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WHO IS USING COMPUTERIZED BUSINESS GAMES?: A VIEW FROM PUBLISHERS' ADOPTION LISTS

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ABSTRACT

This paper reports upon a study which attempted to ascertain, by analyzing publishers' adoption lists, who is using computerized business simulations. Tabular data is presented and the adopters are analyzed with respect to a number of characteristics, such as type and location of adopter. The analysis of the results indicates that the majority of adopters on the lists are United States educational institutions. Within this group analysis reveals that adopters tend to be 4-year rather than 2-year educational institutions, public rather than private and large rather than small. Some limitations of the study are presented along with suggestions for further research.

INTRODUCTION

The first practical business management game, Top Management Decision Simulation, was developed by the American Management Association in 1956 [13]. Since that time the number of business simulations has increased at a rapid rate as reflected by estimates [16--over 100; 18--over 200] and listings of simulations available [10--85 listed; 7--89 listed; 6--183 listed; 19-- 184 listed; 2--242 listed; 9--261 listed]. Thus, there is a great deal of evidence that the number of business simulations available has increased. This increase has occurred for both manual and computerized simulations, although manual simulations have probably increased at a faster rate. Of 261 simulations listed by Horn [9], 86 (33 percent) were computerized, compared to 25 (45 percent) of 55 reported upon in a 1962 study by Dale and Klasson [3].

Whether or not the number of simulation users has increased as rapidly as the number of simulations is less certain because of a lack of research. As Goosen [5, p. 212] notes: "No studies have been made to ascertain the number of business simulation users in the United States." A number of survey-oriented studies, however, do provide some insight into who is using business simulations.

LITERATURE REVIEW

In a 1962 study [3, 11] 107 institutions which were members of the American Assembly of Collegiate Schools of Business (AACSB) were surveyed concerning their use of business simulations. Responses were received from 90 schools with 64 (71%) indicating that they were using some form of business simulation and 6 indicating that they planned to introduce simulations in the next year. Graham and Gray [6] report on a survey of 125 business schools conducted in 1967 in which 84 (91%) of the 92 responding schools reported that they used business games. Ahern, et al. [11] found 63 educational, 16 governmental and 20 industrial organizations reporting the use of simulations. These organizations reported using 127, 73 and 47 simulations, respectively. Finally, Roberts and Strauss [15] replicated the Dale and Klasson [3, 11] study by surveying the 90 respondents from the original study. Responses were received from 73 (81%) institutions with 69 (95%) indicating that they used business simulations. Thus, the percentage of the respondents indicating the use of business simulations in the Dale and Klasson

[3, 11], Graham and Gray [6], and Roberts and Strauss [15] studies implies that the number of users has increased. In addition to these survey-oriented studies Goosen [5] has attempted to identify the number of users of business simulations in a non-survey-oriented manner. He analyzed the membership lists of the Association for Business Simulation and Experiential Learning (ABSEL) in conjunction with AACSB data and estimated that there may be between 500 and 800 simulation users at AACSB member institutions.

Unfortunately, all of the above studies are somewhat restricted. First, three of the four studies are more than 10 years old and therefore cover only about one-half the time since the introduction of business games. Second, all four of the studies are restricted to educational institutions and three of these are even more restricted in that they focus on AACSB member schools. Since only 4-year and graduate institutions can be members of the AACSB, all 2-year and lower educational institutions were not covered in the earlier surveys. Further, there are at least as many 4-year or higher institutions granting business degrees who are not AACSB members and have never been surveyed. Third, one of the studies is non-survey based. Fourth, and perhaps most important, these earlier studies did not attempt to analyze characteristics of the users. Thus, there is very little useful information concerning who is using business simulations.

The purpose of this paper is to provide more recent information and shed additional light from an organizational perspective on the users of business simulations. Specifically, by analyzing publishers' adoption lists, the study reports on the characteristics of organizations which use business simulations.

METHODOLOGY

During the summer of 1977, 13 publishers who collectively were known to publish 22 computerized business simulations were requested by letter to provide their adoption lists and the number of copies sold for each simulation. Non-respondents were sent a follow-up request in November. Adoption lists were received from five publishers concerning 11 of the simulations. There were a variety of reasons why information was not provided for one-half of the simulations--two requests were returned as unforwardable, two publishers had policies against releasing the requested information, two of the simulations had gone out of print, one of the publishers neglected to include the information for one simulation and four did not respond. The simulations for which information was requested and received are presented in the Appendix.

Only four of the adoption lists contained information on the number of copies sold. However, all of the lists contained the names of adopting organizations.

For each of the simulations the total number of adopters was determined first. Second, for each of the

Insights into Experiential Pedagogy, Volume 6, 1979

simulations' characteristics of the adopters, such as location (United States versus foreign), type (2-year or 4-year educational institution or non-educational organization), support (private or public) and number of students were determined. Third, the adoption lists were analyzed to identify how many simulations *in total* were used by each adopter. Further, the simulations were classified as general management or functional and the number of each type used by each adopter was identified. For all the simulations in total and for the general management and functional simulations the number used by adopters was related to selected characteristics of the adopters such as type, location, support and size. These items were related using subprogram CROSSTABS of the Statistical Package for the Social Sciences (SPSS) [14]. This subprogram generates the chi square statistic which was used to check for significant differences among the users of various numbers of simulation for the selected characteristics.

