

Behavioral objectives written by the "Mager approach" are valuable tools for training students in basic knowledge and skills. As indicated in Figure 1, Taxonomy of Educational Objectives (Bloom, 1956), behavioral objectives written in this way would tend to be at the lowest level of the cognitive domain. Nearly all college courses are concerned with the higher levels in the cognitive domain rather than at the level of rote recall.

FIGURE 1

TAXONOMY OF EDUCATIONAL OBJECTIVES  
COGNITIVE DOMAIN

- 1.00 Knowledge  
(defines, describes, lists, names, states)
- 2.00 Comprehension  
(converts, explains, infers, paraphrases, understands)
- 3.00 Application  
(applies, solves, predicts, relates, uses)
- 4.00 Analysis  
(analyzes, diagrams, differentiates, outlines, separates)
- 5.00 Synthesis  
(categorizes, compiles, integrates, plans, revises)
- 6.00 Evaluation  
(appraises, concludes, discriminates, justifies, interprets)

Many have criticized the use of behavioral objectives. Much of the criticism concerns the laborious and time-consuming task of writing countless numbers of behavioral objectives in an attempt to approach the higher levels in the cognitive domain.

To move to the higher levels within the cognitive domain, a method of writing objectives must be used which places emphasis at these levels. Norman Gronlund developed an alternative to the "Mager approach." (Gronlund, 1970). This method begins with an over-all goal statement for the course or for a unit within a course. The goal statement is oriented toward the future ability of the student in the present course, in a future course, or in the real world. General instructional objectives are then derived from the goal statement. These instructional objectives are at the higher levels of ability and are clarified by listing samples of specific behaviors for each objective. The samples of specific behavior represent accepted evidences of the attainment of the general instructional objective. An example of a goal statement and two general instructional objectives with samples of specific behaviors would be as follows:

Goal Statement: Each teacher will develop an ag machinery service program to serve the needs of his students and community.

General Instructional Objectives:

1. Understands the meaning of ag machinery terminology.
  - 1.1 Defines ag machinery terminology
  - 1.2 Identifies the meaning of ag machinery terms when used in context.
  - 1.3 Identifies ag machinery terms that are similar in meaning.
2. Applies economic and census data
  - 2.1 Categorizes the types of farming in the community
  - 2.2 Describes the growth trends of agriculture in the community
  - 2.3 Identifies present needs for new employees in present ag machinery dealerships in the community

The general instructional objectives are goals to work toward rather than specific types of behavior to be learned one by one. Thus, instructional objectives provide direction for instruction without restricting the teacher or reducing the instruction to the training level. This method requires that teaching be directed toward the general instructional objectives rather than toward each specific behavior representing the general instructional objective. Pre-occupation with teaching an extended list of specific behaviors often times results in the loss of the overall goal of the unit or course. Students must be able to see their destination in a

course as well as how they are going to get there. For proper learning to take place, the students and the teacher must keep the goal in mind and not just a conglomeration of specific objectives.

As stated previously, one of the functions of objectives is to serve as a guide for constructing tests and other instruments for evaluating student achievement. A test of the achievement of students is a test of the extent to which the students have attained the general instructional objectives.

Learning outcomes determined by the general instructional objectives will vary in level. Certain of the learning outcomes may be low-level ones while others may be at such a high level that the students may not be capable of reaching these in the course. The low-level outcomes are minimum essentials, achievable by students, and required for further learning in the area. The high level outcomes are at the developmental level. Included at this level are such abilities as to understand, to apply, to interpret, and to think critically, all requiring extended periods of development. Since there are usually two levels of outcomes it is logical that testing should be at two levels.

Outcomes at the minimum-essential level are usually standards of performance. As such, they are specific, independent, and easily defined. An indication that the student can recall the facts related to the objective constitutes the test for minimum essential outcomes.

It is nearly impossible to test for all the specific behaviors that make up learning outcomes at the developmental level. This is the reason for stating only examples of specific behaviors for each general instructional objective. Students are expected to use what was learned in class to solve new but related problems on the exams and not just recall the solutions to problems discussed in class: thus, exhibiting mastery of learning outcomes such as understanding, application, and interpretation.

