

A PEDAGOGICAL EXERCISE UTILIZING COMPUTER SIMULATION

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ABSTRACT

"Tommie Company" is an interactive computerized case developed by the author with the help of a grant from Western Illinois University. The purpose of the computerized case is to provide assistance in the teaching of marketing management and to partially bridge the gap between theory and reality for the student in a business curriculum.

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A new innovation in instructional systems is the use of the interactive case method. The interactive case is the outgrowth of five instructional techniques: gaming, modeling, computer simulation, the Monte Carlo technique, and the case method. Games relate to conditions of business conflict over time. The participants are competitors who make use of mathematical techniques and logical thinking in order to arrive at the best possible strategy for beating their competitor(s). (5) A model is a representation of something else, as, for example, the model aircraft flown in a wind tunnel is a representation of the actual flight of an 'object system', aircraft. (2) A computer simulation is a simulation of a model of some situation in which the elements of the situation are represented by arithmetic and logical processes that can be executed on a computer to predict the dynamic properties of the situation. (3) A Monte-Carlo simulation is a simulation that uses a random number procedure to create values for the probabilistic components of a simulation model. (1) The case method is a method by which students develop their problem solving and decision making faculties in an atmosphere apart from that of the business world. (4)

The interactive case method is the computerizing of a case on a computer terminal. Thus, the interactive case is actually the simulation of a continuous case containing multiple problems and a changing environment. The problems and the

environment are both programmed in advance and scheduled to occur at predetermined times throughout the interactive case. Participants of the interactive case receive the written portion of the case one week in advance of the computer interaction. This will enable participants to conduct research and gather information pertaining to the main problem and the various sub-problems as presented in the case.

The interactive case is a flexible method of instruction. It can be used on campus or can be phoned-in from an off-campus portable terminal. In Illinois, for example, there are ten universities which can receive a phone call and place a faculty member on the computer system in an instant. The ten schools are members of a consortium sharing a CYBER system computer. An interactive case method currently on the system and available to the ten schools is one developed by the author entitled, "Tommie Company, An Interactive Marketing Case."

"Tommie Company" is an interactive case technique in two respects. The first way the case is interactive is in its ability to allow participants to input marketing variables, such as pricing, distribution, promotion and product quality decisions. The computer terminal interacts by instantly displaying to participants the results (outputs) of their decisions and also by providing them with new and continuous market research information not available in the written case. The players receive their new information, such as a change in the product life cycle of one of their products, and can adjust their marketing variables accordingly. The participants, therefore, are interacting with the case by sending and receiving information via the computer terminal.

The second way the players interact with the case is by interacting with other participants. That is to say, the amounts of the variables selected by players #1-9 have an influence on the results of player #10.

After a two to three hour session on the computer

terminal, a classroom discussion is scheduled. Students and the professor then discuss during the next regular class meeting the learning objectives of a particular interactive case.

Figure 1 is the flowchart for the computer portion of the interactive case. The program automatically shuts itself off after 7200 clock-time seconds have elapsed. Players input on the terminal, integer amounts from 1 to 7 in order to modify a marketing variable or to obtain market information. Once an integer is selected, the program calls the corresponding subroutine, performs its function, determines the elapsed time and then readies itself to input a new instructional directive.

Figure 2 illustrates the interaction between player number one and player two when player number one inputs the integer three for the advertising decision. Files A1-A5 contain the dollars currently being spent on advertising for players 1-5, respectively. Player #1 can read all the files and obtain the industry average for advertising amounts by various products and regions. Figure 2 also illustrates that players #1 and #2 can only modify their own files. Figure 2 for purposes of illustration is only partially complete. In the actual simulation there are ten players participating in the interactive case.

The effectiveness of a player's dollars spent on advertising is presented mathematically in Table 1 and graphically in Figure 3.

The basic instructional benefits to be derived from the utilization of the interactive case method are: (1) The interactive case has the ability to compress a long time frame of events into a more usable short time frame. For example, the events occurring in a product's life during a three-year time span can be compressed into a three-hour time period.