RESULTS

Summary data for each simulation are presented in Table 1 for all users and for United States educational institutions only. The simulations are identified by a letter and not by name because some of the publishers requested that the information be kept somewhat confidential. A surface review of Part A of Table 1 reveals some interesting results. First, merely counting the number of adopters of each simulation and summing reveals 1,001 adoptions. Even when organizations and institutions which appear on more than one list are taken into account, there are 653 different adopters represented. Second, the four adoption lists which provided the number of copies sold indicate a total of 11,357 copies sold. If we assume that the institutions and organizations included on these four lists are representative of those on the other lists, and if we adjust for the fact that two of the figures for number of copies sold cover a 22 month period, it can be estimated that the total number of copies sold to adopters on these lists was around 98,000. Third, educational institutions account for a majority of the adopters (543/653 or 98%). Finally, the vast majority of the adopters are located in the United States (591/ 653 or 91%). Due to the last two points, it was decided that a separate analysis of the United States educational institutions was needed also.

The characteristics of the United States educational institutions are presented in Part B of Table 1. As can be seen from Table 1B, the majority of the users are 4-year (82%), public (65%) institutions. When these two variables were considered together, it was found that the sample consists of approximately 50% public 4-year schools, 34% private 4-year schools, 14% public 2-year schools and 1% private 2-year schools. Table 1B also indicates the average number of students attending the institutions using each simulation. To provide further insight into the size characteristic the mean number of students attending the institutions using each simulation is identified when the institutions are classified as 2-year or 4-year and public or private. It should be noted that the number of students could not be identified for some of the institutions. In most instances this difficulty resulted because the institution was a branch campus of a larger institution and separate data was not available for the branch. This situation introduced another distortion in the data since the parent institution figures were overstated because they included the branches.

Turning to the number of simulations adopted by each user the data were analyzed from a number of perspectives for all the simulations as a set, for the general management simulations taken

as a set, and for the functional simulations as a set. Each set of simulations was then analyzed by user type and location for all the users and by user type, support and size for United States

TABLE 2
CHI SQUARE RESULTS FOR COMPARISONS

Comparison	ALL Simulations		Gen. Mgt. Simulations		Functional Simulations	
	Chi Square	Probability	Chi Square	Probability	Chi Square	Probability
Part A:						
Results for All Users						
Type of User (4-year vs. 2-year vs. other)	29.66	.000	6.37	.382	15.14	.056
Location of User (U.S. vs. Foreign)	2.43	.785	4.72	.193	1.61	.806
Part B:						
Results for United States Educational Institutions						
Type of User (4-year vs. 2-year)	30.07	.000	7.40	.060	13.23	.010
Institutional Support (private vs. public)	10.91	.053	4.08	.252	6.50	.164
Institutional Size	68.62	.000	22.69	.030	47.16	.000

educational institutions. Due to the large number of tables and their complexity, generally only those crosstabulation results for which the chi square statistic was significant at the .05 level will be reported. Summary results are provided in Table 2.

Anyone wishing the detailed tables should write to the author.

The greatest frequency with which any single adopter appeared was on six of the lists; for general management and functional simulations the greatest frequencies were 3 and 4, respectively. As can be seen from Table 2A, for all users the chi square statistic was significant only for all the simulations considered together. Analysis of the crosstabulation table revealed that 4-year educational institutions tended to use more simulations than 2-year educational institutions and the non-educational organizations. Location of the user was not found to be significantly related to the number of simulations used.

As can be seen from Table 2B, for United States educational institutions significant differences were found in a number of areas. The 4-year and 2-year institutions differed significantly on the total number of simulations used and on the number of functional simulations used with 4-year institutions tending to use a greater number. While these groups did not differ significantly ($p < .06$) in the number of functional simulations used, the 4-year institutions tend to use a greater number. There were no significant differences related to whether a school was public or private although for all simulations together the chi square approached statistical significance ($p < .053$) and public institutions tended to use more simulations. It is interesting to the author that only one private institution (his own) used more than four simulations which

