

Developments in Business Simulation & Experiential Exercises, Volume 13, 1986

DEVELOPING AND TESTING AIRWAYS: A MARKETING SIMULATION

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ABSTRACT

The development of the AIRWAYS simulation is summarized. Results of two classroom tests of the simulation are explained. Suggestions for administering AIRWAYS based upon the classroom testing experience are discussed.

INTRODUCTION

The AIRWAYS marketing simulation (Fisk and Fisk 1986) was written with the intent that it be used by undergraduate marketing students in their first marketing class or in a services marketing class. The airline industry was chosen for this simulation for three major reasons: (1) Few simulations are available in the services field, despite its rapid growth; (2) Vigorous competition and marketing are relatively new to the airline industry; and (3) Airlines are a frequent topic in newspapers and magazines and hence they provide interesting subjects for contemporary discussions.

The AIRWAYS simulation and manual were designed to minimize the drudgery that is sometimes associated with playing computer simulations. The game was purposely developed to be "simple" vs. a "complex" game. Having played simulation games as students, the authors believed too much effort was required to complete paperwork with no additional learning value. A game which kept paperwork and emphasized analyzing interactions and results was preferred. The majority of students playing the AIRWAYS game in the test studies appreciated the streamlining of paperwork and felt they benefited from playing the game. More of the time could be devoted to understanding the interaction of variables important to in a services environment since less time was required for completing forms. By using a microcomputer the majority of problems associated with using a mainframe computer were eliminated.

Originally, the game was developed with an interactive question/answer entry format. In testing the game, it was found to be a lengthy procedure that became a burden after the administrator became more familiar with the game. Also, although many error routines were built in, other errors were being made which needed to be corrected. These errors were related to the entry method. Thus, the game was completely revamped to provide more efficient but easily used full-screen modules. With the new system, the administrator also was given more flexibility in entry, correction, and execution, and printing duties. Thus the final AIRWAYS simulation is menu driven for simple but efficient operation. The market and firm demand functions were based on a system advocated by Pray and Gold (1981) and Gold and Pray (1982, 1983). This system eliminated the need to artificially impose parameters that would prevent "blowups." The formulas implemented in the first version worked in both semesters.

The creation and design philosophy of the AIRWAYS simulation were reported in an earlier paper (Fisk, Gentry and Fisk 1985). The current paper describes the experiences of pilot testing AIRWAYS with two very different marketing classes and explains the revisions that were made in the simulation based upon these classroom tests.

DESCRIPTION OF AIRWAYS

Students form into teams and assume the role of the management of an airline that is beginning regular service on two routes. Each airline must choose two routes from three under consideration. Information from a preliminary research report is provided to assist them in making reasonable first period decisions. This report includes estimates of minimum and maximum demand for each route. Route 2 has a lower estimated demand potential, but can be profitable if the number of competitors is low.

For each route chosen, seven decisions must be submitted during each period (two weeks of airline activity). The first decision is the purchase of optional market research on each route. This decision must be answered on all three routes since airlines are allowed to purchase research on routes not being flown by them. This option is offered primarily because airlines are allowed to change the routes flown during each period.

Other decisions include: (1) round trip fare for each route; (2) the number of round trips per day on each route; (3) the amount allocated for a two-week promotion campaign for each route; (4) the choice of a food quality level for the in-flight meals on each route; (5) the amount allocated for service quality on each flight; and (6) the percentage of passengers to be overbooked on flights when applicable. A sample copy of the decision sheet is included in Appendix 1.

DEVELOPMENT AND REVISIONS

AIRWAYS simulation decisions are made by student teams weekly. Each decision represents a simulated two-week period. A minimum of six periods of play are suggested to allow students to understand the interrelationships of variables and the effects of competitor actions on their decisions. A simulation administrator (instructor, graduate assistant, or secretary) must perform input and output duties. If more than six teams are necessary, separate industries may be established by keeping each industry on a separate computer diskette. This may also be done if the instructor wishes to establish each class as a separate industry.

