONS OF COMPUTER SIMULATION AS AN EDUCATIONAL TOOL

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INTRODUCTION

The general literature which covers the teaching of various business administration courses is being increasingly comprised of explanations and instructions relative to the utilization of computer simulations, strategic games and optimization techniques. The number of readily available simulation devices is multiplying on an hourly basis as text publishers, professional associations and others venture forth with their individual contributions to this specific aspect of the educational process.

At times it seems that the techniques of computer simulation have become the present day successors to the case approach which assumed ubiquitous proportions just a few years ago. At that time, and in some places still, no self respecting professor of business would, or for that matter in a professional sense could, admit the use of cases and case analysis was not a part of his or her coursework. As a result of such a wholehearted adoption of this particular academic technique there were the inevitable problems of over use and inappropriate use. Thus it was not uncommon to find college students with little or no background in a particular subject embarking on attempts to analyze cases of varying degrees of complexity. The inevitable result of such a policy is that an otherwise highly useful pedagogical tool becomes little more than a futile exercise in shared ignorance.

In summation, the problem of the overuse of the case approach was attributed in some degree to a headlong rush into the technique with almost no concomitant efforts to evaluate either the general effectiveness of such devices or the true impact of the use on the learning process in general and on the students in particular.

Thus it is in this spirit of exploration that the authors of this paper have undertaken to add in some small degree to what appears to be a general lack of investigation as to the academic impact of the use of simulation techniques in the typical college classroom. We share a common concern that those of us who are interested in computer simulation are frequently somewhat mesmerized by the descriptions of the programs and what they are ostensibly designed to accomplish and thus tend to neglect an equally important dimension of our responsibility; namely, what do the students think and how do they react to the use of simulations in classroom.

Much time, energy and resources have been expended in the creation of simulated business, government and non-profit organizational situations. There is little doubt the exercises are almost invariably exciting if for no other reason than the technique is something new to higher education and as such tends to break the inevitable monotony of the traditional class room methods. In addition the use of a simulation can be readily adapted to fairly large class sizes unlike certain other techniques which require smaller classes and close professorial attention. Herein lies a certain difficulty. We all recognize that there is a limit to what can be done in an unique manner by means of lecture, class discussion and audio visual resources. Perhaps we are becoming much like the television programming directors and new product managers who must consistently strive to present to the voracious public something new, exciting, different and intriguing. Hopefully the pressure will not become as intense on us but we do have an audience, or a group of customers, and if that clientele reacts favorably to a certain educational technique we are generally inclined to increase the use of that technique. To the typical student facing perhaps three to five classes per day any change from the expected and the normal is met with at least some degree of enthusiasm. In some classes even a modicum of enthusiasm is a very welcome change for all concerned.

PURPOSE

The purpose of this research is to attempt to find out what students really think of classroom computer simulation exercises as used in one reasonably typical business administration program. Hopefully our students have responded not just in terms of their immediate reaction to the latest in pedagogical entertainment but in more meaningful terms of the impact of the simulation on their educational and even career objectives. As in all questionnaires the authors are quite aware of the tendency for respondents to tell the investigators what the respondent s think the investigators are looking for or desire in the way of responses. The authors attempted to the best of their ability to counteract this inevitable pressure by explaining at the beginning "This questionnaire seeks to explore you reactions to the use of computer simulation in your classroom. Our purpose is to constantly improve the material which we offer to you, our students." Orally the students were assured there were no either correct or incorrect answers. The only good answer they were told was a true answer. To emphasize this point all responses were anonymous and were collected by other students before being given to the instructor. The questionnaire was designed to get answers to certain objections which have been raised concerning the computer simulation technique. Other statement represent the distillation of over a year of cooperation among the authors with the ultimate purpose of telling us and others interested just how our students feel about simulation in the classroom. An expected caveat must be presented at this point. We have no idea how closely our students and their reactions are representative of the

reactions and feelings of your students. One purpose of this paper is to encourage fellow teachers of business subjects to embark on their own investigatory explorations. If you wish to cooperate with us in attempting a student simulation attitude research project of multi-institutional dimensions, we welcome you to our team as it hacks its way through an increasingly thickening jungle. In the area of the analysis of simulation techniques, there is no shortage of work, to be done and no shortage of way to pursue our mutual goals. In a narrow sense we seek to improve the state of our knowledge but the ultimate impact of our studies will be for the benefit of our students.

RESEARCH DESIGN

The research instrument was administered to 130 students enrolled in three different classes at the end of the Fall 1977 semester. Group one was comprised of 60 students enrolled in a beginning course in marketing. These students used the Quaker Oats version of the Purdue Supermarket Game. In this simulation the class was divided into two market areas each having five supermarkets. A team of four students managed each market. In each period each team made about 20 decisions all closely related to marketing policies and the general management of a supermarket.

The second student group was comprised of 51 students enrolled in a managerial finance course which could be described as a corporation finance class. These students used Leroy Brooks Financial Management Decisions Game. This simulation involves 18 separate decisions made each decision period. The game is designed to develop financial analysis skills and general decision making skills.

The final group comprised 18 students who were enrolled in a course called marketing channels, a more advanced class than the two described above. These students used the IMB/360 Marketing Management Game. In this simulation five teams competed vigorously against each other with the decisions of each team affecting the results of all the other teams. The decisions included: marketing research, production level, price, plant expansion, debt and other inputs for a total of 10 decisions.

The questionnaire was divided into two sections. The first part consisted of 24 statements which attempted to determine the individual students reaction to his or her particular simulation. The statements were carefully designed and pretested on a group of ten students who were not a part of the sample but who had previous experience with our classroom simulation exercises. To reduce automatic responses the statements were randomly staggered in terms of positive and negative positions on the use of simulations. The second part of the questionnaire sought to elicit some demographic data: sex, class level, course, cumulative grade point and number of times the respondents had experienced classroom computer simulations.

The responses were recorded by the students on a data processing scanning sheet. The scanner created punched cards which were then processed using SPSS, thus creating a series   of

cross tabulations between each of the demographic responses and each of the 24 opinion responses. For this helpful data processing assistance the authors express their sincere gratitude to Ms. Patty Garczewski of our college computer center. Because of space limitations the cross tabulations will be presented by the authors in a subsequent paper at a later date.

THE SAMPLE

The 130 responses to the questionnaire are comprised of 108 males and 22 females (837. and 177. respectively). In terms of class level there were no freshman, only 6 sophomores (57,), 61 juniors (477.), and 64 seniors (497,). In terms of student familiarity with the simulation technique the study found that for 25 students this was their first experience (197.); 74 of the students had experienced one other simulation (567.); 22 students had been through two other simulations (177.); and ten had participated in three or more simulations (87.). In terms of the cumulative grade point average of the respondents the following table is presented:

```
3.5 - 4.0      4     3%
3.0 - 3.49    26    20
2.5 - 2.99    54    42        (4.0 = A)
2.0 - 2.49    43    33
below 2.0      3     2
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THE SURVEY RESULTS

The respondents were requested to react to 24 statements which covered the use of computer simulation techniques in a classroom situation. The reaction were to be in terms of five gradations: Agree Strongly (AS), Agree Moderately (AM), Uncertain (U), Disagree Moderately (DM), and Disagree Strongly (DS). The remainder of this paper will present each of the 24 statements, the number of responses, and the percentage which pertains to each response.

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1.  The computer simulation used in this class was a useful
educational tool.

      AS        AM        U         DM        DS
    f   %     f   %     f   %     f   %     f   %
   51  39    60  46    13  10     6   5     1   1

2.  The decisions we had to make in the simulation were too
theoretical to be professionally useful.

      AS        AM        U         DM        DS
    f   %     f   %     f   %     f   %     f   %
    1   1    19  15    45  35    53  41    12   9
```

