CHOOSING A MARKETING SIMULATION: SOME EVALUATIVE CRITERIA

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ABSTRACT

Choosing a simulation for use in a marketing class can be confusing and time-consuming. In this article, commercial marketing simulations were evaluated on criteria important for teachers and students using a content analysis approach. Considerable variance was found between simulations. Teachers have a number of choices in selecting a simulation, depending on their teaching objectives.

INTRODUCTION

Management games have proliferated during the last twenty years and are likely to continue to do so because of the availability and increasing power of personal computers. A recent review cited 271 references on simulation games (Keys and Wolfe 1990). The literature is replete with anecdotal evidence that students like participating in simulations (e.g., Carvalho 1991; Hsu 1989; Keys and Wolfe 1990).

While simulations are enjoyable for most students, they also help teach them about marketing and the use of the computer (Klein and Fleck 1990). Indeed, Hsu (1989) suggests that gaming simulations should be regarded more as experiential learning tools than as knowledge delivery vehicles and as environments in which learners and teachers work together. With the popularity of simulations, the number of different types and programs has also increased. An instructor wishing to utilize a simulation for the first time, or wishing to examine other simulations for evaluation, is faced with a complex array of programs that may or may not meet class needs.

How does an instructor choose a simulation without actually investing substantial time in absorbing the details of a number of offerings? The primary purpose of this paper is to suggest and then test a decision framework using a limited set of the simulations that are currently available. The goal will be to expand and refine the framework after this initial exploration. A brief overview of the relevant literature sets the stage for the study.

LITERATURE REVIEW

Computer simulations are used to understand and evaluate marketing variables and have applications in business, research, and education. The selection criteria for each application will depend on the specific objectives of the simulation and the instructor. A brief discussion of each application follows.

Business Applications

In business forecasting, marketing research is often outdated as soon as it becomes available and may not be adaptable to unexpected events in the marketplace. To counteract this drawback, computer simulations may be used in conjunction with research to make decisions, but to be effective, computer marketing simulations may need to be adapted to specific industries (Wood 1989).

Computer simulations have also been used in marketing applications to simulate new product development, market entry and penetration, distribution decisions, and other important marketing decisions (Winokur and Venkitaraman 1991).

Still another area in which computers are used in business applications is in the training of managers, technicians, and other operators. As a training tool, computer simulations have some unique features, such as compressing time and creating realistic, but low-risk environments for learners (Jubelirer 1992).

Research Applications

The use of computer simulations in basic research applications has also been explored. Gatignon (1987) examined the use of one commercial simulation, *Markstrat*, as a research mechanism for evaluating a number of marketing decisions.

Bainbridge (1991) suggests that the influence of relationships is greater in consumer behavior than perhaps traditionally realized, and that understanding the complex sociological interrelationships influencing consumers can be aided by "computerized sociometry."

Educational Applications

The question of educational validity of simulations and games has been addressed by Petranek, Sorey, and Black (1992), who suggest that during a simulation students process a variety of types of information, including facts, emotions, strategies, outcomes, relationships, and others. Some techniques can improve and enhance the learning process, such as a debriefing discussion which attempts to order the diverse happenings and experiences, and journal writing to record, assimilate, and integrate the learning process.

Evaluative Criteria

A number of criteria for evaluating simulations have been discussed in the literature. While some criteria for selecting simulations may be specific to particular applications, others may be universally applicable. Carvalho (1991), for example, suggests simulations must satisfy four criteria: 1) output variables must be functionally related to input variables, which are under the control of students; 2) changes in output variables must react to normal changes in decision variables beyond the normal random built-in effects; 3) simulations must allow for several equally feasible ways of achieving goals; and 4) the decision variable performance criteria relationships must be hidden from the participating students.

Hsu (1989) suggests that simulations should be sufficiently complex to challenge students, be relevant, display realism, and have transparency. The rules should be simple, clearly stated, and be available on-line. In addition, the game should be timely and easily available to those wishing to play.

An evaluation of American business simulations from an Australian perspective was examined in a study which included a survey of both students and instructors. McKenna (1991) asked participants to evaluate four simulations on the basis of their perceptions of the strengths and weaknesses of several evaluative variables: forecasting, marketing, production scheduling, quality control, inventory, finance, and personnel.

