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AN EXPERT SYSTEMS APPROACH FOR TEACHING MARKETING CASE ANALYSIS

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ABSTRACT

This paper presents a procedure for using an expert-system development program to enhance marketing students' case analysis skills. The procedure presents students with case studies and requires them to develop a set of decision rules to select an appropriate marketing strategy for each case. Students' decision rules are used as feedback by instructors, enabling them to adjust teaching style to students' needs.

INTRODUCTION

The past decade has witnessed explosive growth in the development of expert systems technology. This term "expert systems" refers to a branch of artificial intelligence in which sets of heuristic problem-solving procedures are developed to simulate human decision-making. They are referred to as "expert" systems because they have been traditionally developed by interviewing recognized experts in a given field to determine how they make decisions. Their decision rules are then codified to form the expert system, as illustrated in the famous MYCIN medical-diagnostic system experiments during the 1970s [2]

Expert systems technology does not require the use of experts in the conventional sense. Rather, it focuses on programming computers to process information and make actual decisions, much as an actual human decision-maker might do. A system might be developed by modeling expert decision-making, by drawing on the knowledge of many different experts, or by charting the decisions called for by a body of established theory, independent of expert judgment [8]. In marketing and economics, modeling efforts have often sought to explain how typical consumers [13] or industrial decision-makers [5], maybe not experts, make decision.

Developmentally-Oriented Systems

In practice, the approach taken to expert systems varies with the primary objectives for which the system is being constituted. First, systems vary according to their developmental orientation, whether they are research or applications oriented. The former are constructed primarily for the insights they provide into the ways people make decisions or choices. This is characteristic of the MYCIN experiments on spinal meningitis. The MYCIN experimenters were mainly interested in discovering techniques by which a computer might model the diagnostic process.

By contrast, other systems are applications-oriented. They are conceived to solve problems, rather than to show how problems are solved, for example the development of ONCOCIN for clinical cancer diagnosis [14].

Functionally-Oriented Systems

Objectives also vary according the functional orientation of the system. whether it is being developed to help people to solve actual problems or whether it is to be used to train people in problem-solving skills. MYCIN was organized to address actual problem-solving activities, while GUIDON was a MYCIN-derived system developed for training purposes [3].

Overview of Expert Systems Types

Figure 1 captures the various distinctions just noted, suggesting four general classes of expert-systems objectives. Type-l objectives call for the creation of expert systems in an effort to understand how actual experts might make decisions. MYCIN is the prototypic example, but much of the work done in marketing decision-making would also fall into this category. The classic works of Nicosia [11], Engel, Kollat, and Blackwell [5], and Howard and Sheth [9], and more recently Bettman [1], illustrate efforts made to model and to understand consumer decision processes for marketing strategy purposes.

FIGURE 1
A TYPOLOGY OF OBJECTIVES FOR EXPERT SYSTEMS

		Developmental Orientation: Research	Developmental Orientation: Application
Functional Orientation	Problem Solving	Develop systems as a means of understanding how experts make decisions (1)	Develop systems to help people make actual decisions (2)
	Training	Develop systems as a means of teaching people about the decision process (4)	Develop systems to teach decision-making skills (3)

Many of these models are expressed in terms of actual computer models of consumer processes [6; 7; 12;]. In the management decision-making area, the classic pricing behavior studies carried out at Carnegie Mellon in the early 1960s exemplify type-l objectives [4].

Type-2 objectives call for the construction of expert systems that are designed to facilitate actual managerial decision-making. ONCOGIN is the prototypic example, but the marketing literature contains other examples of decision models that might fall into this classification [10].

Type-3 objectives imply the development of systems that teach students how experts make decisions. These might include everything from expert-based tutorial programs to actual expert systems, the use of which provide students with guided experience in the decision-making process. Systems of this nature are not described in the marketing literature, but such applications are not difficult to imagine. Harmon and King [8] summarize the training applications of expert systems in general.

Type-4 objectives differ from type-3 in that the students are involved in developing (as opposed to simply using) expert systems as a learning process. One approach is very similar to what happens in many types of case classes: students are asked to analyze cases and to make actual decisions, taking the role of the expert decision-maker. The instructor via questioning and commenting then helps them to analyze the nature and quality of their decision processes.

The remainder of this paper addresses type-4 objectives. It uses an expert system development software package to help students model, and thus gain insight regarding, their own decision-making.

USING EXPERT SYSTEMS IN CASE ANALYSIS

Implicit in the case study approach is the existence of heuristic decision processes that will enable someone to solve actual cases in the so-called real world. These processes draw upon decision rules that address usual types of marketing problems. For instance, a case might call for the selection of a "volume" strategy: How is the company going to increase sales volume? The correct answer might be to increase the number of product users in the category, to increase the usage rate among current users, or to increase market share without changing the number of people in the market or their usage rate.

While solving this kind of case, students begin to conceptualize these heuristic processes. They start to classify case types and rules for considering them. For instance, if products are in the early stages of the product life cycle, the decision might be to initiate a growth strategy, bringing new customers into the market. Products that are late in the life cycle might call for increased usage or increased market share.

