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STUDENTS' PERCEPTIONS OF THE USE OF A COMPUTERIZED SIMULATION IN TEACHING MANAGEMENT INFORMATION SYSTEMS

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ABSTRACT

Student perceptions of the management information system course, taught with a computer simulation, are examined. In two Sections, the simulation was used along with lecture and in one section, the simulation was used with lecture and cases. All sections perceived the use of simulation in a very favorable way. The students appear to feel that the simulation was a very valuable part of the course. Only a few significant differences existed between the students which used the simulation as well as cases and those students which used the simulation, but no cases.

INTRODUCTION

Many computerized simulations have been developed for use in teaching several different business courses. In the last few years, some researchers have suggested the use of simulation in teaching management information systems or decision support systems.

The purpose of this study is to examine student perceptions regarding the use of computerized simulation In teaching management information systems.

Courtney, Bierer, Luckow and Kables [2] described the use of management games in teaching management information systems design. These researchers found that by using simulation, some of the difficulties in conveying the interrelationships between decision making and information systems were overcome. The students became aware of information needs through their participation in the simulation's decision process.

Jensen and Courtney [5] described how simulation could be successfully used in a policy course to illustrate decision support systems concepts. Couger [1] also described this approach and recognized its use in the MIS course as well as in the policy course.

McLeod [7] suggests the use of a computerized management decision game as an aid in teaching management information systems concepts related to the marketing function.

None of the above research has dealt directly with student perceptions of the use of simulation in teaching MIS. Little research in this area appears to exist. Hopefully, this paper will enable those who are considering the use of simulation in teaching MIS to develop a more accurate prediction of what might be expected from the students if simulation is used.

USE OF THE SIMULATION

The Business Management Laboratory simulation was used in the management information systems course, taught from a managerial perspective. A large majority of the students taking the course were junior or senior business majors.

Also, nearly all of these students had taken a programming oriented computer science course prior to taking the MIS course.

The study is based on data collected from students in three different sections of the course, all of which were taught by the same teacher. In one of these sections, students were required to read and analyze management information systems cases. Of the total class time available for lecture or discussion, approximately twenty percent was spent discussing these cases. It is difficult to allocate the remaining time precisely, as much of the time involved relating systems and information systems concepts to the decision making process of the simulation. Perhaps about twenty-five percent of class discussion and lecture time was devoted to a "pure" discussion of MIS concepts, with the simulation noticeably involved in the remaining fifty-five percent of the time. In the two other sections, no cases were used. In these sections, about one-third of class discussion time was devoted to a 'pure' discussion of MIS concepts and about two-thirds of class discussion time involved the simulation to a noticeable degree. Again, all of these figures should be considered as approximations.

The Business Management Laboratory can be implemented with one or two products and one or two market areas. Up to eight firms can compete in the production and distribution of the same basic product. Quarterly decisions are made in three functional areas~ 1) production, 2) marketing, and 3) finance and administration. Some decisions, such as the plant expansion decision, have a long-term impact. However, most decisions seem to primarily have a short-term impact. The simulation was implemented with the one product, one market area options in all three sections. In one section, eight teams of about three students each competed, in another, eight teams of about four students each competed and in the third section, seven teams of about three students each competed. All teams had three major objectives: 1) maximize profits, 2) maximize market share, and 3) maximize the shareholders' wealth.

The students' textbook [6] provides a diagram which illustrates the determination of the planning approach for the MIS development project. According to the diagram, the question, "Does firm have good objectives?" should be asked. Provided the answer is yes, the next question should be "Is firm meeting objectives?" If the answer to this question is yes, the diagram shows the firm should then "operate existing MIS."

This philosophy was followed with the simulation. The team which was best achieving the three above objectives was deemed to have a good, operable management information system. All other teams were deemed to have information systems in need of improvement and were required to develop a written analysis of their firm's management system, information needs and data sources. Also a basic information system design was required. These written analyses were optional for the team which best achieved the three objectives.

METHOD

All students were surveyed on the final day of classes. The questionnaire asked their opinions regarding the simulation, Instruction, the textbook, tests and grading, and the course as a whole. To accomplish the pur- pose of the current study, student perceptions regarding the simulation, instruction and the course as a whole were examined. Table One provides a listing of the twenty-three items examined. With twenty-two of the items, students were asked to indicate their relative degree of agreement or disagreement with each item. On the final item, they were asked to give a perception of the value of the course as a whole.