We recommend that the instructor plan the simulation so that the student teams play a trial period (0) followed by 10 to 14 additional periods. The major advantage of the trial period is that it allows both the student teams and the instructor to learn by doing but without

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penalty *for* errors. Also, the instructor should allow the teams to enter all three routes by the fourth period. If the introduction of the third route is delayed beyond this point, the teams are more likely to develop price wars. The backside of each student decision form (see Appendix 1) contains space for the students to write a short explanation describing the reasoning behind the decisions for each of their routes. The students are also asked to predict the results of their decisions. This forces the students carefully justify their decisions and carefully predict their results. In the pretests of this simulation, these forms proved to be a very successful qualitative measure of team effort and understanding. The instructor should make weekly reviews of these completed forms. The most valuable aspect of the explanation forms is that they enable the instructor to distinguish between successful performance because of good strategy versus ‘dumb luck.’”

SIMULATION TESTING

The first version of AIRWAYS (Fisk 1984) was tested with a graduate services marketing class as a required project during the Fall semester of 1984 at a large Southwestern University. For the second test, AIRWAYS was assigned as a required project in two sections of undergraduate “Introduction to Marketing” in the Spring semester 1985.

Graduate Services Marketing Class

From a class of 12 students, four teams were formed of three students each. Team members were either MBA students or PHD students. Each team submitted its decisions on a Tuesday of each week and results were distributed on Thursday. AIRWAYS was used with Lovelock's (1984) *Services Marketing* textbook. Lovelock's Southwest Airlines case worked well as early discussion vehicle in conjunction with the AIRWAYS simulation.

Playing the AIRWAYS simulation with the graduate services marketing class proved to be quite successful. Each student team was diligent and thorough in its decision making. Decisions were always turned in on time. The explanations of team decisions were always completed. All teams succeeded in being profitable and the final decisions on grading were directly the result of how carefully each team had analyzed the marketplace and predicted the results of its decisions.

Undergraduate Principles of Marketing Course

Five students were assigned to each airline, resulting in twenty-four airlines divided equally into four industries. Each airline was to submit its weekly decisions on Tuesday and the computer printed results were returned on Thursday.

The simulation began in the fourth week of the semester and continued for nine weeks. The first week results were discussed extensively in class to assure student understanding of the simulation and its requirements. In the following weeks, discussion occupied no more than five or ten minutes of class time per week.

The students were informed that their grade on the project carried the same weight as a major exam. Grades were determined by: 1) the competitive pattern of their decisions; a) the rationale for their decisions and their discussion of the expected results; 3) their level of personal participation as

rated by the other members of their airline.

It was obvious from the beginning of the first week, that many students had not carefully read the user's manual. A number of minor and major errors were made on the first decision forms. For some airlines, these errors were repeated throughout the course of the semester. Six airlines completely missed one or more decisions. After experimentation, the instructor decided to substitute the previous weeks decisions, except that only one flight was scheduled on the previously flown routes.

For the first six weeks of the simulation, airlines were restricted to flying any two *of* the three possible routes. This delay in allowing the use of the third route is not recommended and may have contributed to cutthroat price wars. Several airlines, flying saturated routes and losing \$1-2 million per week, showed great reluctance to switch routes due to a \$100,000 one time cost.

A number of student teams never developed an appreciation for the value of market research. While its cost was nearly insignificant and the instructor confirmed its value on several occasions, several airlines were reluctant to order it, especially on routes they were not currently flying.

Since the primary feedback students received consisted of profit and loss statements, many assigned a low value to the qualitative decision form questions. To convey the importance of the qualitative factors, more time should be scheduled for class discussion of the computer output and each decision form should probably be graded.

In two industries, cutthroat price wars had removed almost all opportunity for profit by the end of the sixth period. In order to increase the number of competitive tactical responses, the option of flying a third route should be introduced by the fourth week.

The largest variance between student group performances was their discussion of expected results. This became a major determinant of group grades for the project and hence the relationship between total profits and the groups grade was weak at best. Several teams showing the greatest understanding of the competitive environment, had started AIRWAYS with one or more serious blunders. The resulting position as an underdog, seemed to force the team to spend more time studying the previous results and formulating solid competitive strategies. Several early industry leaders were almost completely unable to respond as the simulation progressed and their competitors got more sophisticated. Since the educational goal of AIRWAYS is to provide a method by which the students can develop marketing strategy decisions, the final grade should not be based on net profit. Those students who understood the market benefited from the simulation experience.

RECOMMENDATIONS FOR PLAYING AIRWAYS

During the testing of AIRWAYS that was done with both graduate and undergraduate students, we found marked differences in competitive sophistication between the two groups of students. The undergraduates were somewhat clumsy competitors. The graduate students (primarily MBAs) were much more comfortable with team competition and more clever in developing their strategies. Variations in student abilities and

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performance must be recognized if the AIRWAYS simulations is to have its desired learning effects.