(2) The players of the interactive case receive instant feedback from their inputs. This enables players to instantly review their decision making performance and to obtain information which will influence future decision making.

(3) A sense of realism, verisimilitude, is given to players of the interactive case. Students are often exposed to too many theoretical instructional approaches in a curriculum. The interactive case offers students something that has the appearance of being real.

(4) Players interact with other competing teams. This competition motivates players to make optimum decisions since actions taken by one player will positively or negatively affect the results of the other opponents.

(5) There is no actual disturbance of the system being studied. Decisions are made without regard to their possible consequences to the real system. This feature allows players to learn by experimenting with one variable in the system and then to examine the affect that the manipulation has on the other interrelated variables in the system.

(6) The interactive case is a group process. The pooling of resources, the establishment of communication channels, the development of leadership roles and the appreciation of the term, synergistic effort, emerge as benefits to be derived from the interaction of members in a group. Unfortunately, members will also experience some negative features of group interaction. Some dysfunctional elements of group interaction are the self-serving intentions of group members, the "let someone else do it" attitude, and, of course, the pitfalls of using the committee approach to decision making. Nonetheless there is an overall benefit in using the group format. The fact is that committees are a pervasive force in our society which students must learn to cope with before eventually being subjected to their subjugation.

CONCLUSIONS

The interactive case method is a preprogrammed instructional technique designed to be used in the teaching of Business Administrative courses. The use of the interactive case requires no computer programming skills on the part of the instructor. Students are furnished a very comprehensive player's manual with all the necessary instructions needed to participate in the interactive case. The interactive case can also be adopted to the non-business academic disciplines, such as political science, urban economics, and environmental biology.

Figure 1

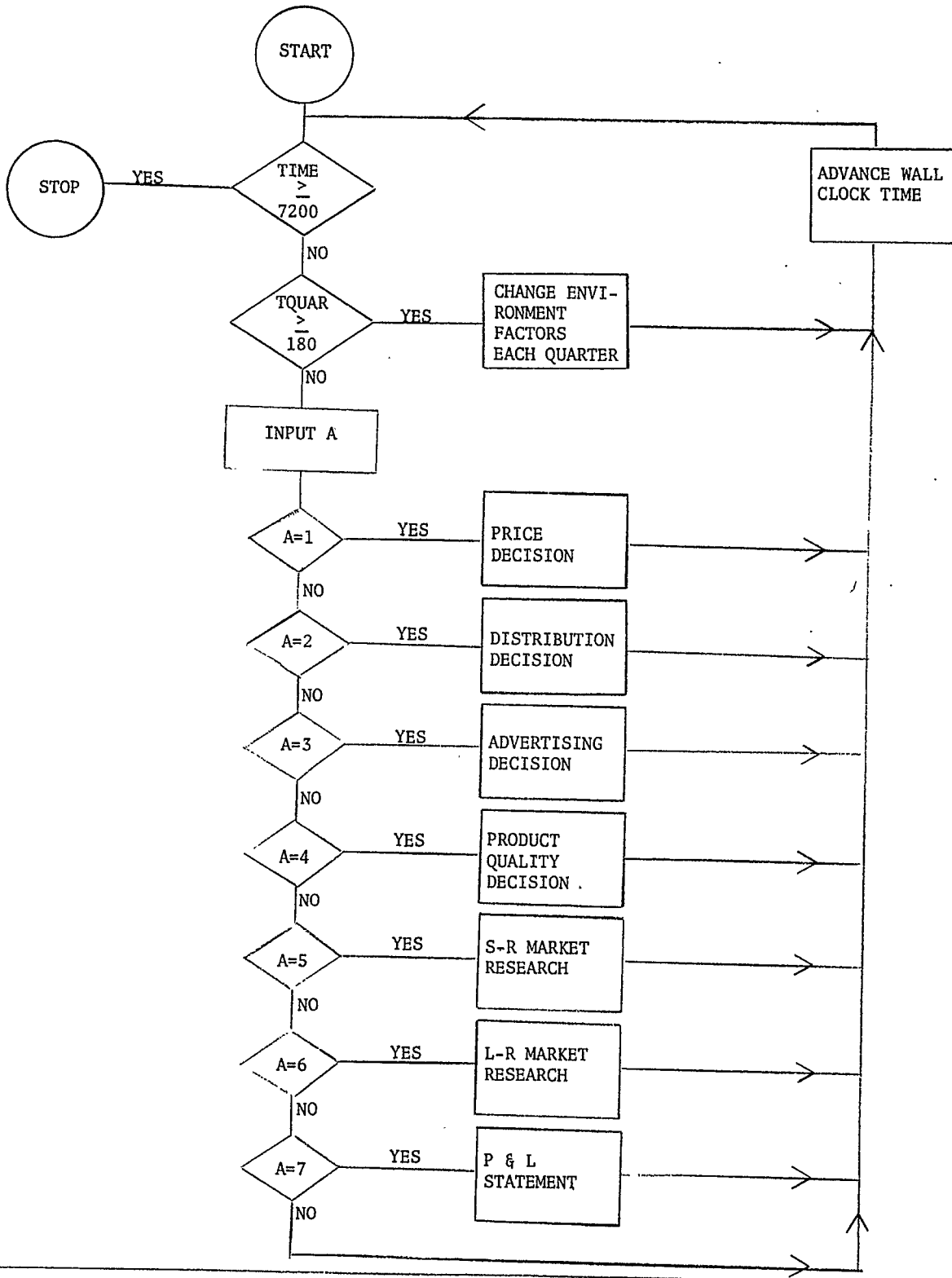


Figure 2

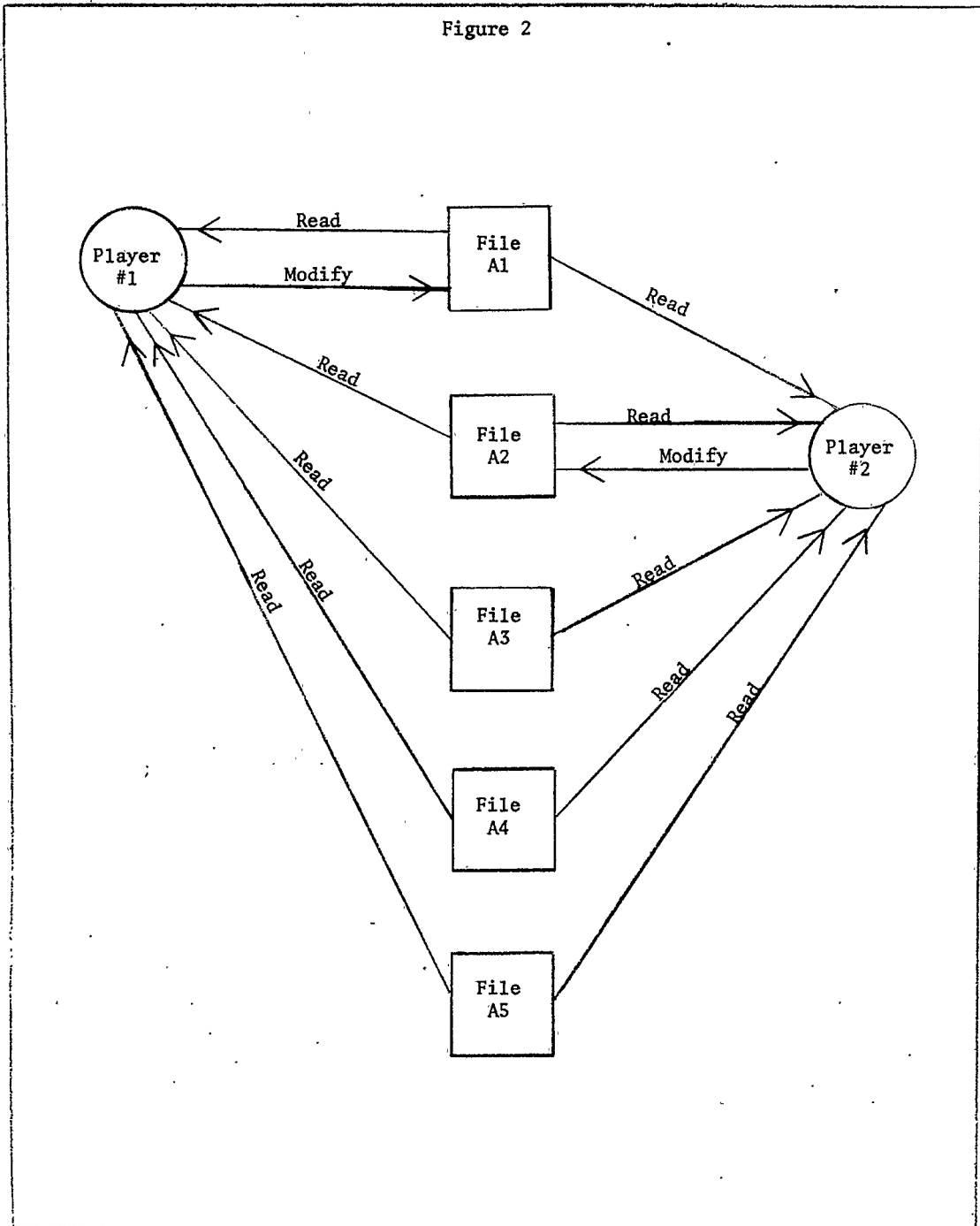


TABLE 1
ADVERTISING EFFECTIVENESS

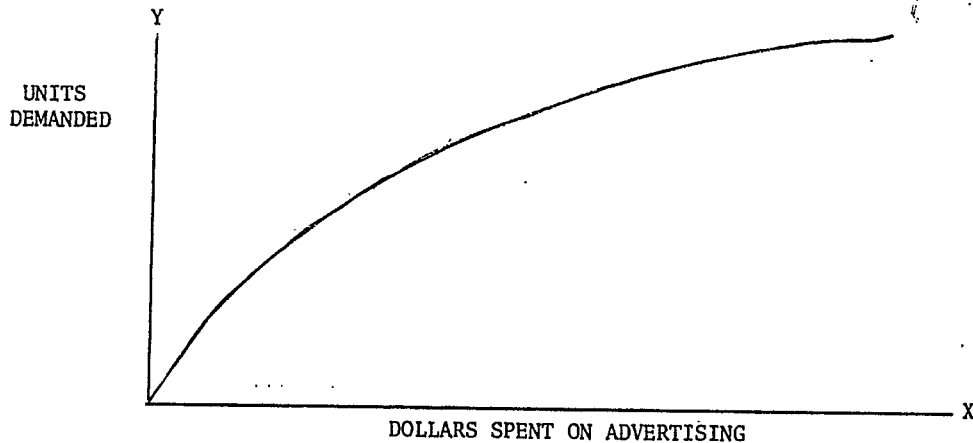
NOTATION

$$AE_{I,J} = \left[(1-F_{I,J}) + \left(\sum_{K=1}^n \frac{ADV_{I,J}}{ADV_{I,J}} \right) * (F_{I,J}) \right] * \left[ABEA_{I,J} - (ABEA_{I,J} * (e^{**(-ADV_{I,J} / KR_{I,J})})) \right]$$

INTERPRETATION

- I = by region
- J = by product
- AESTU = advertising effectiveness for Player #1
- ADV = amount spent on advertising
- F = percent that competitors' ADV influences your AESTU
- ABEA = absolute effect of ADV in units
- e = an irrational number approx. = 2.71828
- KR = ratio of how effective ADV is by region and product

FIGURE 3



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