FINDINGS

A summarization of the student responses to the twenty-three items is provided In Table One. The first ten items provide an indication that the students perceive the simulation as a very valuable part of the management information systems course. A very large majority of the students indicated that the simulation helped them to improve their analytical and decision making skills (item 1), provided a vivid illustration of the usefulness of the systems approach (item 4), helped them develop an understanding of how and why subsystems In an organization are integrated (item 5) and helped them to better understand the relationship

TABLE 1
A SUMMARY OF STUDENT PERCEPTIONS

Columns One to Five are Indications of:

    Strong Agreement 1
    Moderate Agreement 2
    Uncertain. 3
    Moderate Disagreement. 4
    Strong Disagreement. 5

		Responses			
	1	2	3	4	5
1. The simulation has helped me to develop my analytical and decision making skills:	33	36	5	3	0
2. The simulation was rather confusing and hard to understand when it first began:	48	17	3	7	2
3. I enjoyed working on the simulation:	34	30	5	5	2
4. The simulation has provided a vivid illustration of the usefulness of the systems approach:	26	34	11	3	3
5. At the end of the simulation I had a much better understanding of how subsystems in an organization are inter-related and why they must be integrated to achieve organizational effectiveness:	50	20	3	3	1
6. My understanding of the simulation is pretty good at this point in time:	40	34	2	0	1
7. I was rather involved in the decision making process in the simulation:	46	26	4	· 0	0
8. The simulation (and write-up) has helped me to better understand the relationship between decision making and its informational inputs:	31	35	9	2	0
9. One of the more educational aspects of the simulation is the feedback on the results of student decisions:	37	27	10	2	1
10. All things considered, the simulation has been a valuable educational tool:	37	30	6	3	1
11. Compared to the typical management case, the simulation is more interesting:	49	18	4	3	3
12. Computer simulation is a less effective way to teach Management Information Systems than the case method:	6	7	11	21	32
13. Students get more involved in the simulation than in typical management cases:	41	24	8	0	4
14. A good understanding of MIS will be relatively important in most careers of the future:	30	37	7	3	0
15. Computer simulation is a less effective way of teaching MIS than the lecture approach:	6	9	8	27	27
16. It would be better to spend more time discussing MIS cases:	7	11	25	19	14
17. The simulation is more useful in developing the analytical and decision making skills than the typical management cases:	34	29	7	5	2
18. Lectures on the MIS concepts covered in the book make them easier to understand and are a good approach:	13	33	14	12	5
19. The teacher appears to have a good understanding of the MIS area and the field of management in general:	44	29	4	0	0
20. The simulation would be better if the number of decisions were increased from about 12 to about 16:	34	15	16	5	7
21. It would be better if the instructor took more class time to lecture about more of the MIS concepts:	18	22	13	20	4
22. All things considered, the teacher has been effective:	15	39	16	5	2
23. All things considered, the course has been (numbers indicate: 1-very valuable, 2-valuable, 3-not valuable, but not useless, 4-useless):	33	32	5	1	

between decision making and its informational inputs (item 8). It is particularly interesting to note, while these accomplishments were being achieved, the students were enjoying working on the simulation (item 3). Thus, it appears that the simulation enables the students to accomplish several of the major objectives of the course in an enjoyable way.

The "no cases' student perceptions were also compared with the cases student perceptions for these ten items. The chi-square statistic was computed to determine if any significant differences between the two groups' perceptions existed. There were no differences which were significant at the .05 level. Comparison data, the chi-square statistic and associated significance are provided in Table Two.

Several, if not all, of the items listed under the heading of "Instruction" also involved student perceptions of the simulation. Three of the items involved comparing the simulation to the typical management case." (Virtually all of the students had become familiar with cases in management courses taken prior to taking the MIS course.) By an overwhelming majority, students felt the simulation was more interesting (item 11), created more involvement (item 13) and was more useful in developing analytical and decision making skills (item 17). Students also gave a strong indication that the simulation was not less effective than the case method (item 12). Thus, there appears to be a clear perception among most students that simulation is to be preferred to the case method in teaching MIS.