The ultimate aim of every teacher should be for all students to master the learning outcomes expressed by the instructional objectives and achieve the goals set forth for the course. The degree of mastery and achievement by students becomes one very appropriate measure of "good teaching."

Summary

Objectives are essential for organizing learning experiences. General instructional objectives should be directed toward learning outcomes, thus placing the emphasis on the student and the goal he endeavors to attain. When stated as learning outcomes, general instructional objectives provide a guide for the instructor, a guide for selecting teaching methods and materials, a guide for constructing tests, and a guide for the learning activities of students. The proper use of objectives enables the teacher to teach and the students to learn and develop abilities necessary to cope with the rapid transitions taking place in all segments of the real world.

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# SIMULATION GAMES IN TEACHING AGRICULTURAL MARKETING: A CHALLENGE AND AN APPRAISAL<sup>1</sup>

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Computer simulation games have become an integral part of collegiate teaching in business and economics courses for both graduate and undergraduate students. In

addition, many corporations have made extensive use of this technique in their executive training and development programs. Use of business games in colleges of

agriculture has been limited primarily to teaching management principles at both the resident and the adult education levels. The potential for these games, however, as

a tool for understanding the competitive nature of the currently emerging agricultural marketing system has been largely overlooked. The possibilities here rest largely on the opportunity afforded the student in gaining insights into the structural characteristics of the system and a better understanding of the competitive behavior of firms operating in today's complex and changing agricultural market system.

Thus, the objectives of this paper are: (1) to emphasize the opportunity for simulation games in agri-business and marketing instruction, (2) to assess their potential for gaining an understanding of the emerging character of agricultural firms and markets, and (3) to evaluate the authors' experience in using this technique in undergraduate agricultural marketing courses at the University of Kentucky.

### An Opportunity

The food marketing system has undergone significant changes in recent years in response to forces such as economies of scale at the firm level, enlarged market areas, technological developments, and changing consumer tastes and preferences. With these changes a greater degree of interdependence has developed between all segments of the agribusiness complex from production to the final distribution of agricultural products. These changes have, without question, exerted a definite influence on the approach used in studying agricultural marketing. As a result, the market structure analysis approach espoused by Bain and others in the early 60's has had considerable influence on both agricultural marketing research and instruction<sup>3</sup>. In contrast to the traditional approaches to analyzing marketing problems (commodity, institutional, functional), market structure analysis is an overall, integrative approach. Attention is focused on the interrelationships existing between the structure of a given market, the competitive behavior (conduct) of firms operating in that market and the economic performance of the industry. Thus, this structure-conduct-performance orientation tends to emphasize and take into account the whole range of interdependencies existing among the various market activities. Market problems are thus approached from a broader, more realistic context.

This shift in approach, in turn, created an opportunity and prompted a search for new and more applicable teaching tools and techniques. One such technique is the computer simulation game. The remainder of this paper is devoted to an evaluation of computer simulation games as a teaching technique in agricultural marketing courses. This evaluation is based on the authors' experience in using simulation games at the University of Kentucky.

### Games and Procedures

Computer simulation games were used in an intermediate level general agricultural marketing course (AEC 501: Economics of

Agricultural Marketing) during the past four years. The course, offered in the Department of Agricultural Economics, is market structure oriented. Classes were composed of upper-level undergraduates and a few Master's degree graduate students. Enrollment ranged from 12 to 21 students.

There are several computer simulation games available. Most of them, however, are management oriented. This should pose no great difficulty since this type of game is easily adapted to teaching marketing principles. This evaluation is based on the use of the Purdue Dairy Management Game and the Purdue Supermarket Management Game<sup>4</sup>. Both games include a range of decisions involved in the retailing and wholesaling activities of a firm operating in a simulated market situation.

Introduction of the game, as well as timing in execution, is crucial. For most students this represents their first exposure to computer gaming and thus considerable care should be taken to properly introduce the game, point out the purpose of its use in the course, and, in most cases, allow a "warm-up" decision to familiarize them with the decision process and game results. Each semester, the game was introduced about midway through the semester only after a thorough examination of the theory of imperfect competition, a discussion of the market structure analysis approach to agricultural market problems, and an application of this approach to the specific industry of marketing system to which the game applied. Hopefully, this gave the student some overall insight into the industry before participating in the game and thus enhanced his decision-making ability.