Classroom Use

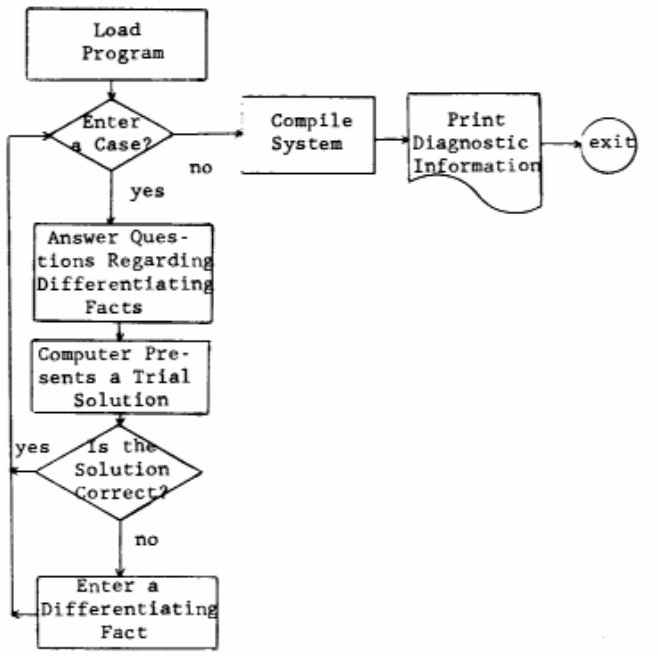
The method to be discussed here incorporates an expert-system development software package to facilitate this process. Three steps should be carried out:

1. Students are presented with a series of carefully structured cases to analyze. Each case contains information that the instructors deem important to the selection of different marketing strategies, or in some situations, similar strategies with different rationales.

2. The program asks students to select a strategy appropriate for the first case. It then requires them to choose a key fact that differentiates the first case from the second, and so on. Students add cases one at a time, each time selecting a strategy and the key differentiating facts that set the case apart from all others.

3. Based on the differentiating facts, the program compiles an expert system- -a program that will ask key questions about a case and suggest solutions based on answers the user provides. The program provides an analysis of the decision rules implicit in each student's analysis. The instructor reviews these and presents feedback to the student. This can be used to structure future lectures and/or cases, or it can be used as a basis for class discussion.

FIGURE 2
A DIAGRAM OF HOW THE EXPERT SYSTEM DEVELOPMENT PACKAGE OPERATES



By making students identify key facts and strategies, the method forces them to be explicit about the rules they are designing to solve the cases. The outcomes can be dramatic. First, students can recreate the model intended by the instructor. When this happens, students react with a sense of "Ahah!" and the whole process takes on added meaning.

Second, students might discover a new set of rules that the instructor had not imagined. This can lead to a new level of understanding by both the instructor and the students as they discuss the nature and implications of the extended set of rules. For instance, the cases might be structured to illustrate the use of growth strategies for market leaders early in the life cycle and market share strategies for followers. Students might perceive the follower as having potential for overtaking the leadership position, as IBM did in the personal computer market when it entered behind Apple and Tandy. This would call for an elaboration of the original model to account for the distinction between "vulnerable" and "strong" market leadership.

Third, students might come up with a nonsense system- -one that does not hold together in any generalized sense. When students do not recognize this already, it is usually quite easy to identify flaws in the system. This, in turn, can lead to a discussion of the principles underlying the rules applying to the cases.

Administrative Considerations

The expert systems approach recommended here can be used in conjunction with lecture materials or in a class consisting entirely of case analysis. In the former situation, cases must be carefully chosen and be somewhat narrow in scope; otherwise, students will develop classification schemes including topics to which they have not yet been exposed in lectures. With well-constructed cases, however, the approach

accommodates an excellent transition from lecture to case analysis.

In a class focusing entirely on case analysis, students will require more guidance through the initial cases because they will not have the advantage of hearing about the instructor's problem-solving framework. The same is true of conventional case analysis, however. The expert systems approach merely forces students to articulate the rules they are using to make decisions.

In general, the instructor should demonstrate how the expert systems program works by presenting his/her

analysis of a few simple cases which are similar in some ways but different in others. By observing such a demonstration, students will see how the expert systems approach "saves" prior decision rules and forces them to add consistent amendments to these rules.

Expert systems are probably more effective when students solve cases in groups. In order to generate consensus regarding a set of decision rules, students must work through the cases and resolve their differences about how to categorize them. The resolution process will enable students to hear alternative viewpoints, perhaps ones they had not considered, and to understand the cases in greater depth. Hence, three or four students working in concert should be able to conceive a more complex and useful set of rules than a single student.

THE EXPERT SYSTEMS APPROACH VERSUS CONVENTIONAL CASE ANALYSIS

In many ways the use of expert systems to analyze cases is like conventional case analysis. Expert systems do, however, present the instructor with certain advantages. First, students receive instant feedback about their decisions because the expert system will signal them regarding any inconsistencies in their decision-making criteria. Through helpful hints or direct intervention the instructor can help students rethink their analyses so that their decision frameworks become workable. The typical time lag of several days for the instructor to read and grade written case assignments is thus eliminated. The. shortened turnaround for feedback may facilitate either more assignments or more diverse assignments, thereby enriching students' experiences in the course.

By choosing a variety of cases, the instructor can expose students to several seemingly unrelated cases which turn out to be similar in less than obvious ways. Thus, students will develop decision frameworks which have integrated many cases. With guidance, they should have a greater understanding of the interrelatedness of business decisions than occurs via classroom discussions and traditional written or oral case presentations.

CONCLUSION

The teaching approach presented in this paper utilizes an expert system development software package to help students become aware of the decision rules they use to solve cases. It provides a useful tool for helping students manage the transition between lecture material and case analysis. When used in conjunction with conventional cases, it adds intellectual structure to the case analysis process- - one that many students miss in their anxiety to produce a "solution." It provides a useful framework for objectively evaluating cases.

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