3. Most of the students I know liked the simulation.

AS		AM		U		DM		DS	
f	%	f	%	f	%	f	%	f	%
17	13	54	41	42	32	14	11	4	3

4. The simulation took more time than it was worth.

AS		AM		U		DM		DS	
f	%	f	%	f	%	f	%	f	%
6	5	22	17	12	9	55	42	35	27

5. Our computer simulation was more entertaining than it was educational.

AS		AM		U		DM		DS	
f	%	f	%	f	%	f	%	f	%
1	1	20	15	21	16	69	53	20	15

6. The simulation helped me to better understand the basic principles of the course.

AS		AM		U		DM		DS	
f	%	f	%	f	%	f	%	f	%
26	20	71	54	13	10	16	12	5	4

7. The simulation added a lot of realism to the class.

AS		AM		U		DM		DS	
f	%	f	%	f	%	f	%	f	%
23	18	72	55	23	18	10	8	3	2

8. Our simulation confused most of the class.

AS		AM		U		DM		DS	
f	%	f	%	f	%	f	%	f	%
8	6	23	18	45	34	37	28	18	14

9. Computer simulations are too complex to be useful in this course.

AS		AM		U		DM		DS	
f	%	f	%	f	%	f	%	f	%
1	1	5	4	17	13	56	43	52	40

10. The simulation enabled me to better understand the complexities involved in decision making.

AS		AM		U		DM		DS	
f	%	f	%	f	%	f	%	f	%
52	40	71	54	4	3	4	3	0	0

11. Student performance on a simulation project has nothing to do with a student's understanding of the material in the course.

AS		AM		U		DM		DS	
f	%	f	%	f	%	f	%	f	%
19	15	20	15	28	21	50	38	14	11

12. Computer simulation is a less effective way of teaching than the lecture approach.

AS		AM		U		DM		DS	
f	%	f	%	f	%	f	%	f	%
6	5	26	20	28	21	47	36	24	18

13. I feel the class in general did not take the simulation seriously enough.

AS		AM		U		DM		DS	
f	%	f	%	f	%	f	%	f	%
8	6	22	17	38	29	50	38	13	10

14. Simulations generate a lot of interaction between the students and the instructor.

AS		AM		U		DM		DS	
f	%	f	%	f	%	f	%	f	%
29	22	66	50	12	9	22	17	2	2

15. Performance in the simulation is a good way for a student to tell how well she or he is learning the subject matter.

AS		AM		U		DM		DS	
f	%	f	%	f	%	f	%	f	%
7	5	42	32	28	21	36	28	18	14

16. Simulation is a great way for a student to quickly understand the course objectives.

AS		AM		U		DM		DS	
f	%	f	%	f	%	f	%	f	%
6	5	37	28	32	24	42	32	14	11

17. Actually most of the decisions were made by one student.

AS		AM		U		DM		DS	
f	%	f	%	f	%	f	%	f	%
19	14	22	17	16	12	39	30	35	27

18. The simulation brought together material I had learned in several other business courses.

AS		AM		U		DM		DS	
f	%	f	%	f	%	f	%	f	%
23	18	73	56	11	8	17	13	7	5

19. I didn't really understand what was going on.

AS		AM		U		DM		DS	
f	%	f	%	f	%	f	%	f	%
19	15	57	44	7	5	32	24	16	12

20. I learn a lot more from one hour spent on a simulation problem than from one hour in a typical lecture.

AS		AM		U		DM		DS	
f	%	f	%	f	%	f	%	f	%
17	13	29	22	41	31	30	23	14	11

21. Using a simulation is a relatively inefficient way to study a subject.

AS		AM		U		DM		DS	
f	%	f	%	f	%	f	%	f	%
1	1	12	9	27	21	60	46	31	24

22. I feel business course instructors should make extensive use of computer simulations.

AS		AM		U		DM		DS	
f	%	f	%	f	%	f	%	f	%
25	19	51	39	41	31	11	8	3	2

23. I learn a lot more from one hour working with a simulation problem than I do from one hour reading a typical text.

AS		AM		U		DM		DS	
f	%	f	%	f	%	f	%	f	%
24	19	40	31	21	16	38	29	7	5

24. A student's performance on a simulation is not an indicator of his/her managerial ability.

AS		AM		U		DM		DS	
f	%	f	%	f	%	f	%	f	%
31	24	35	27	30	23	27	21	8	6