Insights into Experiential Pedagogy, Volume 6, 1979

TABLE 1
CHARACTERISTICS OF USERS BY SIMULATIONS

Characteristics	Simulation											Row Total	Row Total Excluding Overlaps
	A	B	C	D	E	F	G	H	I	J	K		
Part A: <u>Data Relative to All Users</u>													
Total No. of Users	328	258	112	105	81	48	19	17	14	13	6	1001	653
No. of Copies Sold	NP ^a	NP	NP	NP	NP	4419	NP	1459	2040 ^b	3439 ^b	NP	11357	-
Type of Users ^c													
4-year Ed. Insti.	271	212	104	99	76	43	11	16	10	12	6	860	536
2-year Ed. Insti.	54	43	8	5	4	5	5	1	3	0	0	128	107
Other	3	3	0	1	1	0	3	0	1	1	0	13	10
Location of Users													
United States	297	228	97	100	75	48	19	16	14	12	6	912	591
Foreign	31	30	15	5	6	0	0	1	0	1	0	89	62
Part B: <u>Data Relative to United States Educational Institutions</u>													
Type of Users													
4-year Insti.	240	182	89	94	70	43	11	15	10	11	6	771	474
2-year Insti.	54	43	8	5	4	5	5	1	3	0	0	128	107
Institutional Support ^d													
Public	176	146	68	67	58	34	10	12	7	9	3	590	358
Private	106	72	25	28	14	12	4	4	5	2	3	275	194
Number of Students ^e													
Mean for All Users	9910	11753	13383	11227	12637	11217	11612	13108	10198	17624	16446	---	---
Mean for 4-year Institutions	10114	11922	13501	11389	12567	11212	12356	13108	9932	17624	16466	---	10457
Mean for 2-year Institutions	8889	10988	11370	3867	14222	11282	9752	0	10994	0	0	---	9616
Mean for Public Institutions	12842	15345	16080	13103	14043	13368	15417	15926	16828	20375	17681	---	13487
Mean for Private Institutions	5248	4491	6369	6641	6912	6278	2100	1836	4059	5245	15251	---	4765

^aNP means the publisher did not provide the requested data.

^bThese numbers represent the copies sold over a 22-month period.

^cPeterson's Annual Guide to Undergraduate Study 1978 [8] and The World Almanac and Book of Facts 1978 [17] were used to identify whether institutions were 2-year or 4-year, United States or foreign, public or private and institutional size.

^dThe total number of private and public institutions do not add to the total number of users because the institutional support could not be identified for a few schools.

^eThe number of institutions are less than indicated above for type of user and institutional support because institutional size was not available for some of the institutions.

probably kept the chi square statistic from being significant. For the institutional size variable, schools were grouped into five size categories--0 to 1999 students, 2000 to 4999, 5000 to 9999, 10,000 to 19,999 and 20,000 or more. The size variable was significant in all instances and larger institutions tended to use more simulations.

DISCUSSION

By analyzing publishers' adoption lists this paper has extended in three ways prior research dealing with who is using business games. First, other than AACSB institutions were included. Second, foreign users were included. Third, and most importantly, characteristics of the users were identified and analyzed.

The results clearly show that the majority of users are educational institutions in the United States. Further, United States educational institutions who use the greatest number of simulations tend to be 4-year rather than 2-year, public rather than private and large rather than small. The results also show that non-educational organizations do not make much use of these commercially available simulations.

A number of limitations of this study should be noted. First, by focusing on publishers' adoption lists institutions and organizations which have developed their own simulations are excluded, yet, it is known that

Insights into Experiential Pedagogy, Volume 6, 1979

such groups have developed their own simulations [1, 12]. Second, the simulations included in the study represent only a small sample (11 of 86 computerized business simulations listed by Horn, [91] of the simulations commercially available. Never-the-less, this study does provide new and useful information concerning who is using business simulations in terms of institutional users.

This question of who is using business simulations in fact, can be approached from two levels--the individual or the institution. As Faria and Nulsen [4] point out, the individual simulation game user constitutes a new area for research. From the preliminary view (since only 11 simulations are included) which this study provides of who is using business simulations at the institutional level, it appears that more research is needed at the institutional level also. It may be that a sample is not sufficient; we need to know what the population of users is. This need for more information is particularly important in light of Goosen's [5] rather pessimistic projections which reinforce similar conclusions by Dale and Klasson [3, 11] concerning the number of users of business simulations, the number of courses in which simulations are used, and the number of students being exposed to business simulations.

APPENDIX

ALPHABETICAL LIST OF SIMULATIONS SURVEYED

- Barton, Richard F. The Imaginit management Lubbock, TX: Active Learning. 1973.
- Boone, Louis E. , and Kurtz, David L. The sales management learning game. Morristown, NT: General Learning Press. 1972.
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- **Day, Ralph L. and Ness, Thomas E. Market in action: A decision Homewood, IL: Richard D. Irwin, Inc. 1973.
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- **Goosen, Kenneth R. Introduction to managerial accounting: A business game. Morristown, NJ: General Learning Press. 1973.
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- Keys, Bernard, and Leftwich, Howard. The executive simulation. Oklahoma City, OK: Management Resource Associates. 1973.
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- *Scott, Charles R. and Strickland, Alonzo, J. III. Tempomatic IV: Management simulation. Boston, MA: Houghton Mifflin Co. 1974.
- Smith, W. Nye, Estey, Elmer E. and Vines, Ellsworth F. Integrated simulation. Cincinnati, OH: South Western Publishing Co. 1974.
- Thorelli, H. B., and Graves, R. L. International operations simulation. Chicago, IL: The Free Press of Glencoe. 1964.
- *These are the simulations for which adoption lists were received which were classified as general management simulations.
- *These are the simulations for which adoption lists were received which were classified as functional simulations.

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Insights into Experiential Pedagogy, Volume 6, 1979

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