Although the literature review did not reveal a taxonomy for evaluating computerized marketing simulations *per se*, a number of articles did contribute to an understanding of important criteria. In addition to these, the experience of the current authors in using computerized marketing simulations in the classroom contributed to the suggested set of criteria upon which to evaluate computer marketing simulations.

METHODOLOGY

Our approach was to evaluate each simulation based on both the instructor's and the student's manual. We took this approach, rather than actually booting up each program and running a test run, for three reasons. First, a content analysis of the manuals provides the instructor's first look at a program. If the manuals are poorly written, it is doubtful that the simulation will be purchased. Second, the manuals should clearly indicate the purpose for the simulation, the lessons taught, and something about how the simulation is conducted. Third, a content analysis is a more rigorous and systematic way of examining a simulation than is actually running the program. This is so because too many variables are included in running the simulation to have any meaning **across** simulations. Also, each simulation has different input variables, different controls, and different outcomes.

Eleven simulations were evaluated. They were chosen based on a combined criteria of: 1) our familiarity with the simulation; 2) our perception of how frequently the simulation was used; and 3) the availability of the simulation manual from the publisher. While it is recognized that this is not an exhaustive list of marketing simulations, it was judged as a fairly representative sample of commercially available marketing simulations for educators.

Two requirements for valid content analysis procedures are objectivity and systematization (Kassarjian 1977). Kolbe and Burnett (1991) recommend four procedures to aid objectivity: 1) describing the rules and procedures used; 2) training judges; 3) pretesting categories and definitions; 4) the independence of judges. This project adhered to all of these recommendations. We selected criteria for evaluation based on our own experience of important aspects of a simulation, as well as criteria suggested in previous simulation reviews, such as realism (Hsu 1989) and the relationship between input and output variables (Carvalho 1991).

We reviewed the categories and definitions with the two student coders before they were given a sample manual to code. One of the coders was a first year MBA student who had used a marketing simulation

before, and the other coder was a senior in business administration who had previously worked as the student administrator for a marketing simulation. Both coders, therefore, were somewhat familiar with computer simulations and marketing terminology. Two coders are very frequently used for content analysis research.

The manual used for training was a complex manual that was not part of the study sample. After each coder had coded this manual independently, the investigators and coders met for discussion about coding discrepancies. Based on this discussion, the code form and definitions were revised as necessary. A previous version of one of the sample manuals was used to test for initial reliability. Kassarjian (1977) recommends that the ratio of all coding agreements to the total number of coding decisions made by all judges should not be less than 80%. The initial test agreement was 20/21, so we proceeded with the coding of the sample set of student manuals.

RESULTS AND DISCUSSION

Percent agreement is not a recommended reliability measure because it does not adequately account for chance agreement (Krippendorff 1980). However, in a review of content analysis in advertising research, Kang, et. al (1993), found that 65% of the articles examined used percent agreement, and 78% of the *Journal of Advertising* articles used percent agreement. Ranges and individual reliabilities are superior reporting methods relative to reporting overall reliability (Kolbe and Burnett 1991). In this research we looked at percent agreements and individual reliabilities.

There was 100% agreement for the straight-forward items, such as number of pages in the manuals, and less agreement over other, more difficult to interpret items, such as decision inputs. Comparing student manuals, there is considerable agreement for some manuals such as *Fancy Footwork* and *Strategy Analysis* (15/17 or 88%), and less agreement for other manuals such as *Channel Power* (10/17 or 59%). Counting the agreement for all of the decisions, the overall reliability was 76%, which is slightly less than the 80% recommended by Kassarjian (1977), but above the 70% reliability requirement stipulated by Nunnally (1978).

The table shows a summary of the student coder responses for some of the categories.