Learning Issues and Performance Evaluation

What the students learn from AIRWAYS will depend largely on actual situations that develop in the market during play. However, some general learning experiences can be addressed. The importance of giving attention to each variable should be recognized. No one variable alone, even price, can ensure success. Students will be exposed to the pressure generated by competitors. They will have to anticipate market decisions and attempt to remain competitive while also trying to successfully balance revenue with expenses. In addition, they will discover that a good thing can be overdone--such as promotion or number of trips. If decisions are comparable on fare, promotion, and trips, students will recognize the additional power of better service quality or meal quality. If a fare war develops, they should become painfully aware that none of the airlines really wins--only the consumer/ Additionally, the value of market research should be reinforced. Without the extra information gained through this resource, uncertainty would be higher and analysis would be more difficult. This would result in poorer decision making. The opportunity also exists for participants to discover the majority fallacy. Specifically, this means that a route with fewer competitors can be profitable despite a lower demand potential if most airlines select the other routes on which to compete.

Overall, the AIRWAYS simulation affords the opportunity for students to participate in decision making in a services environment. They should be able to do this without the pressure of being held accountable for making a risky decision that fails to yield the results anticipated. In other words, they should experiment and be accountable only for analyzing the results and incorporating *any* knowledge gained into their future decisions. If this is not required, the simulation will be only another exercise and will lose the effectiveness that might otherwise be possible.

The process of assigning grades for performance in a simulation of this nature is always a difficult task. While the purpose of playing a simulation is to discover relationships and principles at work, there must also be some form of reward to the participants for their efforts. It would probably be safe to assume that most people play simulations to "win." In an educational simulation, however, the emphasis should be on learning by experimentation and not simply making the most profit. Often, when winning is recognized as the objective with the greatest payoff, those teams who do not fare well in the first few periods begin to lose enthusiasm. Conversely, the leading team becomes averse to any risk taking and merely strives to remain ahead of the others. Generally, simulation performance can be assessed by final positions on the simulation's stated objective (i.e., profits) and an evaluation of the decision explanations that each team submits with each period of play. Peer ratings should also be used to assist in giving additional credit to those students exerting the most effort within the teams.

Recommendations for Playing AIRWAYS at All Class Levels

We strongly recommend that you establish penalties for teams that fail to turn in a decision sheet. The penalties should be fairly severe. For example, you might drop each student's individual grade for the simulation by 10% for each

time that his or her team fails to turn in decisions.

We recommend that you give your students a quiz about their student manual before starting simulation play. Also, the use of essay questions is suggested to measure student understanding of the dynamics of AIRWAYS after the simulation is completed. A sample quiz and essay questions were placed in the AIRWAYS instructors manual.

In addition to the use of quizzes and essays, you may want to use a variety of other activities to strengthen your students' learning. We strongly recommend that you make the AIRWAYS simulation a part of regular classroom discussion. This will help strengthen the effort that the students put into the simulation and help clarify any problems they might have in playing the simulation.

A second exercise to place more emphasis on the learning process, would be to require each student team to write a brief paper that summarizes what they learned from playing the simulation. Part of the assignment could be a requirement that the students analyze why some of their decisions were incorrect. Within the papers, students should attempt to explain what actually happened. In other words, they should try to explain the relationships or interactions between the variables. The maximum length of a paper could be four to five pages. This would require more effort on the part of both the students and the instructor. It is believed, however, that the benefits derived by this process would be worth the extra effort. This would stress the importance of understanding the dynamics of marketing and reduce the emphasis on just "winning" a simulation. A third exercise, which is often quite productive, is the presentation of brief oral reports for each team. This sort of an exercise can evolve into a closing classroom discussion that serves to debrief the students. A fourth exercise is to create a spreadsheet analysis of how the student teams did over the course of simulation play. The exercise would be to have students individually analyze the industry trends. The trend analysis might include price levels, costs, profits, market share, routes, promotion, meal quality, and service quality. If the students know how to operate spreadsheet programs, they could even be expected to create their own spreadsheet analysis of the industry results.