Students also evaluated the desirability of spending more time discussing cases (item 16). The chi-square statistic indicates that the two groups did have significant differences in perception regarding this item. It appears that students feel the best amount of class discussion time to allot to cases lies somewhere between zero and twenty percent. There also may be an indication that the preferred amount lies closer to zero than to twenty percent, as students were somewhat indifferent about spending more than zero percent of their time on cases, but strongly rejected the idea of spending more than twenty percent.

Student perceptions involving class lecture were the subject of three items. These items present somewhat of a puzzle as students indicate the simulation is a more effective way of teaching MIS than lecture (item 15), but they also indicate that lectures are a good approach (item 18) and more class time should be devoted to the lectures (item 21). The puzzle is compounded when it is noted the students also feel the number of decisions in the simulation should be increased (Item 20). Decisions can be made completely outside of class. However, as currently implemented, the collection of decision forms, distribution of the print-outs of the results and the answering of questions which invariably accompany the first two activities do require a considerable amount of class time.

Two items involved student perceptions of the teacher. The students appear to have perceived the teacher to be quite knowledgeable (item 19) and quite effective (item 22), however the degree of these perceptions differs between the 'case' group and the no case" group. The no case' group appears to perceive the teacher as somewhat more knowledgeable and somewhat less effective than the "case" group. The chi-square statistic indicates that both of these differences are significant.

CONCLUSIONS AND SUMMARY

The simulation is perceived as a valuable educational tool by an overwhelming majority of the students. It was rated very highly by the students in virtually every area and it also compares very favorably with the use of cases. Lecture also certainly appears to have its place in the management information systems class. The use of cases appears to be much more questionable. Cases suffer sharply in direct comparisons with the simulation. If the students' desires

TABLE 2
GROUP SUMMARIES OF STUDENT PERCEPTIONS

Item	No Case Group					Case Group					Chi Square	Significance
	1	2	3	4	5	1	2	3	4	5		
1	21	17	4	3	0	12	19	1	0	0	5.323	0.150
2	21	12	3	6	1	25	5	0	1	1	7.558	0.109
3	22	16	1	4	2	12	14	4	1	1	6.310	0.177
4	17	16	7	3	2	9	18	4	0	1	4.669	0.323
5	29	10	2	3	1	21	11	1	0	0	3.518	0.475
6	21	21	2	0	1	19	13	0	D	0	2.869	0.412
7	27	16	2	0	0	19	10	2	0	0	0.204	0.903
8	19	21	3	2	0	12	14	6	0	0	3.897	0.273
9	21	16	5	2	1	16	11	5	0	0	2.477	0.649
10	20	16	6	3	1	17	14	1	0	0	4.991	0.288
11	2B	9	2	3	3	21	9	2	0	0	4.946	0.293
12	4	4	7	11	19	2	3	4	10	13	0.623	0.960
13	24	13	4	0	4	17	11	4	D	0	3.260	0.353
14	16	21	6	2	0	14	16	1	1	0	2.593	0.459
15	3	5	4	14	19	3	4	4	13	8	2.506	0.644
16	3	11	17	10	4	4	0	8	9	10	14.935	0.005
17	17	18	4	4	2	17	11	3	1	0	3.539	0.472
18	10	23	6	5	1	3	10	8	7	4	9.382	0.052
19	31	13	1	0	0	13	16	3	0	0	6.669	0.036
20	24	6	7	3	5	10	9	9	2	2	6.076	0.193
21	10	12	7	13	3	8	10	6	7	1	1.118	0.891
22	12	19	7	5	2	3	20	9	0	0	10.788	0.029
23	19	21	5	0		14	11	0	1		5.168	0.160

for more time to be devoted to lecture and the simulation are to be considered seriously, obtaining the time by dropping the cases certainly appears to merit strong consideration.

Very few significant differences existed between the perceptions of the "no case" group and the "case" group. Two of the three significant differences occurred when students judged the teacher, with the teacher being perceived as somewhat more knowledgeable, but somewhat less effective when cases were not used. However, a very large majority of the students deemed the teacher to be both knowledgeable and effective, so the differences were only a matter of degrees.

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