TABLE

Simulation	Objective	Product	Inputs	Outputs
Marketing Simulation	Market conditions and decisions	Television	4 Ps, sales force, R&D, etc.	Financial, research, etc.
Fancy Footwork	Product life cycle	Footwear	Design, finance, media, etc.	4 reports
The Marketplace	Marketing concepts and principles	Industrial/ consumer	4 Ps, etc.	Financial, research, etc.
Strategy Analysis	Strategic decision making	Any Industry	Many	Various
Brandmaps	Marketing strategy	Vaporware	Four Ps; R & D, etc.	40 market studies
Markstrat II	Marketing functions	Elect-ronics	4 Ps, sales force, etc.	Research reports, etc.
Paintco IV	Marketing decision making	Paint, coatings	4 Ps, sales force, etc.	financial, research reports
Channel Power	Strategic market planning	Computer Industry	4 Ps, R&D, etc.	Quarterly report
Compete	Increase growth and profitability	Elect-ronics Tele-visions	4 Ps; Sales force; R&D; etc.	10 reports
The Marketing Strategy Game	Compete on cost, different-iation	Apparel	Channels; Sales Targets; Products; Volume, etc.	Company, Trade reports; Sales; Market share, etc.
Marketing Game II	Marketing strategies	Computer software	4 Ps, etc.	5-11 reports

Other criteria evaluated, but not reported in the table due to space limitations, include: number of players/teams, number of pages in manual, whether or not worksheets were provided, number of segments permitted, time periods for play, whether or not instructor input was permitted, and whether or not a "what if" analysis was included. Many of the student manuals were unclear as to instructor input. A more serious category of disagreement was in the decision inputs. This may appear more serious than it really is, because in order for there to be an agreement, all factors had to be agreed upon by both coders. Most of the simulations have a large number

of decision inputs, and the coders found it difficult to agree on all of them, but did generally agree on most of the input decisions. Another area for disagreement was decision outputs. Here our evaluators disagreed on six of the eleven manuals. Students should not be confused on either the decision inputs or outputs. This makes for lost time in running the simulation when questions must be answered that could have been answered in the student manual. On the basis of the level of disagreement for some of the important categories, it would appear that the student manuals could be written more precisely.

After choosing several potential adoptions, an instructor may wish to refer to the table for a brief overview of the details in the student manual. This table represents an overview of the manuals we reviewed and can be an important input in a decision to select a simulation for review. An instructor has a number of choices available to tailor the simulation for a particular class. For example, the number of players, the duration of play, the specific objectives of the simulation, the marketing segments targeted, and the decision inputs and outputs are widely variable between the simulations reviewed and represent a number of possibilities. Therefore, knowing the size of a class, their level of sophistication, and the objectives to be accomplished, an instructor should be able to narrow the alternatives.

The final choice of a simulation may rest on yet another variable. The instructor's manual is often an excellent overview of the simulation and frequently provides information which makes administration of the simulation less difficult. A good instructor's manual details the purpose of the simulation, contains suggestions for classroom use, has some test questions, a few transparency masters, is well written, and has adequate documentation.

An analysis of the instructor's manuals was conducted by one of the authors. Not all simulations included instructor's manuals. The instructor's manual for *Channel Power* does not have many teaching aids and is confusing. The *Market Place*, on the other hand, has an excellent instructor's manual. It details the class level most appropriate, includes several syllabi, has test questions, comprehensive transparency masters, and is well-written. Between these two extremes lay a number of choices.

Selecting a simulation that will accomplish specific objectives in the classroom is a difficult task due largely to the time involved in learning enough about the simulation to make a reasoned choice. Not only must the simulation program run well, but the student and instructor's manuals must also be well-written and sufficiently explanatory to help assure the success of the simulation We hope the foregoing analysis will make the task of selecting an appropriate marketing simulation somewhat easier and more systematic.

LIMITATIONS AND FUTURE DIRECTIONS

This review is incomplete, but is presented as a starting point to evaluate the notion that a comprehensive evaluative framework can be developed that will be useful in choosing a marketing simulation for instructional purposes. In extending this work, a more exhaustive set of the currently available simulations should be evaluated. The criteria where low reliability between coders exists should be investigated. Perhaps the reliability can be improved through redefinition of the criteria. After developing the framework with improved reliability, the validity of the decision criteria should be tested. A variety of validity issues should be addressed. For example, does the framework improve the simulation selection process, are there criteria lacking in the framework, and are instructional objectives more frequently achieved when using the selection framework?

REFERENCES

(furnished on request)