Game procedures provide for dividing the class into two to five teams (decision-making units) with from one or two up to 10 participants (players) per team. The number of participants on a team normally varies with the complexity of the game and the roles to be played. The idea is to constitute teams of sufficient size to bring about interaction among players in a thorough discussion of decisions but not so large that some may lose interest through lack of involvement.

The first task assigned to each team was to determine the organizational structure of its firm and define the firm's goals and objectives. Once these were established, team management decisions should have reflected an effort to attain these overall goals.

Each set of management decisions consisted of a number of individual decisions relative to the internal operation of the firm itself as well as those which directly influenced competitive conditions in the market. Decisions affecting internal firm operations included primarily personnel (number, wage, commission rate, training) and financial matters (new loans, loan repayment).

Decisions which had a direct bearing on the competitive position of the firm in the

market received a high proportion of attention given the market orientation of the course. These involved prices and margins on products offered, price specials, and advertising and promotional expenses. Naturally, the game is constructed to simulate a "real-world" market situation so that game results are influenced by the actions or decisions of all firms in that particular market. In fact, a degree of realism is injected by providing for the entry of outside firms if competitive conditions change drastically.

Along with each set of decisions submitted, each team was required to give reasons for the decisions made and explain why they felt it necessary to alter their position from the previous time period. While the latter is not part of the game itself, it did provide a basis for a more thorough decision-making process. Each team member then received a detailed computer print-out statement of results which reflected the consequences of the previous set of decisions. This statement included balance sheet and operating information for their own firm. Only very limited information with respect to competitors' actions are included; primarily the same type that would be available in a real market situation (i.e. price, market shares, etc.)

### Appraisal of Games

Using simulation games in agricultural marketing courses serves a multiple purpose. By directly involving each student in a simulated market setting, not only should the concept of a market take on new meaning, but also the game should assist the student in gaining a clearer understanding of the operation of a highly complex marketing system. This, in turn, helps provide an opportunity for the instructor to make direct application of certain principles of marketing economics. Given these teaching and learning possibilities, the overall appraisal of the merit and applicability of these games is one of general satisfaction. There are, however, some specific comments regarding simulation games which deserve attention.

The games seemed especially well-suited in helping students understand the complexity of agricultural markets and in comprehending the high degree of interdependence between firms, especially in markets where firms were few in number. These concepts seemingly become more obvious to students following the opportunity to gain experience in a simulated market setting. Too often, teams discovered that "well conceived" plans sometimes went awry because results were influenced not only by their own actions but also by the competitive practices of other firms in the market. For example, while some students felt they understood the concepts of demand elasticity and the kinked demand curve before beginning the game, they later recognized they had not understood the implications of these concepts for market competition. The game experience helped

the students realize that an oligopoly setting discourages price competition — but encourages non-price competitive practices such as sales promotion through advertising, trading stamps, etc.

Another feature of simulation games is their role in broadening the student's myopic view of marketing. Many students may view the marketing system as extending only to the local elevator or processing plant. Some computer games can increase the student's awareness of the continuous chain of interrelated activities throughout the entire agricultural production and marketing systems.

Computer simulation games also provide the opportunity for a sensitivity analysis by which the student can evaluate the effect of a certain competitive practice when all other forms of competition or market variables are held constant. An example is allowing one firm the opportunity to vary its advertising level while all other variables are held constant by all firms. Similarly, the effect on the market process of varying the number of participating firms can also be seen, which in turn helps demonstrate important economic principles.

Finally, a few comments regarding administration of computer games. While such games seem to be useful teaching and learning devices for marketing courses, certain methods or procedures in administering them can increase their effectiveness. Game administrators should be aware of the amount of course time which should be devoted to a game. Devoting regularly scheduled class meetings for both critiquing game results and completing team

decisions is highly desirable. This is crucial to maintaining and stimulating interest and in promoting a sense of competition among teams. In addition, this provides an opportunity for the administrator to point out the application of a principle or specific aspect of the course. Naturally, the amount of class time required is correlated with the frequency with which game decisions are submitted.

Submitting one set of decisions per week seems optimal. Submitting decisions on a less frequent basis tends to create difficulty for the students in recalling past game results and hence may contribute to a loss of interest. More frequent decisions may not allow enough time for a sufficiently detailed analysis of game results by each participant prior to submission of each set of decisions. In this connection, the administrator should strive to minimize time lags wherever possible — especially the time between submitting decisions and receiving results. Thus, access to on-campus computing facilities is essential.

#### Conclusion

Babb and Eisgruber have outlined some ideas or concepts that can be taught through business management games<sup>5</sup>. These include concepts and practices of management, suboptimization, and long run and short run planning. This paper has attempted to point out one additional concept which can be taught with computer simulation games, that is, a greater understanding of the complexities of today's agricultural market system and the existing competitive relationships. In a market system as complex as found in the U.S.,

this becomes crucial. Perhaps too often we graduate our students in an agri-business curriculum without a proper appreciation for the competitive jungle within which they will be expected to perform. This is particularly crucial for some students who hold a rather myopic view of the market system. Computer simulation games can add breadth as well as some reality to our marketing courses. While most of these games tend to have a management orientation, it is relatively easy to adapt them to a marketing situation. Some procedural or logistical requirements must be reckoned with in implementing the games, but the games do offer considerable potential as a teaching and learning device in a study of agricultural marketing problems.

#### NOTES

- 1 The investigation reported in this paper (No. 72-1-93) is in connection with a project of the Kentucky Agricultural Experiment Station and is published with approval of the Director.
- 2 Assistant and Associate Professors of Agricultural Economics, respectively, University of Kentucky.
- 3 For example, see Joe S. Bain, INDUSTRIAL ORGANIZATION (New York; John Wiley & Sons) 1968 (second edition) and Willard F. Mueller and Robert Clodius, "Market Structure as an Orientation for Agricultural Economics Research," JOURNAL OF FARM ECONOMICS, August 1961, pp. 515-533.
- 4 For more detail about these games and their use see:  
E. M. Babb and L. M. Eisgruber, "Manual-Purdue Dairy Management Game", "Manual-Purdue Supermarket Management Game", and MANAGEMENT GAMES FOR TEACHING AND RESEARCH, Chicago: Educational Methods, Inc., 1966.
- 5 Babb and Eisgruber, MANAGEMENT GAMES, op. cit. p. 26.

## AN UNDERGRADUATE HOG MARKETING GAME\*

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### INTRODUCTION

This paper reports some experience in the use of a simple hog marketing game as a teaching aid, and to study the feasibility of simulating alternative hog informational/bargaining arrangements in a behavioral laboratory.

The hog marketing game was designed for teaching purposes to dramatize, and to make students aware of, the alternative marketing strategies available to hog farmers.

A secondary purpose was the use of the game as a pilot to pre-test the potential of this technique in market structure research, and to examine the degree of abstraction which is compatible with realism and involvement.

The first section of this paper introduces the main components of the game. This is followed by a discussion of the game play by the students. An optimal solution to the game play is then discussed.

### GAME COMPONENTS

The final version of the hog marketing game allows for:

- 1) The purchase of two weights (40 and 60 lbs.) and two grades (A and B) of feeder pigs.
- 2) The sale of finished hogs at two weights (210# and 230#) and four grades (#1, 2, 3, and 4).
- 3) Sale to two packers (I and II).
- 4) Sale through several marketing channels including terminal, country, grade and yield markets, and eastern shippers, and
- 5) Alternative farmer bargaining arrangements.

Each of the two packers maintained, in addition to a head hog buyer, a representative at the terminal, a country market (packer-operated), and a grade and yield buying agency at the packing plant.

At each play of the game, the farmers decided what feeder pigs to buy and how to sell the finished hogs.

### GAME PLAY

In the spring and fall of 1969, an advanced livestock marketing class was used in a pilot simulation of finished hog marketing to packers.

### Design

The participants in this exercise were members of the Ag. Econ. 521 class, a dual level course in livestock marketing. They were divided into two groups, "farmers" and "packers." The simulation centered on four alternative hog marketing-hog buying alternatives: terminal, country, grade and yield, and contractual.

In the spring class, Version I of the game was introduced gradually over a period of four class sessions, beginning simply and increasing in complexity. In the fall class, the total complexity of Version II was presented to the student in the first session.

In both the spring and the fall, however, the first day of exposure consisted of a "walk through" which allowed the student