Recommendations for Playing AIRWAYS with Services Marketing Students

Some users of the AIRWAYS simulation may be using it with a services marketing course. If it is a graduate class, our instructions in the next section will also apply. For undergraduate services marketing classes, we recommend that the instructor use the AIRWAYS simulation as a backdrop for examining many of the concepts that are often taught in a services marketing course (intangibility, perishability, simultaneity of production and consumption, etc.). If you use Lovelock's (1984) Services Marketing textbook, his Southwest Airlines case worked well with the AIRWAYS simulation. The Federal Express cases will also have some insightful similarities. In the first test of the AIRWAYS simulation, by the second author, it worked quite well in conjunction with the Lovelock text. Readings on the airline industry might also be assigned. Many are referenced in the AIRWAYS Student Manual. A recent article by William Crosby (1985), Vice President of Passenger Services for American Airlines, may be of particular interest.

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Recommendations for Playing AIRWAYS with Graduate Students

AIRWAYS is designed to be simple enough to play with students in introductory marketing classes. However, AIRWAYS may be played quite successfully with graduate students, too. When tested on a graduate class, the students found the game to be interesting and challenging. Graduate students should be held to higher levels of understanding and performance than undergraduates. This may include accelerated simulation play. It might also include coupling the simulation play with a case on the airline industry or a more complex term paper assignment/

CONCLUSION

it is strongly suggested, that after an initial pilot test, a simulation must be tested under actual use conditions. It was clear in the AIRWAYS example, that multiple industries introduced administrative problems not encountered in the first pilot test with graduate students. The original version of AIRWAYS became laborious and time consuming as the number of teams and industries increased. With the original AIRWAYS data entry system, mistakes were frequently made. Also, since the original program lacked a print spooler, decision entry and printer output for four industries took a minimum of two hours, including long waiting periods before the next set of industry data could be entered. The majority of this time was needed for printing the team reports. The AIRWAYS simulation was greatly enhanced by redesigning the entry correction, execution, and printing modules into a menu driven system. A print spooler was also added to reduce waiting time between catering team decisions for each industry.

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APPENDIX 1 AIRWAYS DECISION SHEET

AIRLINE # _____ INDUSTRY _____

TEAM MEMBERS _____

ROUTE 1

FLY RESEARCH FARE TRIPS PROMOTION MEALQ SERVQ OVERBKZ

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ROUTE 2

FLY RESEARCH FARE TRIPS PROMOTION MEALQ SERVQ OVERBKZ

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ROUTE 3

FLY RESEARCH FARE TRIPS PROMOTION MEALQ SERVQ OVERBKZ

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DECISION EXPLANATIONS

ALL ROUTES

FLY: 1 = YES, FOR ROUTE YOU ARE FLYING THIS PERIOD
2 = NO, FOR ROUTE YOU WILL NOT FLY THIS PERIOD

RESEARCH: 1 = YES, 2 = NO

ONLY ROUTES BEING FLOWN THIS PERIOD

FARE: EXPRESSED IN ROUND DOLLARS (NO CENTS) AND NO GREATER THAN \$999.

TRIPS: AN INTEGER FROM 1 TO 15.

PROMOTION: EXPRESSED IN ROUND DOLLARS (NO CENTS, NO COMMAS).

MEAL QUALITY: 1 = MINIMAL, 2 = MODERATE, 3 = DELUXE.

SERVICE QUALITY: AN INTEGER FROM 2 TO 7 (SEE MANUAL FOR DESCRIPTIONS).

OVERBOOKING: AN INTEGER FROM 0 TO 99 (NO DECIMALS).

NOTE: UNTIL NOTIFIED OTHERWISE BY THE CAB, THE ONLY DECISION THAT SHOULD BE MADE FOR ALL 3 ROUTES IS THE MARKET RESEARCH DECISION. IF DECISIONS FOR ALL ROUTES ARE COMPLETED BEYOND THE MARKET RESEARCH DECISION, ONE ROUTE WILL BE ARBITRARILY DROPPED BY THE GAME ADMINISTRATOR!

APPENDIX 1 (cont.) AIRWAYS DECISION EXPLANATIONS (Please Print)

Route 1: Explain the reasoning behind your decisions in this route:

Predict the results of these decisions:

Route 2: Explain the reasoning behind your decisions in this route:

Predict the results of these decisions:

Route 3: Explain the reasoning behind your decisions in this route:

Predict the results of these decisions:
