8-1977

Computer-Assisted Instruction for Teaching Decision-Making in Food Systems Administration

Deborah Dean Canter
University of Tennessee, Knoxville

To the Graduate Council:

I am submitting herewith a dissertation written by Deborah Dean Canter entitled "Computer-Assisted lnstruction for Teaching Decision-Making in Food Systems Administration." I have examined the final electronic copy of this dissertation for form and content and recommend that it be accepted in partial fulfillment of the requirements for the degree of Doctor of Philosophy, with a major in Human Ecology.

Betty L. Beach, Major Professor

We have read this dissertation and recommend its acceptance:

Mary J. Hitchcock, Grayce E. Goertz, Eugene W. Schoch

Accepted for the Council:

Carolyn R. Hodges

Vice Provost and Dean of the Graduate School

(Original signatures are on file with official student records.)

To the Graduate Council:

I am submitting herewith a dissertation written by Deborah Dean Canter entitled "Computer-Assisted Instruction for Teaching Decision-Making in Food Systems Administration." I recommend that it be accepted in partial fulfillment of the requirements for the degree of Doctor of Philosophy, with a major in Home Economics.

Betty L. Beach, Major Professor

We have read this dissertation
and recommend its acceptance:

Mary J. Hitchcock

Eugene E. Beerly

Eugene W. Schoch

Accepted for the Council:

Vice Chancellor
Graduate Studies and Research

COMPUTER-ASSISTED INSTRUCTION FOR TEACHING DECISION-MAKING IN FOOD SYSTEMS ADMINISTRATION

A Dissertation

Presented for the

Doctor of Philosophy

Degree

The University of Tennessee, Knoxville

Deborah Dean Canter

August 1977

ACKNOWLEDGMENTS

The author expresses sincere appreciation and gratitude to Dr. Betty L. Beach, Associate Professor of Food Systems Administration, for her guidance, encouragement, and assistance in conducting this research project and in the editing of the manuscript. Appreciation is also extended to Dr. Grayce E. Goertz, Associate Dean, College of Home Economics, Dr. Mary Jo Hitchcock, Professor of Food Systems Administration, and Dr. Eugene W. Schoch, Professor of Educational Psychology and Guidance, for their suggestions and direction during the planning and writing of this research project.

Appreciation is expressed to those individuals who served as members of the panels of experts for their help and support throughout this research project. To my fellow graduate students, past and present, a special thanks is extended for their moral support and encouragement.

Special appreciation is extended to Dr. Alan M. Davis, Assistant Professor of Computer Science, and Mr. Bruce H. Delaney, The University of Tennessee Computing Center, for their time and expertise in planning and implementing the technical aspects of this research. Appreciation is extended to the didactic faculty, clinical instructors, and students of the Coordinated Undergraduate Program in Dietetics, whose cooperation made this research possible.

Appreciation is also given to the Department of Health, Education and Welfare, Health Resources Administration, Allied Health Professions Special Improvement Grant for partial funding of this research project.

A very special word of thanks is extended to the author's parents, Mr. and Mrs. John Canter, for their patience, encouragement, and support without which the attainment of this degree would not have been possible.

Special appreciation is expressed to my roommate, Marta Axelson, for her tolerance, sense of humor, support, and encouragement in living through production of this paper.

ABSTRACT

Models for the inclusion, development, and implementation of computer-assisted instruction (CAI) in a dietetic education program were developed, tested, and evaluated. The models were applied to the Coordinated Undergraduate Program in Dietetics, The University of Tennessee, Knoxville.

An assessment of competencies to be met by an entry-level generalist dietitian in food systems administration revealed that the competency concerning principles and practices of management of personnel was not being met adequately by dietetic students. As a result, four CAI case study simulations were developed to upgrade and expand decision-making experiences in personnel management. Case studies were programmed in Coursewriter III language and pretested for content validity and proper programming function before presentation to the students.

Participating faculty and students were introduced to CAI and oriented to the use of computer terminals. Case study simulations were presented via CAI and programmed learning booklets (for off-campus students) to 59 students enrolled in FSA 4140, Food Systems Personnel Development, taught Winter Quarter, 1977. Small-group discussions after completion of each case study helped enrich the simulation experience.

Evaluation of CAI effectiveness was assessed by administration of three test instruments immediately before and after the CAI experience. The Leadership Evaluation and Development Scale (LEADS),

the Leadership Opinion Questionnaire (LOQ) and the Self-Perception of Confidence (SPOC) Scale assessed managerial decision-making ability, the leadership dimensions of Consideration and Structure, and comfort (confidence) of the student when faced with a personnel management problem situation, respectively.

Because of the inability of objective measurement devices to assess change in affective behavior, no significant change was noted in managerial decision-making ability or in the leadership dimensions of Consideration and Structure as a result of the CAI simulations. A significant increase in comfort (confidence) was noted after the CAI exposure.

The models for inclusion, development, and implementation of CAI in a dietetic education program was determined to be feasible for use with the Coordinated Undergraduate Program in Dietetics, The University of Tennessee, Knoxville.

TABLE OF CONTENTS

CHAPTER PAGE

LIST OF TABLES

TABLE PAGE

LIST OF FIGURES

CHAPTER 1

INTRODUCTION

Management is defined by Koontz and O'Donnell (1972) as the establishment and maintenance of an internal environment in which people working together in groups can perform effectively and efficiently toward the attainment of group goals. The functions of management, generally recognized as planning, organizing, directing, staffing and training, and controlling, may be assumed by, or delegated to, the dietitian (West et al., 1977; Lipscomb and Donaldson, 1964). Experiences related to these functions and subsequent decision-making activities are an important part of a dietitian's training.

1.1. IDENTIFICATION OF THE PROBLEM

Actual first-hand experience in decision-making in various management areas may be limited during a dietitian's training (Spears, 1973). Of 515 administrative dietitians surveyed (Sanford et al., 1973), 21 percent selected their first position following training to strengthen their background in management and gain needed management experience. Only 4.6 percent of those who chose therapeutic dietetics as a first position did so to obtain additional training in therapeutic dietetics. In response to the criticism that administrative dietitians are reluctant to make decisions, Spears (1973) suggested the dominant theme of decision-making should be carried in all professional courses for dietetic students. Lack of qualified instructional personnel and/

or appropriate activities may be a problem in providing decision-making experiences in some training programs. Difficulty in providing students with appropriate decision-making experiences in the clinical facility may be caused by factors such as reluctance of hospital administrators to delegate decision-making functions to students or lack of opportunity for decision-making activities corresponding to students' schedules in the clinical facility. Scheduling of students to meet didactic as well as clinical demands may hinder the student from becoming involved in the day-to-day activities of the facility, knowledge of which is important to decision-making.

Decision-making opportunities also may present themselves at a time in the student's training when adequate background knowledge of how to react to the situation has not yet been received. Such problems pose barriers to students acquiring competencies where decision-making ability is an important component. One possible solution to these problems is the use of self-instruction, programmed instruction, simulation or other individualized teaching techniques to meet student needs (Perry, 1972).

Computer-assisted instruction (CAI) is such a teaching technique or strategy (Rowen, 1971). CAI is defined as a man-machine interaction in which the teaching function is accomplished by a computer system without intervention by a human instructor. Both training material and instructional logic are stored in computer memory (Salisbury, 1971). The computer plays an active role in the instructional process; that is, the computer is assisting in the instructional process as instruction is taking place (Stelzer, 1971).

The feasibility of using CAI to teach decision-making was suggested as being almost limitless (Chase, 1968; Beck and Monroe, 1969; Alpert and Bitzer, 1970; Zachert and Pantelidis, 1971). CAI is useful in the development of critical thinking and was more effective than standard educational procedures in learning situations calling for judgment, interpretation of complex problems, and evaluation by the learner of the consequences of her/his actions (Alpert and Bitzer, 1970).

While the use of CAI has been suggested for teaching critical thinking and decision-making, actual experimentation with and reporting of this instructional strategy was limited.

1.2. PURPOSE OF THE STUDY

The purpose of this research was to develop and implement CAI-simulated learning experiences in food systems administration to assist dietetic students in gaining proficiency and self-confidence in the decision-making skills of personnel management. The approach to this study was to:

1. develop conceptual models for inclusion, development, and implementation of CAI in a Coordinated Undergraduate Program in Dietetics;

2. test the models by developing and implementing CAI simulations as a part of a course in food systems administration required of dietetic students; and

3. evaluate the feasibility of using CAI as a means of providing simulated decision-making experiences in place of difficult to obtain actual experiences.

CHAPTER 2

REVIEW OF LITERATURE

The clinical phase of dietetic education has as a stated goal the strengthening of training for developing the characteristics important in leadership and in management. The Committee on Goals of Education in Dietetics (1972) identified these characteristics as a sense of responsibility, emotional stability, flexibility, confidence in relationships with others, an acceptance of one's own fallability, realism, creativity, and the ability to control. Lack of strength in any one of these traits may decrease the dietitian's competence in supervision. A primary concern of dietetic educators is the lack of suitable learning experiences to develop leadership and management characteristics.

2.1. SIMULATION AS A TEACHING TECHNIQUE

Simulation, as defined by Beck and Monroe (1969), is a procedure in which a model of, or an analog to, a real situation is developed for the purpose of testing or teaching. In education, simulation is used to provide a learning environment which represents a life-like situation, and has four characteristics: simulation starts with an analogous situation, allows for low-risk input, provides the student with symbolic consequences, and is replicable.

The term "analogous situation" refers to the environment in which the learner will function in the simulation exercise. This environment should have enough of the characteristics of the real

situation to provide the learner with a realistic learning environment. The second characteristic, that of low-risk input, allows the student to make a response or decision without irrevocable commitment and without changing the original circumstances. The simulation exercise tells the student the consequences of her/his actions. These consequences are symbolic, in that the physical or psychological learning climate is not modified. With low-risk input and symbolic consequences, the simulation exercise is replicable, providing the opportunity to try various procedures.

The use of simulation as a teaching strategy was reported frequently in the literature. Use of simulation was described in business and industry journals as a viable training technique. Yetton (1969) reported that management simulation exercises may be used as an aid to decision-making, as a vehicle for management education, or for research purposes. Simulation resulted in the successful training of middle-management personnel in decision-making in a large insurance company (Smith, J. R., 1973). The simulation game method was reported as particularly well suited to teaching process, especially the decision-making process (Yetton, 1969; Beck and Monroe, 1969; Slahor, 1972; Smith, J. R., 1973).

Simulation proved a viable alternative to lecturing in high enrollment classes, and facilitated student interaction, participation, and learning (Cheatham and Erickson, 1976). Properly designed simulation exercises allowed students to "experience" relationships and concepts, to assume realistic roles, face problems, formulate

strategies, make decisions, and get fast feedback on the consequences of their actions.

Well-designed simulation games clarify abstract relationships for students by presenting the relationship on a more concrete level. Simulation games can be a means of influencing students' attitudes (Livingston, 1971).

Flexibility is one of the chief characteristics of educational simulation. Responsibility for imaginative and critical thinking is placed on the students themselves. The students make the decisions; the teacher merely supervises the simulation activity. Another value of simulation is the inspirational function of stimulating interest in a topic and in providing the element of discovery (Broadman, 1969).

Many teachers assume that one macro-instructional strategy (e.g., lecture, discussion, laboratory) will suffice for all students in a given class (Mitchell, 1973). However, no one teaching technique is more effective than another when instruction is evaluated by student performance on an examination. There is evidence to support the superiority of guided individualized instruction. One technique which combines both individualized instruction with follow-up group interaction is the case study approach to simulation. A combination of these two strategies form a unique instructional technique.

2.2. SIMULATION BY THE CASE STUDY APPROACH

A case study consists of an account of a problem situation, including enough detail for learners to suggest possible solutions (Ford, 1969). A case study may be a "second-hand" account of a situation

that has occurred, or a "first-hand" account of a situation that could happen. Galvin (1973) defined the case study approach to teaching as a problem-oriented instruction in which the student is judged chiefly or solely in terms of the ability to produce viable and defensible solutions to specific problems posed in a case study format. This method of teaching is distinguished by a strong emphasis on decision-making, normally involving a choice by the learner between two or more alternative solutions to a case problem. Case studies are written descriptions of typical situations that involve principles or practices or both, with or without suggested solutions, with a view to the development of the students' skill and understanding in the field (Umstattd, 1964).

Fourteen situations where case studies could be utilized were listed by Ford (1969). Development of skill in decision-making, lending reality to indirect experience, pooling the insights of group members, focusing on concrete problems, helping learners see many points of view, showing that few problems have easy answers, and bridging the gap between theory and practice were included in the list. Other suggestions were broadening experience, analyzing motives, presenting problems in proper perspective, discouraging "casual oversimplification," increasing involvement in learning, training learners to think independently as well as cooperatively, and giving synthesis and meaning to parts of a whole.

Several examples of case studies were found in the literature. A variety of problem situations were presented which could be used in teaching problem-solving and decision-making. The most common

format consisted of presentation of the problem situation, followed by several questions for thought or discussion.

Advantages of the case study method of teaching are the same as any other simulation technique. It is nearly impossible for a student to remain passive while engaged in simulation learning activities (Zachert, 1970). Participation in such activities resulted in enhanced perception, reinforcement of theory, and heightened motivation. The importance of teamwork and good communications were also learned.

The case study apprpach to teaching was popularized by the Harvard School of Business. The use of the case method of instruction method at Harvard was discussed by Hunt (1951). The case study method was defined as a type of "discussion" teaching, and stressed the importance of group interaction in solving the case. Case studies requiring a choice to be made from among reasonably possible alternatives provide a basis for a reasoned difference of opinion to develop in the classroom. Group discussions should center on analyzing the reasons for the differing opinions so that each student may reach her/his own judgment. Group discussion develops the capacity to communicate to others the ideas that are running through one's mind. In a group discussion, the student can learn to change views without "losing face" and also to respect and utilize the ideas of others.

Disadvantages of using the case study method were presented by some authors. Writing a good case study is difficult, and seeking out and writing cases is demanding, even for professionals (Howells, 1969). The text must follow a narrow line. The case must not state the "real" facts, but rather the kind of evidence from which the student would have to deduce the "real" facts in an actual situation. However, the

case must be complete and precise enough to permit the student to identify with someone actually facing the problem situation (Hunt, 1951).

Another shortcoming of the case study method is that it may become static. In other words, a student may not perceive the dynamics of the developing situation, the feeling for the problem as it evolves through time (Ramey, 1967). One way of dealing with this shortcoming is to move from a mere case study analysis to a sort of role-playing situation. CAI is one method of accomplishing this change.

2.3. COMPUTER-ASSISTED INSTRUCTION

The use of computers in the field of education is not new. Computers have established themselves as not only useful, but in some cases, indispensable tools for the educator. Although the computer in the classroom is not yet common, it is hardly exceptional. Uses of the computer in education are many and the field is expanding rapidly (Salisbury, 1971).

Computer-assisted instruction (CAI) is a man-machine interaction in which the teaching function is accomplished by a computer without intervention by the human instructor. Both the training material and the instructional logic are stored in computer memory. The computer is actually assisting in the instructional process as it is taking place (Stelzer, 1971; Salisbury, 1971; Reed et al., 1972). Computer-assisted instruction programs are based on the unique value of the computer to adapt the selection and presentation of instructional materials to the pace and style of the individual student and in

acquiring and processing data relating to the effectiveness of the teaching and learning process (Alpert and Bitzer, 1970).

In order to fully appreciate the range of application of CAI, the different instructional strategies and instructional logics used in CAI must be understood.

Instructional Strategies Used in CAI

The term "instructional strategy" was defined by Stelzer (1971) as the role the computerized portion of the instructional environment plays in the introduction of new material. Instructional strategy also refers to the structure that is imposed on the student/computer interaction by the instructional materials and instructions stored in the computer. Basically, there are four possible instructional strategies: drill-and-practice, tutorial, dialogue, and simulation and gaming.

One of the most common applications of CAI is the provision of practice and evaluation for a learner who needs extensive training (Hansen, 1966). In the drill-and-practice instructional strategy, the computer is used for drilling the student in exercises covering material which was introduced previously to the student (Rockart et al., 1975). Using the computer for drill saves the teacher time. In this strategy, the burden of introducing the new material falls on the instructor, a text, or some other medium apart from the computerized portion of the environment. The student/computer interaction is highly structured and deviation from the predefined sequence of instructional events is not allowed. A question is posed to the student, frequently with alternative answers provided. The student answers the question

and then immediately receives feedback or evaluation (Stelzer, 1971). Drill-and-practice CAI is popular, especially at the elementary and junior high levels, because students spend much time in drill. Because group drill is often ineffective, many teachers favor the individualization and automation of drill-and-practice by CAI (Zinn, 1967).

In the tutorial mode or instructional strategy, the computer is used to assist in the presentation of new material to the student (Rockart et al., 1975). The student/computer interaction is still highly structured in that the sequence in which information is presented to the student and the expected student responses are totally controlled by the author (Stelzer, 1971). Advantages of presentation of information by computer include constructed response processing and flexibility in control and concealment of material (Zinn, 1967).

The third instructional strategy, dialogue, introduces new material under computer control, but the student/computer interaction is not predefined. In this strategy, the student can enter comments, ask questions, ask for additional information, and enter responses in free format. The instructional system is expected to respond to the student much as a human instructor would (Stelzer, 1971). Typically, the course writer has provided two or more stages of discussion with some facts available on request. A set of conditional statements programmed in the computer describes the dependency of computer replies on student responses. During the information gathering stage, the course writer may sequence the availability of information. In the decision-making stage, the student is guided toward one of the conclusions or solutions acceptable to the course writer (Zinn, 1967).

The last computer instructional strategy is simulation and gaming. In this strategy, the computer assists in the simulation of some real world event, situation, or sequence of events or situations. By interacting with the computer, the student can control or affect the simulated events or processes. Simulation and gaming computer programs are models which may be used as an examination of decision-making skills or practice for professionals on well-defined problem situations (Zinn, 1967).

Instructional Logics Used in CAI

"Instructional logic" was defined as the method that is used to branch the student through the instructional material (Stelzer, 1971). There are three types of instructional logic: linear, adaptive, and learner-controlled.

In the linear type of logic, there is no branching. Every student is presented with exactly the same material in exactly the same sequence. The only individualization that takes place in this type of logic is the time it takes a student to move through the material.

Adaptive logic is one in which the branching decisions in the program are based on student performance. If a student performs poorly on a computer drill, she/he may be routed to a remedial lesson stored within computer memory.

In learner-controlled instructional logic, the material is organized like a map. A student may explore the "map" as she/he desires, choosing those topics or sections which are of interest to the student.

Different instructional strategies may be combined with different types of instructional logic. The possibility of so many combinations makes CAI attractive to enterprising and innovative educators (Rockart et al., 1975).

Current CAI Applications

While few projects were well-documented, numerous uses of CAI in various disciplines were reported in the literature. The past several years have been a period of excitement, of fascination with the computer itself, of the trying out of new ideas because the field was new and relatively unexplored. Many of the projects reported were descriptive in nature (Armsey and Dahl, 1973).

Work in CAI has been carried out at several institutions: University of Illinois, Stanford University, University of Pittsburgh, Florida State University, University of Texas at Austin, and The Ohio State University. The PLATO project at the University of Illinois uses CAI at the college level as do the programs at Florida and Texas. Other groups are studying the use of CAI at the elementary and secondary levels in such subjects as mathematics, reading, and the natural sciences (Alpert and Bitzer, 1970; Loftin, 1974). Hawkins and Ney (1976) reported the use of CAI in training school administrators at Texas A & M University while Wassertheil (1969) described the teaching of statistics via CAI at the State University College at New Paltz, New York.

Of all professional and graduate fields of study, the health professions are most active in developing the teaching applications of computers (Hunter et al., 1975). At The Ohio State University Medical

School, the first two years of undergraduate medical education may be independent study or traditional curriculum. CAI is an important part of the independent study program. The University of Illinois is well known for its system entitled CASE, which simulates clinical encounters with patients. In CASE, the role of the patient is played by the computer with the student performing diagnosis and prescribing therapy (Harless, 1971). A similar program for dietetic students is used at The Ohio State University. In this system, the computer acts as the patient with the dietetic student interviewing the "patient" for food preferences and diet counseling (Breese et al., 1977).

The use of CAI with nursing personnel was considered a valuable educational tool for student nurses, and an important aid in continuing education (Reed et al., 1972). The use of CAI in preparing vocational education trainees for the General Educational Development (G.E.D.) tests was suggested by Stelzer (1971) since lecturing does not seem to be effective at this level of training.

CAI is an important addition to the teacher's repertoire of instructional techniques. The technique is not held out as a panacea, but as a promising form of educational technology with the potential of meeting some of education's most pressing needs.

Cost-Effectiveness of CAI

The subject of the cost-effectiveness of instructional technology as compared to traditional teaching approaches is discussed widely but poorly documented. Of 300 reports in the literature on cost-effectiveness of instructional technology, only 32 were supported by empirical or quantitative data (Caffarella, 1975). The majority of the

studies used television as the instructional medium. Studies on other instructional strategies were limited. Use of data for comparison with present-day costs is limited by spiraling double-digit inflation.

Cost comparison of computer-assisted instruction (CAI) with traditionally-administered instruction (TAI) is extremely difficult because of lack of comparability across the two systems of instruction (Kopstein and Seidel, 1968). The form of much published data on TAI does not permit a detailed breakdown of the various factors, including support activities, that may be considered in determining cost per student hour. With respect to the relative effectiveness of CAI and TAI, reliable, objective information is almost non-existent. The few studies available are mostly unpublished and/or based on such small numbers of observations, restricted circumstances, and doubtful methodology as to make them inconclusive (Kopstein and Seidel, 1968).

Seidel (1969) suggested that the question of CAI cost-effectiveness is the right question asked at the wrong time. The new era of "educational revolution" (of which present day CAI is but a beginning) cannot be bound by the constraints of the traditional classroom, the traditional school day, and traditional administration of the educational system. Comparisons of cost-effectiveness between the traditional and the new, relatively undeveloped system, is hardly possible at this point in time.

2.4. EVALUATION OF LEADERSHIP AND DECISION-MAKING ABILITY

The assessment of leadership potential and decision-making ability has been a topic of study for many years, with little success.

Psychological research data do not identify or assess leadership ability (Gibb, 1972a). Neither does the use of the case study method of teaching lend itself to easy evaluation. Three abilities are taught by the case study method which cannot be tested on an examination (Hunt, 1951). The first is the ability to select from a group of facts those which are important and relevant to the problem situation. Second is the ability to consider adequately several alternatives in analyzing the problem. And third, there is no opportunity to test a student's ability to use and build upon the ideas of others in a group discussion.

Difficulty in assessing the gain of knowledge through the use of a simulation game was reported by Livingston (1971). Teachers reported that while students were enthusiastic about the teaching technique and seemed to be learning from it, tests did not bear this out. One interpretation of this problem was that enthusiasm of students and teachers for the teaching device was not a valid predictor of its success as measured by student performance on tests or, the kind of learning that students and teachers get excited about is not measurable by an objective test.

A review of standarized testing instruments relating to leadership and decision-making ability revealed a limited number from which to select. Two appropriate test instruments were identified.

Leadership Evaluation and Development Scale

The Leadership Evaluation and Development Scale (LEADS), developed by Harley W. Mowry (1964), consists of eight human relations

cases, each followed by several multiple-choice questions, giving 44 questions in all. The cases present real problems and the questions which follow pose real and difficult choices (Gibb, 1972a). The correct or scoring answer for each question was determined by use of the test with 321 supervisory personnel. Use of the test with introductory human relations courses was suggested.

The LEADS test was utilized in one unpublished research study with 113 production managers. Using salary corrected for age and seniority as a criterion of leadership ability, LEADS correlated 0.36 with this criterion. Split-halves reliability, a measure of internal consistency of a test, as a result of this study was calculated as 0.81.

Leadership Opinion Questionnaire

The Leadership Opinion Questionnaire (LOQ), developed in 1960 and revised in 1969, by Edwin A. Fleishman, provides a measure of two dimensions of supervisory leadership, Consideration and Structure. Fleishman (1969) stated that

> Consideration (C). Reflects the extent to which an individual is likely to have job relationships with subordinates characterized by mutual trust, respect for their ideas, consideration of their feelings, and a certain warmth between the individual and them. A high score is indicative of a climate of good rapport and two-way communication. A low score indicates the individual is likely to be more impersonal in relations with group members.
>
> Structure (S). Reflects the extent to which an individual is likely to define and structure his or her own role and those of subordinates toward goal attainment. A high score on this dimension characterizes individuals who play a very active role in directing group activities through planning, communicating information, scheduling, criticizing, trying out new ideas, and so forth. A low score characterizes individuals who are likely to be relatively inactive in giving directions in these ways.

Fleishman stated that no cases were found in which low Consideration scores were associated with good performance (e.g., low turnover, good employee attitudes, low stress, or high proficiency ratings). Thus, low Consideration scores were more indicative of an undesirable situation, whereas the Structure scores depended more on the situation.

These two dimensions, Consideration and Structure, were independent, based on factor analysis studies and correlations between the two dimensions in 17 sample groups. While both dimensions are important, Consideration was the more critical of the two. Thus, the programs which increase Consideration behavior are very likely to increase management efficiency (Gibb, 1972b).

Reviewers of this instrument agreed that, despite the difficulties, the LOQ is a well-made instrument with definite potential in training and training evaluation (Doppelt, 1965; Kirchner, 1965; Gibb, 1972b). Use of the LOQ as a pre-post training evaluation instrument was recommended by Fleishman (1969) in the Manual for Leadership Opinion Questionnaire.

CHAPTER 3

MODEL FOR INCLUSION OF CAI AS A COMPONENT IN A DIETETIC EDUCATION PROGRAM

Implementation of computer-assisted instruction into an educational program involves consideration of resources available. The dietetic educator facing the decision whether or not to utilize this instructional strategy should consider such aspects as availability of proper computer equipment, adequacy of facilities for student access to the computer, and the availability of time, money, and expertise to support CAI lesson development. Consideration of these points enables the dietetic educator to assess the feasibility of implementing CAI. Lack of any one of the above basic components may hinder or slow development and implementation.

3.1. ASSESSMENT OF NEEDS

A model (Figure 3.1) was developed for the inclusion of CAI in a dietetic education program. The starting point in this model involves assessing how effectively and efficiently competencies are currently being met in the educational program. Competencies are defined as the skills, knowledge, and behaviors to be demonstrated at a specified proficiency level by a student that are derived from explicit conceptions of the duties and responsibilities of a dietitian by experts in the field (Shanklin, 1976). Competencies of an entry-level dietitian are identified by using such documents as Tasks

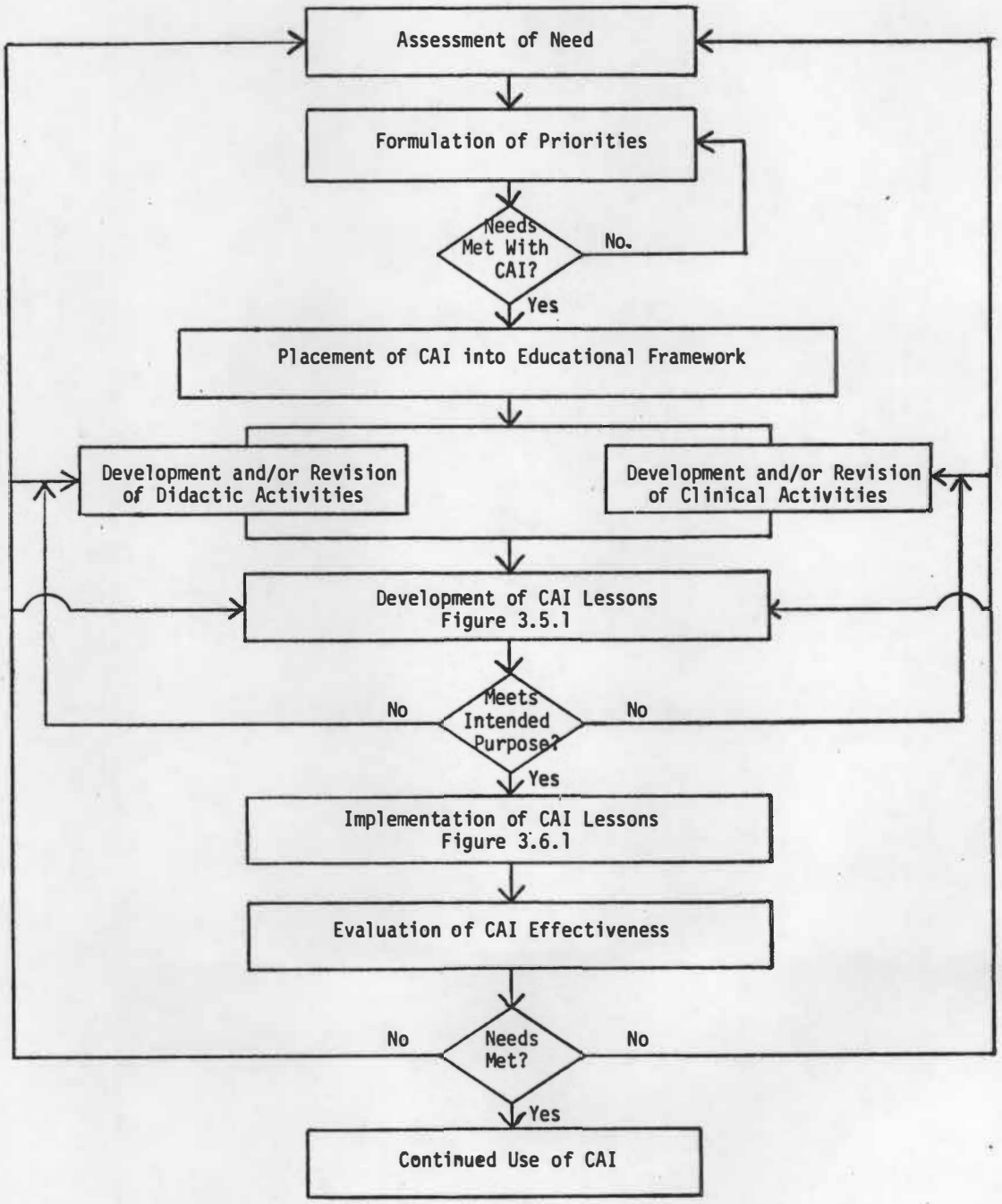

Figure 3.1. Model for Inclusion of CAI in a Dietetic Education Program.

Required for Entry-Level Dietitians as Identified by Dietitians in West Tennessee (Lawson, 1973), proposed entry-level management competencies of the Dietetic Internship Council (1974), and Suggested Terminal Performance Objectives and Enabling Objectives for ADA Competencies in Management (Task Force for Developing Competencies, 1975). Use of competencies aids the educator in evaluation of student proficiency.

Input for assessment comes from students, graduates of the dietetic program, professionals in the field, clinical and didactic instructors, professional staff in the clinical facilities, and other knowledgeable individuals associated with the dietetic program. Those competencies identified as not being satisfactorily achieved are candidates for alternative teaching methods such as CAI.

3.2. FORMULATION OF PRIORITIES

The identified competencies are prioritized with consideration to those which are best met with CAI as opposed to other instructional strategies. Applications of CAI in education are numerous; however, time, money, and expertise may be limiting factors in regard to the sophistication of the CAI application in a particular dietetic program. CAI is not the panacea for all teaching problems, but may be an exciting alternative to traditional approaches (Bork, 1969).

One or more CAI strategies may be used to help meet a particular competency. When acquisition of facts and knowledge is of prime concern, tutorial CAI routines are utilized. The tutorial routine involves presentation of material to the student for the first time

with primary focus on acquisition of new facts and concepts. This approach, whether simple or complex, is designed to largely replace the instructor in presenting facts. The objective of CAI at this level is to provide a simple, straightforward, and individualized approach in the acquisition of new material (Rockart et al., 1975).

Drill-and-practice routines are used in developing the student's skill in the use of a given concept. This involves leading the student through a series of examples in which she/he practices the material already learned. Tutorial and drill-and-practice routines may be combined to aid in the student's development of a competency. An example of this approach is a CAI tutorial lesson on the ADA Exchange Lists followed by a drill-and-practice routine on diet calculation by the exchange list method.

Dialogue and simulation CAI routines are more complex, and are used to meet those competencies calling for skill in problem-solving and decision-making. Such routines provide access to problem-solving tools and the student uses these to attack a problem. Not only is problem-solving practiced, but concepts and skills previously acquired are reviewed. An example of this approach is the computer-simulation encounters developed by the Medical Dietetics Division at The Ohio State University (Breese et al., 1977).

3.3. PLACEMENT OF CAI INTO THE EDUCATIONAL FRAMEWORK

CAI lessons are incorporated into a dietetic education program in various ways to supplement either didactic or clinical activities. New material may be introduced to students via CAI, with follow-up

discussions or activities to reinforce the learning experience. Or, new material may be introduced through various didactic or clinical activities with CAI acting as the reinforcing experience. Appropriate CAI routines may provide remedial work for students not meeting minimum competency levels, or act as "refresher courses" for students at any stage in the educational sequence.

CAI is applicable in didactic activities in that it can do much to enhance, or make more meaningful, material presented in the classroom. Although pressure of class size influences the method of teaching, the assumption often is made that one macro-instructional strategy (e.g., lecture, discussion, laboratory) will suffice for all students (Mitchell, 1973). CAI, used with other instructional strategies, allows for individualization of instruction which no one instructor might provide.

Benefits of using CAI in relation to clinical activities are more indirect, but equally important. CAI may be used to make up for deficiencies in actual experiences available, as in simulating employee interviewing and/or counseling. Clinical instructors often find themselves acting as remedial teachers in the clinical situation. Students needing review of subject matter before embarking on a clinical activity might utilize appropriate CAI lessons, freeing the clinical instructor for other non-delegable tasks such as formative evaluation of students in the clinical setting, or assisting students who have mastered required content to improve their clinical competence.

Students are challenged most often in the clinical setting with various activities to improve judgment and critical thinking. CAI

dialogue and simulation routines might be an important part of clinical training, giving students the opportunity to practice problem-solving and decision-making in a low risk environment. Students are thus better prepared to take advantage of actual problem-solving and decision-making situations when these occur in the clinical facility.

3.4. DEVELOPMENT AND/OR REVISION OF RELATED ACTIVITIES

Inclusion of CAI as a component in a dietetic education program requires development, revision and/or deletion of didactic and/or clinical activities. Some activities in either sector may require deletion to avoid duplication of effort or rearrangement of activities to act as an introduction to or a reinforcer of the CAI experience.

3.5. DEVELOPMENT OF THE CAI LESSONS

Figure 3.2 shows in detail the steps of the development components of a model for inclusion of CAI in a dietetic education program.

Establishment of specific objectives for achieving a competency defines more clearly the needs to be met. One or more CAI lessons may be needed to meet the objectives. These lessons are used alone or in conjunction with other instructional strategies.

The type of CAI strategy utilized depends on the objective(s) to be met. Tutorial, drill-and-practice, dialogue, or simulation and gaming are used separately or in combination to present information and/or develop skill.

A review of the literature is used to ascertain the availability

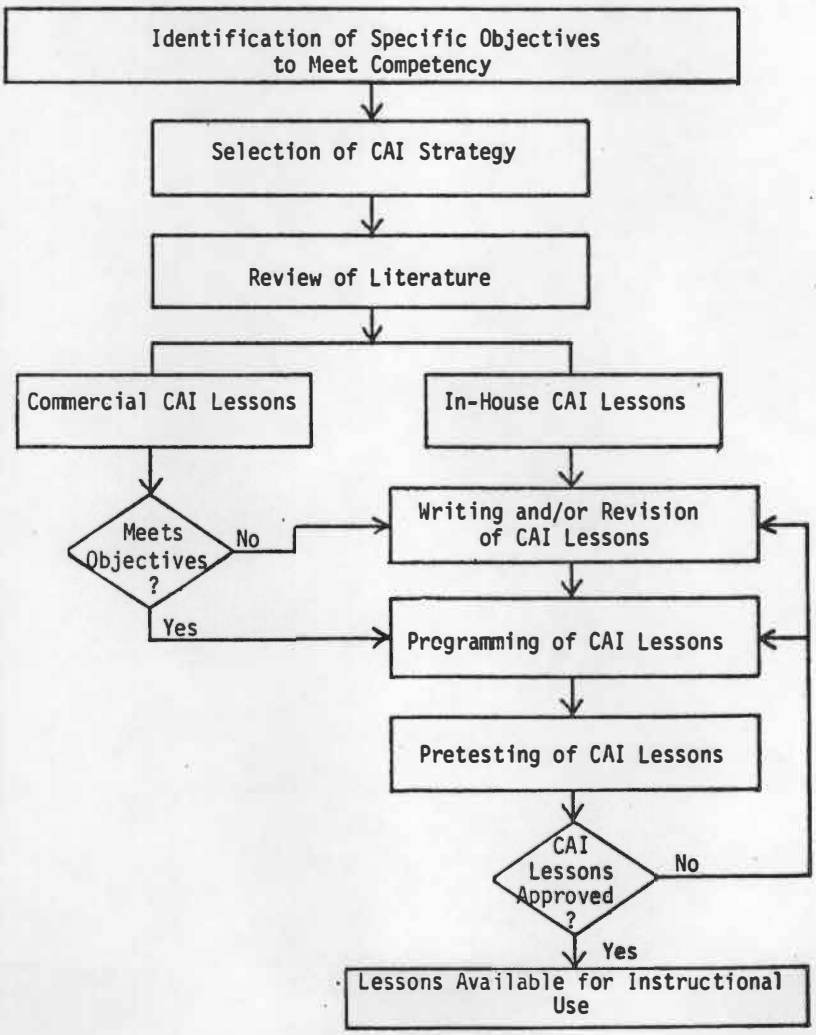

Figure 3.2. Development Component of a Model for Inclusion of CAI in a Dietetic Education Program.

of commercially-developed CAI lessons which meet the stated objective(s). Use of such lessons depends on availability of funds to purchase the lessons and compatability of these with available computer facilities. Sources such as the Index to Computer Based Learning (1973) or Proceedings of a Conference on Computers in the Undergraduate Curricula (1970) provide much valuable information for the dietetic educator. If suitable lessons are available and the constraints of money and computer hardware are met, commercially-developed lessons are used to meet the specified objective(s).

If commercially-developed CAI lessons are not available to meet the stated objective(s), the in-house development of CAI lessons is necessary. Choice of the CAI programming language is a major consideration. Several languages are available which allow teachers, if novices to the computer, to translate material into instructional logic for the computer. The CAI programming language selected depends, also, on the computer system used. Some examples of CAI programming languages are TUTOR, MENTOR, and Coursewriter III (Hunter et al., 1975). Coursewriter III, developed by International Business Machines (1973), is the most widely used language and is designed for use by inexperienced programmers. English is used in combination with two-letter operation codes which provides the instructions or commands to the computer. A workshop or shortcourse can be utilized to teach Coursewriter III to participants in a few days.

As CAI programs become more complex or sophisticated, consultation with a computer programmer familiar with CAI is usually necessary during lesson development. Such consultation increases development

costs, but is justified by reducing frustration and wasted time which can easily discourage novice programmers. The consultant also advises on the most efficient storage of the computerized instructional material, both during and after development, since utilization of computer core may be a major cost factor in CAI.

The actual writing of a CAI lesson is a time-consuming part of the developmental process. Estimates of the effort required to develop the material vary, but most CAI experts suggest that 50 to 100 hours of preparation is required for each hour of terminal time (Butman, 1973). Background information for use in the lesson is gathered, condensed, and put into the proper format. The type of CAI strategy utilized determines the organization of the instructional material. Writing of a tutorial lesson is similar to producing a lecture, whereas drill-and-practice CAI lessons take the form of a multiple-choice test. Dialogue and simulation strategies are more complex and developmental time is considerable.

Programming is done by the lesson writer, or by a trained computer programmer. The type of terminal utilized affects the degree of sophistication of the programmed lesson material. The teletypewriter terminal is the most common interactive terminal used for programming and is the least expensive type of terminal. The teletypewriter terminal produces a hard-copy printout of the instructional material, a major advantage for the instructor and/or programmer.

The alphanumeric cathode-ray-tube terminal (CRT) presents a full screen of data (approximately 20 lines) in a few seconds, and if equipped with an auxiliary printing device, also produces hard-copy.

The CRT is especially useful to the programmer to see data on the screen as the student will see it, whereas the hard-copy printout facilitates locating errors and making corrections, additions, or deletions in the program.

Graphic terminals vary greatly in capability, but have in common the ability to produce drawings as well as text. Availability of this type of terminal expands the possibilities of CAI applications.

Two types of pretesting of the finished CAI lessons insure smooth implementation. The first type of pretesting is to check for content validity of the instructional unit. This phase of pretesting is performed by experts in the particular subject matter area. Clarity of directions and/or situations presented to the student are examined to reduce possible misunderstanding or frustration.

The second type of pretesting is commonly known as debugging. This type of pretesting reviews the programming logic and routines. All program features are checked for proper functioning by having an individual not familiar with the CAI lesson to go through the lesson, duplicating a student's interaction with the computer. Pretesting points up mistakes or weaknesses in the CAI lessons which the programmer and/or author may have overlooked (Hawkins and Ney, 1976).

3.6. IMPLEMENTATION OF THE CAI LESSONS

The implementation component of the model for inclusion of CAI in a dietetic education program is outlined in Figure 3.3. Proper introduction and/or orientation of all persons involved with the CAI component is an important aspect of implementation. The process

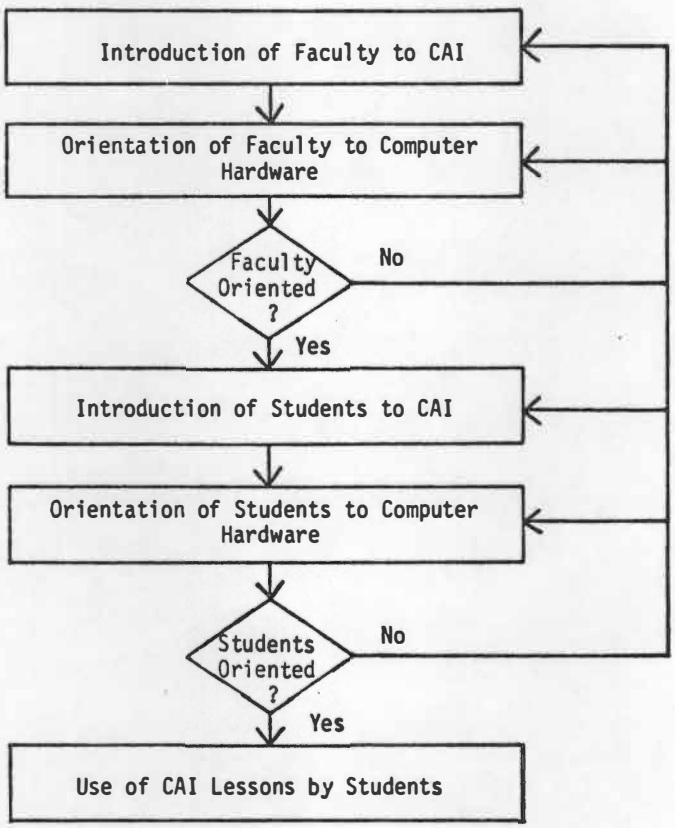

Figure 3.3. Implementation Component of a Model for Inclusion of CAI in a Dietetic Education Program.

follows the concept that learners generally find it more meaningful to move from the general to the specific (Mager, 1967). Persons involved with CAI receive an overview of CAI before progressing to the more detailed aspects of the instructional strategy.

Faculty support for the inclusion of CAI in a dietetic education program is important. A workshop or shortcourse on CAI may be the most economical way to introduce the instructional strategy to faculty members as well as to teach the basics of CAI language and programming. Suggested topics for discussion include the definition of CAI, history of CAI development, the current "state of the art," uses of CAI, and advantages and disadvantages of CAI over other strategies.

The orientation of the faculty to the operation of the computer terminal following the introductory overview encourages faculty to work with a terminal and experiment with simple CAI programs. Easy accessibility to a terminal by faculty members makes such experimentation more likely. If possible, a terminal conveniently located near faculty work areas is suggested.

Faculty members working directly with students involved in a CAI project should be familiar with the lessons used. While students need not be supervised when they are actually using the computer, at least one resource person should be available to answer student questions about technical problems or content. If participating faculty pretest each CAI lesson in the "student mode," the faculty member then is acquainted with the overall CAI program and can anticipate student questions.

Introduction of students to CAI follows the same sequence as the

orientation of the faculty. A lecture or group discussion on CAI serves as a starting point. Presentation of an overview of CAI as an instructional strategy is followed by a question-and-answer period. Students having previous experience with computer programming or with CAI should be invited to comment on their experiences with computers. The specific CAI lessons used by the students may be introduced and/or briefly described at this time.

It is important for students to become familiar and comfortable with the use of the computer terminal. The introduction to the terminal should be with small groups of students, so that each student will have a chance to experience interaction with the terminal and receive feedback. Topics covered in this orientation include sign-on and sign-off procedures, special features of the CAI lesson or program (e.g., use of the word "HELP" to receive a correct answer, use of "###" to permit re-entry of an answer), and procedures to follow if problems occur.

Whether the CAI lesson used is a simple drill-and-practice routine, or a sophisticated simulation or gaming strategy, students may proceed at their own pace. Scheduling of actual interactions with the computer, however, may be done by a supervising faculty person or may be left up to the individual student. In some instances, terminals may be available only on a first-come, first-serve basis; or, terminals may be reserved for use by a certain group of students at a specified time.

Coordination of CAI activities with appropriate computer center personnel is important. The number of students able to utilize CAI

at one time may be limited by the particular computer system used. Such coordination in the early stages of planning will assure smoother implementation (Powell, 1976).

3.7. EVALUATION OF THE EFFECTIVENESS OF CAI

Effective evaluation of CAI involves re-examination of the objective(s) to be met through use of the strategy. Were the anticipated outcomes or behaviors cognitive or affective in nature? While the meeting of cognitive-type objectives is measured by a written test, measuring changes in the affective domain is more difficult and subjective. If minimum levels of acceptable performance for various areas are available, evaluation is easier. In evaluating the meeting of affective objectives, behavioral changes may not be immediately obvious. Delayed evaluation may cause the CAI effects to be clouded by other intervening variables.

Students using CAI may be compared to a control group not exposed to CAI, or students may be compared against themselves as in pretest-posttest evaluation. Such comparisons indicate the effectiveness of CAI as an instructional strategy. Students are often a good judge of the effectiveness of the instructional strategy, and their perceptions and comments should be actively solicited.

Either type of evaluation may indicate the need for CAI lesson revision and/or changes in programming. Periodic revision is necessary for some CAI lessons to update the information presented, or to incorporate suggestions for improvement made by reviewers or users of the lesson.

If it is ascertained that stated needs or objectives have not been met with the CAI instructional unit, one or more changes are necessary as indicated in the model (Figure 3.1, page 20). Alterations in didactic and/or clinical activities accompanying the CAI lessons may be required, revamping of the CAI component itself, or reassessment of need for the lesson. The model provides for continuous review of not only the CAI component, but also the relationship of the use of CAI to overall program needs.

CHAPTER 4

PROCEDURE

The purpose of the study was to develop and implement CAI-simulated learning experiences in food systems administration as a means of providing dietetic students with difficult to obtain decision-making experiences. Modules were developed for the inclusion, development, and implementation of CAI in a dietetic education program. Assessment of competencies to be met by an entry-level generalist dietitian provided the basis for development of four case study simulations presented via CAI to students enrolled in a food systems administration course. Small-group discussions followed completion of each case study assignment. Effectiveness of CAI was measured by the use of three test instruments administered immediately before and after the CAI experience.

4.1. ASSESSMENT OF NEEDS

Input for assessment of competencies needed in food systems administration came from several sources. A post-graduate questionnaire, regularly sent to graduates of the coordinated dietetic program and their first employers one year after graduation, was mailed to 41 persons. Graduates and their employers were asked to rate the adequacy of the undergraduate training in both nutrition and food systems administration. Form B.1 shows the food systems administration section of the post-graduate questionnaire sent to both the graduates and their first

employers. The rating was on a scale of zero, indicating no preparation received or preparation completely inadequate, to four, indicating that completely adequate training had been received. In addition, graduates and employers were asked to assess the need for decision-making experiences for dietetic students in relation to each administrative and clinical element listed.

A need for upgrading experiences in personnel management was indicated by the survey data. Graduates indicated a need for more opportunities for problem-solving and decision-making in performing the personnel function.

Discussions with dietetic coordinators and clinical instructors indicated a similar concern that the competencies in personnel management were not being fully met. Difficulty in meeting these competencies was attributed to three factors: unwillingness of hospital administrators to delegate solving of personnel problems to students; reluctance of administrators to allow student surveillance and/or control of counseling and/or disciplinary sessions, even with close supervision by dietetic coordinators; and, lack of opportunities for student participation in personnel supervision corresponding with students' schedules in clinical facilities. Lack of experience resulted in a cycle, in that lack of experience prevented student participation in situations where experience could be gained.

4.2. IDENTIFICATION OF PRIORITY COMPETENCIES

The need assessment results indicated prioritization of competencies in personnel management, with consideration of those that could

be partially or fully met via simulated experiences. Three broad competencies relating to personnel management were identified from the list of Suggested Terminal Performance Objectives and Enabling Objectives for ADA Competencies in Management (Task Force for Developing Competencies, 1975). A group of 20 professionals with an average of 15 years management experience, including food service administrators, food systems administration faculty, graduate students, clinical instructors, and dietetic coordinators, comprised the panel of experts. A mailing was sent to each panel member, consisting of a letter of explanation (Form B.2), a listing of the three broad ADA competencies in personnel management (Form B.3), and a questionnaire (Form B.4). The questionnaire asked that each of the three personnel management competencies be evaluated for importance to an entry-level generalist dietetian, present level of attainment by students, and appropriateness of substituting simulated experiences as a method of achieving greater competency. Each person was asked to prioritize the three competencies, placing first that competency which she/he felt should be most emphasized with dietetic students.

The competency stating that a student should be able to "apply the principles and practices of management of personnel in the procurement, development, maintenance and utilization of an effective and satisfied working force in foodservice systems" (Task Force for Developing Competencies, 1975) was rated the highest. The panel of experts indicated this competency was the most difficult one for obtaining actual experiences, and was the most likely candidate for effective use of CAI simulation.

4.3. PLACEMENT OF CAI INTO THE EDUCATIONAL FRAMEWORK

For the highest rated competency, four terminal performance objectives (TPO's) were identified as appropriate objectives for the course FSA 4140, Food Systems Personnel Development, taught winter quarter of the senior year of the coordinated dietetics program. Identification of enabling objectives for each TPO established the constraints for the teaching activities. Four study packages were developed consisting of prerequisite knowledge acquired in the didactic lectures, and required readings (Table C.1). Basic information gained from these prerequisite learning experiences better prepared the students for the simulated encounters. The CAI case studies were developed for reinforcement of the prerequisite knowledge.

Fifty-nine students comprised the FSA 4140 class. Table 4.1 shows a breakdown of the student population. Of the 59 students enrolled in the course, 11 were participants in off-campus credit programs. These students received lectures via videotape. Because these students did not have access to a computer system compatible with the CAI lessons, the case studies were provided in a programmed-learning booklet.

4.4. DEVELOPMENT AND/OR REVISION OF DIDACTIC ACTIVITIES

Placement of CAI into the didactic course FSA 4140 precipitated some revision in the course outline and class activities. Because of the large number of students in the class, clinical instructors were

Table 4.1. Classification of Students in FSA 4140, Food Systems Personnel Development (N=59)

Classification of Group	Number
Undergraduate Students	
Dietetic Students	
On-campus	13
Off-campus	4*
Food and Lodging Students	
On-campus	28
Other Students	
On-Campus	7
Off-Campus	7**
TOTAL	59

*Students assigned to Chattanooga, TN.

**Students participating in off-campus credit programs:
6 in Chattanooga, TN
1 in Jackson, TN.

asked to help lead the small-group discussions which followed each case study assignment. The clinical instructors were well-qualified for this task because of their experiences in working with dietetic students on a small-group basis.

4.5. DEVELOPMENT OF THE CAI LESSONS

Identification of Specific Objectives to Meet Competency

The terminal performance objectives and enabling objectives designed to help meet the specified competency in personnel management are listed in Table C.1. The enabling objectives listed were used as guides in the identification of more specific objectives for the individual case studies.

Selection of the CAI Strategy

Because of the affective nature of the expected outcomes of TPO's, simulation was selected as the most suitable CAI strategy. The aim of CAI simulation in this instance was to provide a learning environment representative of a realistic situation while allowing the student to practice problem-solving and decision-making in a low risk environment providing symbolic consequences.

Tutorial and drill-and-practice CAI routines were considered inappropriate techniques in this situation because the learning objectives were affective, rather than cognitive in nature. Limitations of time, equipment, and expertise hindered utilization of the dialogue CAI strategy.

Review of Literature

No commercially-developed CAI lessons appropriate for meeting the stated objectives in food systems administration were available. As a result, in-house development of the simulated situations was necessary.

The case study approach was selected as the method to teach problem-solving and decision-making. Computer simulation of case studies in library administration was utilized by Zachert and Pantelidis (1971), and their format was chosen for organization of the computer simulations in FSA 4140. The case study organization is diagrammed in Figure 4.1. Decision alternatives with subsequent consequences allowed each student to work her/his way through a problem situation, thus simulating a manager's following through of a problem to its solution. Although the model in Figure 4.1 shows only three decision alternatives for presentation to the student, the number of alternatives may be increased. However, the case study writer must be aware of the geometric progression of the decision alternatives and their subsequent consequences.

Writing of the CAI Lessons

Although few published case study situations related specifically to food service operations, similar personnel problems were found to exist in all types of work settings. Because of this similarity, two common personnel problems described in the literature were adopted as the basis for Case Study Two, A Problem of Promotion (Anon., 1972) and Case Study Four, The Feud (Anon., 1970). The basic format of

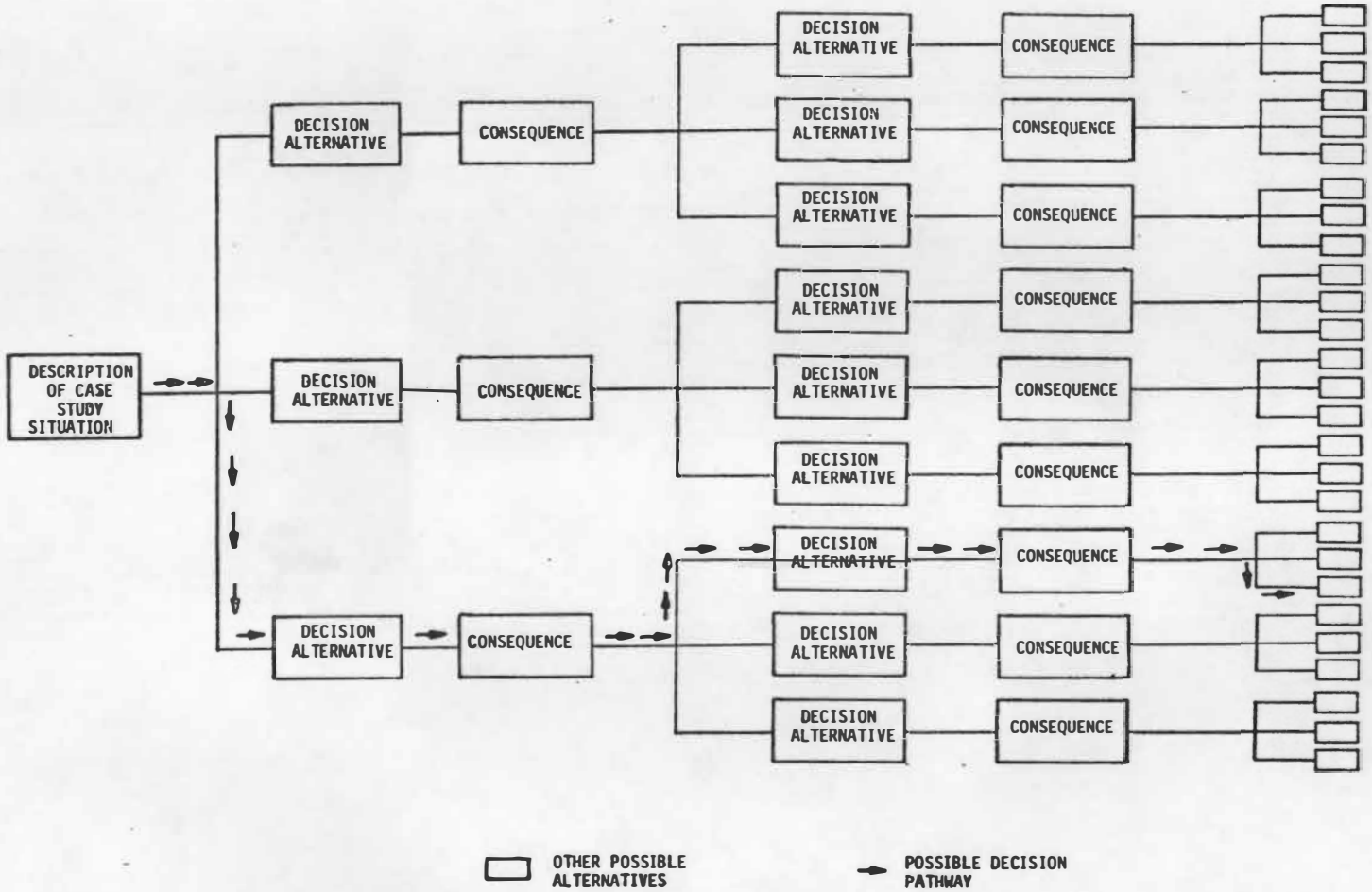

Figure 4.1. Format of Case Study Organization.

Adapted from Zachert, M. J. K. and Pantelidis, V. S.: A computer assisted sequential in-basket technique. Ed. Tech. 11(12): 44, 1971.

Case Study One, Sally's Staffing Problem (Chervenak, 1976) and Case Study Three, Determining Training Needs for a Food Service Operation (Haubenreich, 1976) were developed in a food systems administration workshop for faculty and graduate students for the introduction of CAI to the instructional process.

In the development and refinement of the four case studies, decision alternatives and subsequent consequences were selected to reflect various management theories and styles presented to students in both didactic and clinical components of their training. It was recognized immediately that not every decision alternative or consequence could be anticipated; therefore, it was the prerogative of the knowledgeable case study developer to present those alternatives and consequences which were most realistic to the situation. Brainstorming sessions with food systems administration graduate students and clinical instructors proved an effective means of obtaining alternative decisions and consequences.

Because of the branching scheme of the case study organization, similar decision alternatives and consequences were repeated at various points. Thus, students selecting different decision pathways sometimes obtained the same end result which reflected realistic outcomes as well as heightened student interest as various decision pathways were explored.

Programming of the CAI Lessons

The four case studies were programmed in Coursewriter III language for use in an IBM 360/65 central processing unit. The case

studies were presented to students on Digital Corporation VT-50 cathode-ray-tube terminals.

Case studies also were organized and produced as programmed-learning booklets for presentation to those students off-campus where compatible computer facilities were unavailable. In using either the CAI case study or the programmed-learning booklet, the student was presented with the case study situation and then required to select a decision alternative. When using CAI, the consequence of the decision was immediately reflected on the terminal screen, along with the next decision alternatives. When using the programmed-learning booklet, the student was instructed to turn to a designated page in the booklet to see the consequence and the next decision alternative. Thus, the student worked her/his way through the problem situation whether using the computer or the programmed-learning booklet.

Pretesting of the CAI Lessons

Two forms of pretesting for each case study was done. Case studies were reviewed for content validity by a panel of experts composed of clinical instructors and food systems administration faculty before presentation to the students. In order to familiarize the reviewers with all possible decision alternatives and consequences, an abbreviated version of each complete case study, using the format in Figure 4.1 was provided. This overall outline enabled the reviewers to visualize all possible decision pathways.

Debugging of the computerized case studies was done by the researcher and the computer consultant. Food systems administration graduate students pretested the CAI case studies in the "student mode"

to detect any programming errors or other problems missed by the programmers.

4.6. IMPLEMENTATION OF THE CAI LESSONS

Introduction of Faculty to CAI

Introduction of the faculty to CAI was begun in the summer of 1976 prior to implementation of the CAI component in January, 1977. An eight-day shortcourse on CAI was held for food science, nutrition, and food systems administration faculty and graduate students. Discussion on the definition of CAI, history of development, and "state of the art" was led by a consultant in CAI development on the faculty of the Department of Computer Science, The University of Tennessee, Knoxville. Application of CAI to the fields of food science, nutrition, and food systems administration was discussed by the researcher. The remainder of the course was spent in teaching the basics of Coursewriter III programming language, with course participants urged to develop a short CAI lesson in their subject matter area.

Orientation of Faculty to Computer Hardware

Shortcourse participants were introduced to the operation of the computer terminal early in the course. Sample CAI lessons, including one of the case study simulations, were provided to aid in the orientation process. Any problems encountered with programming or with the operation of the terminal were addressed by the shortcourse leaders each day in class.

Two computer terminals, a Digital Corporation LA36 DECwriter II hard-copy interactive terminal and a Datamedia Elite 1520 video terminal, were installed in the Food Science, Nutrition, and Food Systems Administration department for the convenience of the faculty. Faculty members were urged to use the terminals for experimentation and CAI lesson development. Several short CAI lessons in both nutrition and food systems administration were developed by participating faculty and introduced into the instructional program.

Introduction of Students to CAI

Dietetic students were introduced to CAI during the fall quarter, 1976, by the use of a tutorial drill-and-practice lesson on the ADA Exchange Lists (Canter, 1975). Small groups of eight to ten students were oriented to the use of the computer terminal by the researcher and the computer consultant. The students were encouraged to use the lesson as a review tool throughout the quarter. Food and lodging, dietetic, and graduate students enrolled in FSA 4130, Food Systems Administration, during fall quarter, 1976, also utilized a Fortran computer program simulating the flow of customers through a cafeteria serving line and the effect on entree serving time. These experiences with the computer enabled students to understand the capabilities and benefits of computer access, as well as an appreciation of some of the problems that occur when working with a computer system.

Students in FSA 4140, winter quarter, were introduced to CAI in a lecture. Because FSA 4130 is a prerequisite to FSA 4140, all students in the class had previously been exposed to some computer interaction;

only the dietetic students, however, had previously utilized CAI. Areas covered in the introductory lecture included a definition of CAI, a short history of its development, current applications of CAI in various disciplines, and advantages of CAI as an instructional strategy. Because student connect time while "signed-on" to the computer was a cost factor in the CAI project, this aspect also was discussed with the students. Students then were introduced to the CAI experience in which they were to be involved as a part of the course. Time was allowed for a question-and-answer session. After the introductory lecture and discussion, class members were scheduled to attend small-group orientation sessions at which operation of the computer terminals was demonstrated.

Orientation of Students to Computer Hardware

Arrangements were made with the University of Tennessee, Knoxville, Computing Center for reservation of a room containing ten Digital Corporation VT-50 cathode-ray-tube computer terminals. This room was reserved for the small-group orientation sessions, as well as for various hours during the period the case studies were used. Students also had access to any of the approximately 50 terminals located on campus at hours outside the reserved times, but on a first-come, first-serve basis. Reservation of the terminal room guaranteed a period of uninterrupted use of terminals by FSA 4140 class members.

Small-group orientations were one-hour sessions consisting of eight to ten students led by the researcher and the computer consultant. Student computer numbers were assigned and operation of the

terminal was demonstrated. Students then practiced "signing on" and "signing off" with the help of the orientation leaders. Possible problem situations concerning terminal operation were outlined along with possible solutions. The small size of the group allowed each student the opportunity to work at her/his own terminal, experiencing interaction and receiving immediate feedback from the orientation leaders if questions arose or problems were encountered.

Off-campus students received the introductory CAI lecture via videotape and so were familiar with the activities of their on-campus counterparts. Use of the programmed-learning booklets was explained by the researcher and the FSA 4140 course instructor. Specified times were designated for teleconference calls to discuss the case study simulations.

Use of CAI Lessons by Students

The sequence of events an individual student followed in progression through the CAI experience is shown in Figure 4.2. As seen in Table C.1, case studies were assigned during a three-week period following prerequisite learning experiences. Usually there was a three to four day period between assignment of the case study and the follow-up small-group discussions. The assignment usually was made at the end of the week for completion by the beginning of the following week. This intervening time period allowed students ample access to computer facilities according to each student's own schedule.

As each student proceeded through a case study problem, she/he was asked to record each decision on a preprinted answer sheet

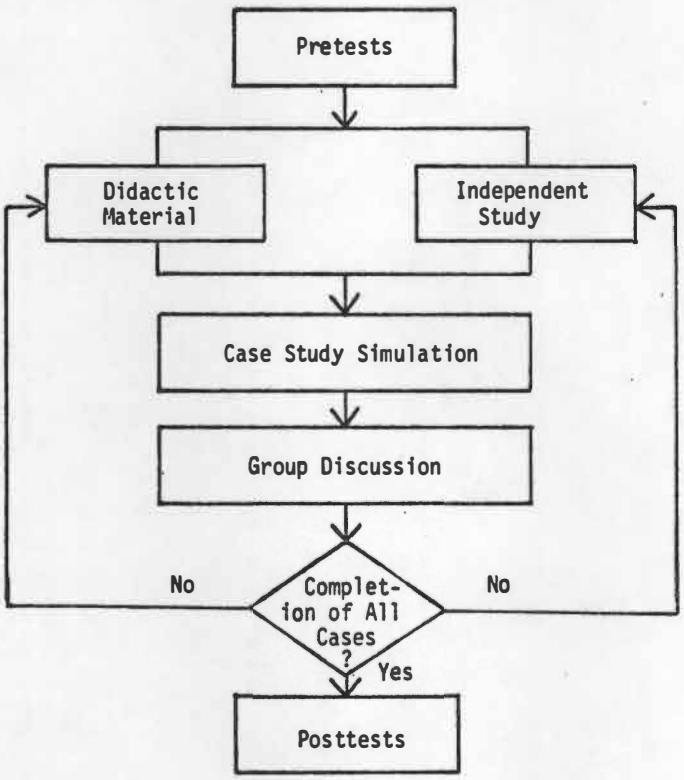

Figure 4.2. Sequence of Events for a Student Participating in Case Study Simulations.

(Form D.1). The answer sheet was developed in lieu of hard-copy printout so the student could have a record of her/his decision pathway. Space was provided for the student to record the rationale for each decision made, along with comments for discussion and overall reaction to the case study. The answer sheets were utilized during the small-group discussions and submitted to the instructor after completion of the assignment.

After completion of each case study, a portion of the following class period was utilized for small-group discussions of the case study situation. Groups of eight to ten students met to share their decision-making experiences and rationales with fellow class members and a group discussion leader.

Group discussions also were conducted with off-campus students by means of a scheduled teleconference. This arrangement allowed the instructor to discuss decisions and rationales with the group, guiding the encounter while allowing the participants to share their views.

4.7. EVALUATION OF CAI EFFECTIVENESS

Two standardized tests, the Leadership Evaluation and Development Scale (LEADS) and the Leadership Opinion Questionnaire (LOQ), were used as pretest-posttest instruments to determine the effectiveness of the CAI component. The two instruments were used to assess change in managerial decision-making ability and in the leadership dimensions defined as Consideration and Structure.

A third evaluation tool, known as the Self-Perception of Confidence (SPOC) Scale (Form D.2), was designed to measure student confidence

in situations relating to personnel management. SPOC was developed using the basic concept of an instrument known as a "comfort scale" obtained by the researcher in material distributed at a CAI workshop (Use of the Computer in Dietetics, 1975). Although the term "confidence" appears to be the term best suited for assessment of a managerial trait, the term "comfort" was retained in the body of the instrument since limited reliability with use of the term had previously been established at The Ohio State University.

The SPOC scale consisted of 15 short phrases, each describing a situation relating to personnel management. The descriptive phrases were checked for content validity and clarity of expression by food systems administration faculty members. Students were asked to rate their comfort (confidence) on a scale of one to five, one meaning "very uncomfortable" to five meaning "very comfortable." Ratings from the 15 situation then were weighed, totaled, an an average computed, giving a confidence score for each student. The SPOC scale was used as a pretest-posttest evaluation instrument to assess change in confidence after the CAI case study experience.

The range, mean, and standard deviation were computed for class scores on the three evaluation instruments. A Student's t-test was used to test for significant differences in pretest and posttest scores within student groups (e.g. dietetic students, food and lodging students, other students) for all three evaluation instruments. A z-test was used to test for significant differences in pretest and posttest scores for the class as a whole for all three evaluation instruments. A

biserial correlation coefficient was computed with student scores on each of the three evaluation instruments and the forced dichotomy of supervisory work experience--no supervisory work experience. A Spearman's Rank-Difference Correlation Coefficient also was computed to assess correlation between the pretest and posttest scores for each evaluation instrument. A Pearson Product-Moment Correlation Coefficient was computed to check for correlation between the posttest scores for each instrument and student grade point average.

Profile and Cost Data

Profile data were collected on each student prior to beginning the study. A profile data sheet (Form D.3) was developed to gain specific information from student participants. Information collected included personal descriptive information, previous management coursework, previous supervisory work experience, and previous exposure to CAI. The information was used to describe the FSA 4140 class population and as a basis for the biserial and Pearson Product-Moment correlations.

Cost data for the study also were compiled. This included cost of computer terminals for development of CAI lessons, cost of consultant/programmer time, cost of use of computer core, and cost of student connect time.

CHAPTER 5

RESULTS AND DISCUSSION

Personnel management competencies required of an entry-level generalist dietitian were identified and prioritized. The competency assigned top priority by a 20-member panel of food service managers and administrative dietitians related to the development of an effective and satisfied working force in a foodservice system. This competency was used as a basis for the development of four food service personnel management case study simulations. A seven-member panel, composed of food systems administration faculty and clinical instructors, checked the case studies for content validity before presentation to the students. Fifty-nine students, enrolled in FSA 4140, Food Systems Personnel Development, winter quarter, 1977, participated in the simulations presented via CAI and programmed-learning booklets.

Each case study simulation was based on terminal performance objectives and enabling objectives designated to help meet the selected personnel management competency (Task Force for Developing Competencies, 1975). Case studies were designed to reinforce learning acquired in class lectures and required reading assignments.

The importance of measurement of employee productivity and evaluation of employee performance was stressed in Case Study One, Sally's Staffing Problem. Maintenance of the work force through personnel scheduling was also emphasized. The case study situation was designed to demonstrate some of the problems which might occur in a

food service operation due to underproductivity, poor work center arrangement, inadequate scheduling, and ineffective supervision. Students were guided through an analysis of staffing needs in working toward the solution.

The management functions of recruiting, interviewing, hiring, orienting, training, appraising, and terminating were the focus of Case Study Two, A Problem of Promotion. The student was required to utilize knowledge gained from a class lecture on employee selection and promotion and required readings to arrive at a solution. The case study was designed to promote awareness of the factors considered in employee selection and/or promotion, and the importance of communication between an administrator and her/his employees.

The terminal performance objective relating to the development of orientation, in-service training, and education programs for personnel was the basis for Case Study Three, Determining Training Needs for a Food Service Operation. The case study focused on methods of employee training, factors considered in selection of a training method, and the importance of employee cooperation to the success of a training program.

Human relations was the central theme of Case Study Four, The Feud. Faced with the problems of two long-standing employees who argue constantly, the student was required to utilize knowledge of employee hierarchial needs, job satisfaction, and motivation theory. The effect of employee rapport on morale and productivity was emphasized, and the role of the food service administrator as a counselor was highlighted.

Students worked independently on each case study. Twenty to 30 minutes was required for completion of each decision-making activity and the accompanying answer sheet. Three to five decisions for each case study were required of the student before completion of the simulation.

5.1. SMALL-GROUP DISCUSSIONS

Feedback was provided in small-group discussions with fellow class members and a group discussion leader following completion of each case study simulation. Each case study situation was reviewed with the discussion leaders prior to the discussion sessions. A summary sheet consisting of a description of the problem situation along with abbreviated versions of each decision alternative and consequence were prepared by the researcher for use by the discussion leaders during the group interaction period. An example of such a summary sheet is shown in Figure C.2.

The small-group, consisting of eight to ten students with the discussion leader, offered the students an opportunity to share their decision-making experiences and rationales for their decisions. Within each group, varying opinions on how to solve the problem were related to the management theories presented in the prerequisite learning experiences. The group discussions aided the students in the development of problem analysis and communication skills, as well as respect for and utilization of the ideas of others.

Because of the constraints of class time and course demands, the discussions were limited to approximately 20 to 30 minutes. An increase in the amount of time allotted to the discussion period would

allow more in-depth analysis of the problem presented and further opportunity for development of skills.

5.2. EVALUATION OF STUDENT PERFORMANCE

Evaluation of the effectiveness of CAI was assessed by the use of three test instruments, the Leadership Evaluation and Development Scale (LEADS), the Leadership Opinion Questionnaire (LOQ), and the Self-Perception of Confidence (SPOC) Scale. The tests were administered immediately before and after the CAI exposure. A 31-day time period occurred between pretest and posttest administrations of the three test instruments. Student scores arranged by student classifications (dietetic, food and lodging, other) on pretest and posttest administrations of the three test instruments is shown in Table A.1. Whether or not each student had previous supervisory work experience is also indicated.

Leadership Evaluation and Development Scale (LEADS)

Managerial decision-making ability of the students was assessed by use of the LEADS instrument. All four of the case study simulations were designed to give students additional experience in managerial decision-making. Table 5.1 shows the LEADS pretest and posttest scores for students in FSA 4140, Food Systems Personnel Development.

Using the Student's t-test for analysis, an increase in score, significant at $p \leq .05$, was noted with the dietetic students. Significant changes from pretest to posttest scores were not evident with other student classifications or the total student group.

Table 5.1. Leadership Evaluation and Development Scale (LEADS) Pretest-Posttest Scores for Students Participating in Case Study Simulations via Computer-Assisted Instruction and Programmed-Learning Booklets in FSA 4140, Food Systems Personnel Development

Student Classification	N	Pretest Scores* Range	Mean	Standard Deviation	Posttest Scores* Range	Mean	Standard Deviation
Undergraduate Students							
Dietetic Students	17	14-34	27	4.6	20-36	29**	5.2
Food and Lodging Students	28	17-37	28	5.0	16-35	27	5.4
Other Students	14	21-38	29	4.8	21-37	29	5.1
TOTAL	59	17-38	28	4.9	20-37	28	5.4

*Total Possible Score = 44.

**Significant at $p \leq .05$ (Student's t-test).

The LEADS pretest and posttest scores for students in FSA 4140 corresponding to norms given for the LEADS test in the Preliminary Manual for LEADS (Mowry, 1964) is shown in Table A.2. The norm mean score for the LEADS instrument was 25. The FSA 4140 class mean for both the pretest and posttest administrations was 28, indicating that the class scored in the 70th percentile.

A Spearman's Rank-Difference Correlation of the pretest and posttest LEADS scores showed a rho correlation coefficient of 0.75. Student scores tended to fall in the same ranked position on the pretest and posttest administrations. When LEADS pretest scores were correlated with the forced dichotomy of supervisory work experience - no supervisory work experience, a biserial correlation coefficient of 0.51 was computed. LEADS posttest scores correlated 0.39 with the same variable. No significant difference was found between the two correlations, indicating that the case study simulations affected both groups of students (those with work experience and those without work experience) similarly. A Pearson Product-Moment Correlation of 0.24 was compuated between posttest LEADS scores and student grade point average

Pretest and posttest scores by student classifications are shown in Table A.1. Of the 59 class members, 31 improved their LEADS score by one to eight points. Twenty-three of the 59 students decreased their LEADS score by one to nine points, while 5 of the 59 class members showed no change from pretest to posttest. Of the 31 class members without previous work experience, 16 (52 percent) increased their LEADS score, 11 (35 percent) decreased their LEADS score, and 4 (13 percent) remained unchanged. Of the 28 students having previous work experience, 15 (54 percent) increased their LEADS score, 12 (43 percent) decreased their

score, and 1 (3 percent) remained unchanged from pretest to posttest administrations.

Students attributed decreases in test scores to reasons such as attempts to remember answers from the pretest administration rather than carefully reassessing the problem presented, lack of interest in performing well on the second administration, or poor attitude the day of the test.

Leadership Opinion Questionnaire (LOQ)

The LOQ instrument measured two dimensions of leadership, Consideration and Structure. The Consideration dimension was particularly stressed in the case studies A Problem of Promotion and The Feud. Good relations with subordinates was an important factor in both case study situations. The Structure dimension was highlighted in the case studies Sally's Staffing Problem and Determining Training Needs for a Food Service Operation, in which organization, planning and scheduling were emphasized. Pretest and posttest Consideration scores for FSA 4140 students are shown in Table 5.2, while Table 5.3 shows the pretest and posttest Structure scores. Using the Student's t-test for analysis, no significant change from pretest to posttest scores were evident in either Consideration or Structure.

Consideration and Structure pretest and posttest scores for FSA 4140 class members corresponding to norms given for Consideration and Structure in the Manual for the Leadership Opinion Questionnaire (Fleishman, 1969) are shown in Table A.3 and Table A.4, respectively. Eighty-one percent of the class scores correspond to the average to high verbal description groups in Consideration on the pretest, while

Table 5.2. Leadership Opinion Questionnaire (LOQ)--Consideration Pretest-Posttest Scores for Students Participating in Case Study Simulations via Computer-Assisted Instruction and Programmed Learning Booklets in FSA 4140, Food Systems Personnel Development

Student Classification	N	Pretest Scores*			Posttest Scores*		
		Range	Mean	Standard Deviation	Range	Mean	Standard Deviation
Undergraduate Students							
Dietetic Students	16	43-65	55	5.6	43-62	54	5.1
Food and Lodging Students	28	43-66	54	5.6	39-70	54	8.0
Other Students	14	49-65	56	4.9	46-65	56	6.6
TOTAL	58	43-66	55	5.6	39-70	55	6.7

*Total Possible Score = 80.

Table 5.3. Leadership Opinion Questionnaire (LOQ)--Structure Pretest-Posttest Scores for Students Participating in Case Study Simulations via Computer-Assisted Instruction and Programmed Learning Booklets in FSA 4140, Food Systems Personnel Development

Student Classification	N	Pretest Scores*			Posttest Scores*		
		Range	Mean	Standard Deviation	Range	Mean	Standard Deviation
Undergraduate Students							
Dietetic Students	16	24-55	46	4.6	37-54	46	4.4
Food and Lodging Students	28	38-61	50	5.4	37-60	48	5.6
Other Students	14	41-57	48	4.3	39-57	47	5.0
TOTAL	58	34-61	48	5.2	37-60	47	5.3

*Total Possible Score = 80.

74 percent ranked average to very high on the posttest as seen in Table A.3.

Sixty-seven percent of the class ranked average to high in Structure on the pretest, whereas 49 percent of the class scores corresponded to the average to high descriptions on the posttest, as shown in Table A.4. Fifty-one percent of the class scored in the low to very low categories in Structure on the posttest. In a study described in the Manual for the Leadership Opinion Questionnaire (Fleishman, 1969), a large electronics company utilizing the LOQ found its managers gravitating toward the high Consideration-low Structure pattern. Since a high Consideration-high Structure pattern was desired, more material on planning and organizing was added to the company's training program. As a result, an increase in the Structure dimension was noted in subsequent evaluation. A similar trend in the FSA 4140 class scores could, therefore, indicate a need for more instruction or experience on the planning and organizing functions of management.

A Spearman's Rank-Difference Correlation of the Consideration pretest and posttest scores gave a rho correlation coefficient of 0.59. Correlation of the Structure pretest and posttest scores also gave a rho correlation coefficient of 0.59.

Using the biserial correlation for supervisory work experience-no supervisory work experience with the Consideration pretest scores, a correlation of 0.35 was found. Posttest scores correlated 0.41 with the variable. A significant difference was not found between the correlation coefficients, indicating that the simulation exercises affected all students in the same manner, regardless of previous work experience. Pretest Structure scores correlated -0.02 with the variable

of supervisory work experience - no supervisory work experience, while posttest scores correlated -0.22. Again, no significant difference was found between these correlation coefficients. The negative correlation coefficient possibly indicates that students with work experience tended to exhibit fewer of the Structure characteristics than students without work experience.

A Pearson Product-Moment Correlation indicated no relationship between Consideration scores and student grade point average. Likewise, no relationship was found between Structure scores and student grade point average.

Of the students completing the LOQ, 20 of the 58 increased their Consideration score by 1 to 25 points as shown in Table A.1. Thirty-three of the 58 students decreased their Consideration score by 1 to 14 points. Five students did not change their Consideration score from pretest to posttest administrations. Comparison of pretest and posttest Structure scores showed that 20 of the 58 students increased their Structure score by 1 to 7 points, while 34 of the 58 students decreased their score by 1 to 14 points, and four remained unchanged from pretest to posttest administrations.

Of the 30 class members completing the LOQ who did not have previous supervisory work experience, 11 (37 percent) increased their Consideration score, 18 (60 percent) decreased their Consideration score, and one remained unchanged. Of the same 30 people, 13 (43 percent) increased their Structure score, 16 (53 percent) decreased their Structure score, and one remained unchanged from pretest to posttest administration.

A comparison of pretest and posttest scores for the 28 students having previous supervisory work experience showed that 9 (32 percent)

increased their Consideration score, 15 (54 percent) decreased their Consideration scores and 4 (14 percent) remained unchanged from pretest to posttest administrations. Of these 28 students, 7 (25 percent) increased their Structure score, 18 (64 percent) decreased their Structure score, and 3 (11 percent) showed no change.

Developers of the LOQ indicated that the most desirable situation occurred when supervisors were average to high in both Consideration and Structure (Fleishman, 1969). FSA 4140 students satisfied this statement in the Consideration dimension, but tended to be low in Structure, both before and after the CAI simulations.

Self-Perception of Confidence (SPOC) Scale

All four case study simulations were designed to aid students in developing and/or gaining comfort (confidence) in personnel management problem situations. Pretest and posttest SPOC scores for students in FSA 4140 are shown in Table 5.4. Using the Student's t-test for analysis, an increase in comfort (confidence), significant at $p \leq .05$, was noted with the food and lodging students. A z-test indicated an increase in score significant at $p \leq .01$ for the class as a whole.

A Spearman's Rank-Difference Correlation between pretest and posttest scores gave a rho correlation coefficient of 0.64, indicating a tendency for students who rated themselves high to continue to do so. Biserial correlation for pretest SPOC scores with the dichotomy of work experience-no work experience showed a correlation of 0.12, while correlation of posttest SPOC scores was 0.11. There was no significant difference in the two correlation coefficients. The CAI case study simulations

Table 5.4. Self-Perception of Confidence (SPOC) Scale[#] Pretest-Posttest Scores by Students Participating in Case Study Simulations via Computer-Assisted Instructions and Programmed-Learning Booklets in FSA 4140, Food Systems Personnel Development

Student Classification	N	Pretest Scores			Posttest Scores		
		Range	Mean	Standard Deviation	Range	Mean	Standard Deviation
Undergraduate Students							
Dietetic Students	17	2.0-4.8	3.5	0.44	2.2-4.6	3.7	0.54
Food and Lodging Students	28	2.3-4.1	3.4	0.40	2.6-4.3	3.5*	0.43
Other Students	14	3.0-4.9	3.7	0.54	3.1-4.7	3.8	0.51
TOTAL	59	2.3-4.9	3.5	0.47	2.2-4.7	3.6**	0.49

*Significant at $p \leq .05$ (Student's t-test).

**Significant at $p \leq .01$ (z-test).

[#]SPOC Scale: 1 = Very uncomfortable
2 = Fairly uncomfortable
3 = Neutral
4 = Fairly comfortable
5 = Very comfortable

affected the FSA 4140 class members similarly, despite differences in previous work experience. A Pearson Product-Moment Correlation showed no correlation between SPOC posttest scores and student grade point average.

Thirty-six of the 59 students improved their SPOC score by 0.1 to 1.4 points, 18 of the 59 students decreased their score by 0.1 to 1.2 points, and 5 students showed no change in comfort (confidence) as seen in Table A.1. Of the 31 students having no previous supervisory work experience, 16 (52 percent) increased their SPOC score, 12 (39 percent) decreased their SPOC score, and 3 (9 percent) remained the same from pretest to posttest. A comparison of pretest and posttest scores of the 28 students having previous work experience showed 19 (68 percent) improved their SPOC score, 7 (25 percent) decreased their SPOC score, and 2 (7 percent) remained the same from pretest to posttest administrations

5.3. STUDENT RESPONSE TO CAI PROJECT

Student response to the CAI project was positive. Although minor frustrations sometimes resulted from problems with computer terminals, students commended the project as a meaningful learning experience. Those with work experience stated that the cases were realistic, thus establishing further content validity. Participants stated that having to deal with a consequence of each decision reinforced the concept of thinking through a situation before acting.

Several students suggested that case studies be developed on other topics, indicating interest in expansion of the CAI application. In a poll taken in class at the end of the CAI experience, the students supported the continuation of CAI as a component of FSA 4140. Only one student out of 59 expressed the opinion that time allotted to CAI could have been better utilized another way.

5.4. TIME AND DIRECT COST DATA

A summary of the time and direct cost data compiled during the study is shown in Table A.5. Time data are a reflection of the actual person-hours spent in development, implementation, and instructional activities. Development time for this project comprised the largest segment of the time data. However, case studies were written without specific time references so that the cases could be used for several years without the need for major revision. Programming of the case studies was also considered a one-time task, although periodic pretesting and simple revisions may be necessary. While the initial orientation of the faculty was costly in terms of both time and money (removing faculty from other productive tasks), subsequent professional development may be less detailed and comprehensive.

While charges for terminal purchase and shipping were the most expensive of the direct costs, this was a one-time expenditure. Maintenance of the equipment and purchase of software (e.g. computer printout paper for the teletypewriter terminal) were required periodically but were nominal. Storage of the finished CAI lessons on computer tape removed them from the computer core, and lowered storage charges to one dollar per month.

If adequate terminals are available, purchase of terminals for developmental purposes by a dietetic program could be eliminated, greatly lowering the cost of inclusion of CAI in the dietetic education program. Depending on the complexity of the CAI lessons and programming knowledge of the dietetic educator, consultant and programmer fees could be reduced with in-house programming. Programming by the dietetic educator, however, is a cost factor in that it removes her/him from performing other tasks important to the functioning of the dietetic education program.

CHAPTER 6

CONCLUSION, RECOMMENDATIONS, AND SUMMARY

6.1. CONCLUSION

The models developed for inclusion, development, and implementation of CAI in a dietetic education program were found to be feasible for use with the Coordinated Undergraduate Program in Dietetics at The University of Tennessee, Knoxville. CAI was included as a part of the course FSA 4140, Food Systems Personnel Development, taught winter quarter, 1977. Application of the development model resulted in the creation of four case study simulations designed to expand and upgrade experiences in decision-making for personnel management. The case study simulations were implemented successfully and utilized by 59 students enrolled in FSA 4140.

Effectiveness of the CAI case studies were assessed by the use of three test instruments as pretest-posttest evaluation devices. Use of Leadership Evaluation and Development Scale (LEADS) was employed to measure managerial decision-making ability. Dietetic students were the only student group to exhibit a significant increase in LEADS scores after the CAI simulation experience. The Leadership Opinion Questionnaire (LOQ) measured the leadership dimensions of Consideration and Structure. No significant change in pretest to posttest scores was noted in either dimension by any student group. The Self-Perception of Confidence (SPOC) Scale was employed to assess change in "comfort"

of a student when faced with a personnel management problem situation. A significant increase was seen here with the food and lodging student group and in the class as a whole after the CAI simulation experience.

Acquiring of the management skills such as the ones being measured by the three instruments used is a long-term developmental process. Students cannot be expected to acquire and/or improve personnel management skills in a few short weeks. The use of only four CAI case study simulations does not appear to be sufficient "experience" to effect a significant change in these management skills or traits.

Assessment of affective behaviors is difficult and has received less emphasis compared to other areas such as the cognitive and psychomotor domains. Achievement of changes in affective behavior may not manifest themselves until some time after completion of a learning experience. Results of the pretest-posttest evaluation instruments do not reflect significant affective change as a result of the CAI simulations at this point in time. This is not to say that change has not occurred, but may manifest itself at a later time.

Positive student response to the CAI simulations seems to indicate a meaningful learning experience, though success is not reflected in objective measurements. Application of CAI in the meeting of other more objectively measurable competencies can further help to establish CAI as a viable component of a dietetic education program. Until better methods of assessing affective change are developed, however, subjective evaluation of success of CAI in effecting

changes in the affective domain must continue.

6.2. RECOMMENDATIONS

The approach used for assessment of needs in the dietetic program was effective, and should be continued on a regular basis. The postgraduate questionnaire should be expanded to include feedback on the long-term effect of inclusion of CAI. Graduates should be asked to suggest possible decision-making experiences which may be used to supplement current learning activities. Competencies, terminal performance objectives, and enabling objectives should be clearly identified for all food science, nutrition, and food systems administration courses. This identification process should be pursued by all persons involved in dietetic education. Didactic and clinical instructors, students, and dietetic professionals should continue the process of identifying competencies needed by an entry-level generalist dietitian. Alternative methods of meeting the stated competencies should be investigated. Dietetic professionals and educators should work closely with hospital administrators to gain support for "on-the-job" learning experiences to complement simulated learning experiences.

Application of CAI could be expanded to reinforce didactic instruction in achieving competencies required of an entry-level generalist dietitian. Additional tutorial, drill-and-practice, and simulation programs could be developed and introduced into the instructional program in the areas of food science, nutrition, and food systems administration. Faculty should be encouraged to take

advantage of the convenient access to the computer terminals for development of CAI lessons in various subject matter areas.

Movement of the CAI case study simulations from the didactic course FSA 4140, Food Systems Personnel Development, to the corresponding clinical course for the dietetic students, FSA 4420, Clinical Experience in Dietetics is recommended. Only 29 percent of the dietetic students enrolled in FSA 4140 had previous work experience, as compared to 50 percent of the food and lodging students and 64 percent of the graduate students. Experience provided by the case study simulations could help remove this deficiency, and better prepare the dietetic students to appreciate "real" experiences encountered in the clinical facility. CAI case study simulations should not, however, be limited to use by dietetic students only. Simulations could be used to assist any student in food systems administration with inadequate background in personnel management. Movement of the CAI case study simulations to the clinical course also removes, to some extent, the constraints of class time. Small-group discussions with a clinical instructor could be pursued in greater depth, thus increasing the benefits of the simulation experience.

Preparation of a more detailed "learning packet" for each case study simulation is recommended. Prerequisite learning experiences could be more clearly indicated, along with guidelines or "thought questions" for use by participants in the small-group discussions. More time should be devoted to the small-group discussions, since much of the benefit of the simulation experience is derived from the sharing of various approaches to the problem situation. Group discussion

leaders should meet prior to the encounters to review the case study problem, alternatives, consequences, and approaches to the discussion sessions.

Further research is needed in the area of evaluation of CAI effectiveness, especially when the objective(s) to be met by the use of CAI is (are) affective in nature. Until objective methods of assessing affective behavior is developed, subjective evaluation must be utilized.

6.3. SUMMARY

The purpose of this study was to develop and implement CAI-simulated learning experiences in food systems administration to assist dietetic students in gaining proficiency and self-confidence in the decision-making skills of personnel management.

Models were developed for the inclusion, development, and implementation of CAI in a dietetic education program. These models were then applied to the Coordinated Undergraduate Program in Dietetics, The University of Tennessee, Knoxville.

Assessment of needs of competencies to be met in food systems administration was performed with input from program graduates, didactic and clinical instructors, and dietetic coordinators. Competencies in personnel management applicable to an entry level generalist dietitian were identified and prioritized by a 20-member panel of experts. Terminal performance objectives and enabling objectives for the top priority competency acted as guides for the development of four personnel management case study simulations.

The four personnel management case studies were programmed in Coursewriter III computer language for presentation on Digital Corporation VT-50 cathode-ray-tube computer terminals. Pretesting for content validity was performed by a seven-member panel of experts before presentation of the cases to the students. Debugging was performed to check for proper programming of the case study material.

Participating faculty and students were introduced to CAI and oriented to the use of the computer terminals. Case study simulations were presented via CAI and programmed-learning booklets to 59 students enrolled in FSA 4140, Food Systems Personnel Development, winter quarter, 1977. Small-group discussions after completion of each case study helped enrich the learning experience.

Evaluation of CAI effectiveness was assessed by administration of three test instruments immediately before and after the CAI experience. The Leadership Evaluation and Development Scale, the Leadership Opinion Questionnaire, and the Self-Perception of Confidence Scale assessed managerial decision-making ability, the leadership dimensions of Consideration and Structure, and comfort (confidence) of the student when faced with a personnel management problem situation, respectively. No significant changes in managerial decision-making ability or in the leadership dimensions of Consideration and Structure were indicated as a result of the CAI simulations as measured by these test instruments. A significant increase was noted in comfort (confidence) in the class as a whole and within the food and loding student group in the class. No significant relationship was found between test scores on any of

the three instruments and the variable of student grade point average. Little relationship was found between scores on the three evaluation instruments and previous work experience. Although effectiveness of the CAI case study simulations was not evident in the results of the objective measurements used, students and faculty involved responded positively to the CAI experience and showed interest in continuation and expansion of the CAI component.

The models for inclusion, development, and implementation of CAI in a dietetic education program were feasible for use with the Coordinated Undergraduate Program in Dietetics, The University of Tennessee, Knoxville. Application of the models should be extended to incorporate other areas within the program. Further research is recommended on the use of CAI to meet both cognitive and affective competencies in a dietetic education program. Research in evaluation of affective change is necessary to enable assessment of effectiveness of CAI when objectives to be met are affective in nature.

LIST OF REFERENCES

LIST OF REFERENCES

Alpert, D. and Bitzer, D. L.: Advances in computer-based education. Science 167: 1582, 1970.

Anon.: Let's get down to cases: the feud. Supervisory Mgmt. 15(10): 43, 1970.

Anon.: Let's get down to cases: a problem of promotion. Supervisory Mgmt. 17(2): 43, 1972.

Armsey, J. W. and Dahl, N. C.: Computers. In "An Inquiry into the Uses of Instructional Technology." New York: The Ford Foundation, 1973.

Beck, I. H. and Monroe, B.: Some dimensions of simulation. Ed. Tech. 9(10): 45, 1969.

Bork, A. M.: Computers in education--the full spectrum. Contemporary Ed. 40(5): 275, 1969.

Breese, M. S., Welch, A. C., and Schimpfhauser, F.: Computer-simulated clinical encounters. J. Am. Dietet. Assoc. 70(4): 382, 1977.

Broadman, R.: The theory and practice of educational simulation. Ed. Research 11: 179, 1969.

Butman, R. C.: CAI--there is a way to make it pay (but not in conventional schooling). Ed. Tech. 13(12): 5, 1973.

Caffarella, E. P.: How little do we know about the cost-effectiveness of instructional technology? Ed. Tech. 11(1): 56, 1975.

Canter, D. D.: A CAI lesson on the ADA exchange lists. Class project. The Univ. of Tenn., 1975.

Chase, R. M.: Computer management game. Cornell H.R.A. Quarterly 9(3): 92, 1968.

Cheatham, T. R. and Erickson, K. V.: Simulation exercises: a viable alternative to lecturing in high enrollment classes. Improving College and Univ. Teaching Yearbook 1976: 87, 1976.

Chervenak, P. J.: Sally's staffing problem. Class project. The Univ. of Tenn., 1976.

Committee on Goals of Education in Dietetics, Dietetic Internship Council: Goals of the clinical phase of dietetic education. Unpublished paper. Am. Dietet. Assoc., Chicago, 1972.

Craig, D.: Guiding the change process in people. J. Am. Dietet. Assoc. 58(Jan.): 22, 1971.

Dietetic Internship Council, Am. Dietet. Assoc.: Competencies of the entry-level generalist dietitian. Unpublished paper. Am. Dietet. Assoc., Chicago, 1974.

Doppelt, J. E.: Leadership Opinion Questionnaire. In "The Sixth Mental Measurements Yearbook," ed. Buros, O. K. Highland Park, N.J.: The Gryphon Press, 1965.

Fleishman, E. A.: Manual for Leadership Opinion Questionnaire. Chicago: Science Research Associates, Inc., 1969.

Ford, L.: Using the Case Study in Teaching and Training. Nashville: Broadman Press, 1969.

Galvin, T. J.: The Case Method in Library Education and In-Service Training. Metuchen, N.J.: The Scarecrow Press, Inc., 1973.

Gibb, C. A.: Leadership Evaluation and Development Scale. In "The Seventh Mental Measurements Yearbook," ed. Buros, O. K. Highland Park, N.J.: The Gryphon Press, 1972a.

Gibb, C. A.: Leadership Opinion Questionnaire. In "The Seventh Mental Measurements Yearbook," ed. Buros, O. K. Highland Park, N. J.: The Gryphon Press, 1972b.

Griffith, R. T.: Effect on turnover of training food service employees. J. Am. Dietet. Assoc. 65: 43, 1974.

Hansen, D. N.: Computer assistance with the educational process. Rev. of Ed. Research 36(5): 588, 1966.

Harless, W. G.: CASE: a computer aided simulation of the clinical encounter. J. Med. Ed. 46(May): 443, 1971.

Haubenreich, M. A.: Determining training needs in a food service operation. Class project. The Univ. of Tenn., 1976.

Hawkins, H. L. and Ney, D. D.: Utilizing computer-assisted instruction in training school administrators. Improving College and Univ. Teaching 24(1): 13, 1976.

Hayden, R. J.: Performance appraisal: a better way. Pers. J. 52: 606, 1973.

Howells, G. W.: Case studies--Birmingham style. Pers. Training and Mgmt. 35(3): 32, 1969.

Hunt, D.: The case method of instruction. Har. Ed. Rev. 21(Summer): 175, 1951.

Hunter, B., Kastner, C. S., Rubin, M. L., and Seidel, R. J.: Today's computer-based learning methods: health professions. In "Learning Alternatives in U.S. Education: Where Student and Computer Meet." Englewood Cliffs, N.J.: Educational Technology Publications, 1975.

Index to Computer Based Learning. ed. Hoye, R. E. and Wang, A. C. Englewood Cliffs, N.J.: Educational Technology Publications, 1973.

International Business Machines: Coursewriter III, Version 3, Author's Guide. White Plains, N.Y.: IBM Corporation, Technical Publications/Industry, 1973.

Kirchner, W. K.: Leadership Opinion Questionnaire. In "The Sixth Mental Measurements Yearbook," ed. Buros, O. K. Highland Park, N.J.: The Gryphon Press, 1965.

Kleiber, F. M.: How to select a supervisor. Supervision 35(May): 30, 1973.

Konnersman, P. N.: Forecasting production demand in the dietary department. Hospitals, J.A.H.A. 43: 85, 1969.

Koontz, H. and O'Donnell, C.: Principles of Management: An Analysis of Managerial Functions. New York: McGraw-Hill Book Co., 1972.

Kopstein, F. F. and Seidel, R. J.: Computer-administered instruction versus traditionally-administered instruction: economics. Audiovisual Communication Rev. 16(2): 147, 1968.

Lawson, V. K. Private communication. Memphis, TN., 1973.

Leskover, E. W.: A guide for discussing the performance appraisal. Pers. J. 46: 150, 1967.

Lipscomb, M. and Donaldson, B.: How well do directors of dietetics fulfill managerial responsibilities. J. Am. Dietet. Assoc. 45: 218, 1964.

Livingston, S. A.: Will a simulation game improve student learning of related factual material? Ed. Tech. 11(2): 19, 1971.

Loftin, M. M.: Whatever happened to CAI? Training in Business and Industry 11(6): 26, 1974.

Mager, R. F.: Preparing Instructional Objectives. Belmont, CA.: Lear-Siegler, Inc./Fearon Publishers, 1967.

Mitchell, P. D.: Can computer simulation improve the effectiveness of college training? Ed. Tech. 13(12): 14, 1973.

Mowry, H. W.: Preliminary Manual for Leadership Evaluation and Development Scale. Los Angeles, CA.: Psychological Services, Inc., 1964.

Oberg, W.: Make performance appraisal relevant. Har. Bus. Rev. Jan.-Feb.: 61, 1972.

O'Donovan, T.: Matching job to employee. Hospitals, J.A.H.A. 46(Nov. 1): 62, 1972.

Perry, J. W.: Allied health: dimensions, dilemmas, and decisions. J. Am. Dietet. Assoc. 61: 26, 1972.

Proceedings of a Conference on Computers in the Undergraduate Curricula. Iowa City: Center for Conferences and Institutes, The Univ. of Iowa, 1970.

Powell, J. V.: A model for the implementation of computer-assisted instruction on the university level. Improving College and University Teaching Yearbook 1976: 121, 1976.

Ramey, J. W.: Simulation in library administration. J. of Ed. for Librarianship 8(2): 85, 1967.

Reed, C. R., Collart, M. E., and Ertel, P. Y.: Computer-assisted instruction for continued learning. Am. J. of Nursing 72(11): 2035, 1972.

Rockart, J. F., Morton, M. S. S., and Zannetos, Z. S.: Associative learning project in computer assisted instruction. Ed. Tech. 11(11): 17, 1975.

Rowen, E. A.: Practical tips on training with CAI. Training in Bus. and Industry 10(6): 48, 1971.

Salisbury, A. B.: An overview of CAI. Ed. Tech. 11(10): 48, 1971.

Sanford, J. P., McKinley, M. M., and Scruggs, M.: Graduates of hospital dietetic internships. J. Am. Dietet. Assoc. 63: 254, 1973.

Schaeffer, B.: Teaching aids for dietary personnel. Hospitals, J.A.H.A. 44(Sept. 16): 74, 1970.

Schneider, C. E.: Training and development programs: what learning theory and research have to offer. Pers. J. 53(April): 288, 1974.

Scott, R. D.: Job expectancy--an important factor in labor turnover. Pers. J. 51(May): 360, 1972.

Seidel, R. J.: Is CAI cost/effective? The right question at the wrong time. Ed. Tech. 9(5): 21, 1969.

Shanklin, C. W.: The assessment of the feasibility for using the evaluation component of a model for implementing and evaluating a competency-based dietetic program. Unpublished dissertation. The Univ. of Tenn., 1976.

Slahor, S.: Decision-making experiences in administration. School Mgmt. 16(3): 31, 1972.

Smith, J. R.: Simulation: challenging enough for management. Training in Bus. and Industry 10(2): 47, 1973.

Smith, R. D.: Models for personnel selection decision. Pers. J. 52(Aug.): 688, 1973.

Spears, M. C.: The first year of a coordinated undergraduate program in food systems management. J. Am. Dietet. Assoc. 62: 417, 1973.

Stelzer, J.: Computer-assisted instruction and vocational education. Ed. Tech. 11(3): 43, 1971.

Task Force for Developing Competencies, Food Service System's Management Education Council: Suggested terminal performance objectives and enabling objectives for ADA competencies in management. Unpublished paper. Am. Dietet. Assoc., Chicago, 1975.

Umstattd, J. G.: College Teaching: Background, Theory, and Practice. Washington, D.C.: University Press, 1964.

Uhrich, R. V. and Noort, A. J.: Production demand forecasting. Hospitals, J.A.H.A. 37(3): 106, 1971.

Use of the Computer in Dietetics. Workshop at the Medical Dietetics Division, School of Allied Health Medical Professions, The Ohio State Univ., Aug. 27-29, 1975.

Walker, J. W.: Forecasting manpower needs. Har. Bus. Rev. 47(2): 152, 1969.

Wassertheil, S.: Computer assistance in statistics. Improving College and Univ. Teaching 17(4): 264, 1969.

West, B. B., Wood, L., Harger, V. F., and Shugart, G. S.: Food Service in Institutions. New York: John Wiley and Sons, Inc., 1977.

Wohlking, W.: Effective discipline in employee relations. Pers. J. 54(Sept.): 489, 1975.

Yetton, P.: Playing business games. Pers. and Training Mgmt. 34(6): 24, 1969.

Zachert, M. J. K.: Introduction to continuing education seminar #8: Use of simulation in the library science classroom. Paper presented at Special Libraries Assoc. Continuing Education Seminar, Detroit, Mich., 1970.

Zachert, M. J. K. and Pantelidis, V. S.: A computer-assisted sequential in-basket technique. Ed. Tech. 11(12): 44, 1971.

Zinn, K. L.: Computer technology for teaching and research on education. Rev. of Ed. Research 37(5): 618, 1967.

APPENDICES

APPENDIX A

TABLE A.1. Student Scores on Pretest and Posttest Leadership Evaluation and Development Scale (LEADS), Leadership Opinion Questionnaire (LOQ), Self-Perception of Confidence (SPOC) Scale, and Previous Supervisory Work Experience**

Student*	LEADS		LOQ Consideration		LOQ Structure		SPOC	
	Pretest	Posttest	Pretest	Posttest	Pretest	Posttest	Pretest	Posttest
1	25	22	43	49	46	52	4.8	4.6
2	17	20	52	56	46	42	3.4	2.2
3	27	33	55	49	50	44	3.2	3.5
4**	34	36	64	61	34	40	2.7	4.1
5	28	32	48	43	54	50	3.4	3.2
6	24	27	65	59	49	54	3.7	3.6
7**	31	33	58	58	45	44	3.3	3.9
8	24	24	48	49	48	45	3.6	3.6
9	24	24	--	--	--	--	4.1	4.3
10	30	33	55	54	43	42	3.3	3.5
11	34	36	55	61	47	37	3.7	3.8
12	31	28	60	54	46	50	3.7	3.9
13**	20	21	57	55	55	47	3.7	4.1
14	26	29	58	62	44	46	3.5	3.7
15**	27	32	57	54	44	46	3.7	4.2
16**	33	34	54	53	45	43	3.4	3.5
17	24	24	50	51	44	49	3.1	3.0
18	26	26	50	50	50	46	3.5	3.5
19**	34	31	51	52	49	53	2.9	3.5
20**	34	35	51	61	48	40	3.7	3.3
21**	35	31	51	54	52	49	3.6	3.8
22**	23	22	54	58	59	51	3.9	3.8
23**	24	27	43	68	38	37	2.7	2.8
24	26	29	43	40	52	56	3.3	4.3

TABLE A.1. (Continued)

Student*	LEADS		LOQ Consideration		LOQ Structure		SPOC	
	Pretest	Posttest	Pretest	Posttest	Pretest	Posttest	Pretest	Posttest
25**	23	24	63	60	54	52	3.2	3.5
26	31	34	48	50	48	44	3.1	2.9
27	35	34	54	40	40	47	3.3	3.3
28**	31	34	53	50	42	44	3.4	3.8
29	25	16	57	56	56	60	3.6	3.8
30	24	31	54	52	39	40	3.5	3.4
31	24	27	49	47	47	46	3.5	3.7
32	23	20	46	39	50	54	4.1	3.9
33	23	24	66	65	55	54	3.5	3.7
34**	31	34	57	57	52	50	3.1	2.7
35	33	26	53	52	53	39	2.9	3.5
36	28	21	55	61	48	48	3.3	3.5
37	21	22	55	45	49	53	3.5	3.6
38**	23	24	63	56	56	53	3.3	2.6
39**	29	21	53	48	51	45	3.2	3.1
40	17	19	56	52	61	57	2.3	3.7
41**	31	24	52	62	47	47	2.8	2.9
42**	37	35	48	43	46	43	4.0	4.1
43**	25	31	63	57	48	45	3.5	3.8
44	30	25	56	54	47	50	3.3	3.8
45**	26	22	58	70	51	47	3.8	4.1
46**	31	31	59	59	44	39	3.0	3.6
47	29	37	49	51	47	45	3.7	3.5
48	24	21	52	48	49	45	3.3	3.3
49**	32	31	54	46	44	51	4.3	4.6
50	30	27	55	62	50	46	3.3	3.5

TABLE A.1. (Continued)

Student*	LEADS		LOQ Consideration		LOQ Structure		SPOC	
	Pretest	Posttest	Pretest	Posttest	Pretest	Posttest	Pretest	Posttest
51**	21	25	58	49	57	57	3.7	3.7
52	34	32	54	64	48	52	4.9	4.7
53**	38	36	63	60	43	43	3.9	4.1
54**	30	25	51	54	49	41	3.2	3.3
55	21	22	49	47	47	43	3.2	3.1
56**	33	31	61	57	55	51	4.3	4.5
57**	24	22	65	65	51	52	3.5	3.4
58**	31	32	60	65	51	45	4.4	4.1
59**	32	34	59	58	41	42	3.5	3.5

*1-17 Dietetic Students

18-45 Food and Lodging Students

46-59 Other Students

**Indicates that the student had previous supervisory work experience.

TABLE A.2. Leadership Evaluation and Development Scale (LEADS) Pretest-Posttest Scores for Students in FSA 4140, Food Systems Personnel Development, Corresponding to Norm Scores

Percentile	Norm Score	Number of Students with Scores Corresponding to Norm Score	
		Pretest Score	Posttest Score
99	37-44	2	1
98	35-36	2	5
95	33-34	8	9
90	32	2	4
85	31	8	7
80	30	4	0
70	28-29	4	3
60	26-27	6	6
50	25	3	3
40	23-24	14	7
30	22	0	6
20	20-21	4	6
15	19	0	1
10	17-18	2	0
5	15-16	0	1
2	12-14	0	0
1	0-11	0	0

TABLE A.3. Leadership Opinion Questionnaire (LOQ)-Consideration Pretest-Posttest Scores for Students in FSA 4140, Food Systems Personnel Development, Corresponding to LOQ-Consideration Norm Scores

Verbal Description	Percentile	Consideration Norm Scores	Pretest Scores		Posttest Scores	
			No. Students in Category	% of Class	No. Students in Category	% of Class
Very High	97-99	67-72	0	0	2	3
High	75-96	58-66	17	29	18	31
Average	31-74	50-57	30	52	23	40
Low	5-30	42-49	11	19	12	21
Very Low	1-4	38-41	0	0	3	5

TABLE A.4. Leadership Opinion Questionnaire (LOQ)-Structure Pretest-Posttest Scores for Students in FSA 4140, Food Systems Personnel Development, Corresponding to LOQ-Structure Norm Scores

Verbal Description	Percentile	Structure Norm Scores	Pretest Scores		Posttest Scores	
			No. Students in Category	% of Class	No. Students in Category	% of Class
Very High	97-99	64-68	0	0	0	0
High	75-97	55-63	8	14	4	7
Average	31-74	47-54	31	53	24	42
Low	5-30	38-46	18	31	28	48
Very Low	1-4	31-37	1	2	2	3

TABLE A.5. Time and Direct Cost Data for Computer-Assisted Instruction Project in FSA 4140, Food Systems Personnel Development

Professional Time Data	Person-Hours	Direct Cost Data	Amount
Development Time		Consultation by CAI expert	$ 100.00
Writing of 4 case studies	450		
Consultation with CAI expert	10	Programming of case studies	382.00
Programming of case studies	22		
Pretesting of case studies	15	Orientation workshop	888.00
Implementation Time		Computer Center service charges*	21.00
Orientation of faculty (N=20) by consultant	144	Disk charges*	125.00
Orientation of students (N=48) by faculty	35	Terminal connect charges while programming*	114.00
Instructional Time			
Faculty preparation for small-group discussions	24	Terminal connect charges by students (48 students, 100 hrs.)*	48.00
Small-group discussions with students	12	Additional cost for student connect time, absorbed by The University of Tennessee, Knoxville	250.00
Revision of case studies	20		
TOTAL	732	Purchase and shipping of computer terminals for developmental purposes**	2,627.00
		TOTAL	$4,555.00

*Winter, 1977.

**Summer, 1976.

APPENDIX B

Form B-1. Food Systems Administration Section of Postgraduate Questionnaire Sent to Dietetic Graduates and Their First Employer One Year After Graduation

For each of the administrative elements listed, please check (✓) the column which best describes the adequacy of preparation in the first job in this area through the Coordinated Undergraduate Program in Dietetics at UT-K. If elements were not part of the first position, please check (✓) the first column.

Adequacy of Preparation

0 - no preparation
1 - very inadequate preparation, very little help
2 - somewhat inadequate, could have been improved considerably
3 - adequate, helpful, and needed little improvement
4 - very adequate, very helpful and could not easily have been improved.

Also, please check (✓) the last column for the administrative elements which you feel are most crucial for dietetic students to be given opportunities to practice decision-making.

	ADEQUACY OF PREPARATION						
	Not part of first position	No preparation 0	Very inadequate 1	Somewhat inadequate 2	Adequate 3	Very adequate 4	Students need decision-making opportunities
I. Departmental organization and management: Planning departmental objectives							
Planning departmental policies							
Developing departmental procedures							
Planning organizational structure							
Coordinating activities with other departments							
Coordinating activities within the department							
Evaluating departmental activities							

	ADEQUACY OF PREPARATION						
	Not part of first position	No preparation 0	Very inadequate 1	Somewhat inadequate 2	Adequate 3	Very adequate 4	Students need decision-making opportunities
II. Personnel Management: Interviewing and Selection							
Orientation and/or initial training							
Direct supervision							
Conducting group training programs							
Individual counseling							
Conducting group meetings							
Appraisal of performance							
Planning work schedules							
Development and use of job descriptions, etc.							
Assuring personnel records kept and used							
III. Financial Management: Planning departmental budget							
Assuring cost accounting records are kept							
Analysis of food, labor, and other costs							
Assuring cost control procedures are followed							
Preparation of financial reports							
Determining selling prices							
IV. Menu Planning: Planning regular menus							
Planning modified diet menus							
Planning menus for special occasions							
Cost analysis of menus							
Conducting food preference studies							

	ADEQUACY OF PREPARATION						
	Not part of first position	No preparation 0	Very inadequate 1	Somewhat inadequate 2	Adequate 3	Very adequate 4	Students need decision-making opportunities
V. Food Purchasing: Analyzing market conditions							
Determining quality specifications							
Determining quantities of foods to be purchases							
VI. Receiving, storage and control of food and supplies: Assuring receipts checked with requisitions							
Temperature control in food storage							
Assuring records for issues and receipts are kept							
Seeing that inventory procedures are followed							
Maintaining security measures in storage area							
VII. Food Production: Production charting							
Development and use of standardized recipes							
Methods of quantity food preparation							
Judging quality of food products							
Assuring food production records are kept							
Coordination of labor, equipment, and material utilization							
VIII. Food Distribution and Service: Patient tray service procedures							
Procedures of food service to personnel and visitors							

	ADEQUACY OF PREPARATION						
	Not part of first position	No preparation 0	Very inadequate 1	Somewhat inadequate 2	Adequate 3	Very adequate 4	Students need decision-making opportunities
VIII. Continued Portion control							
Food merchandising							
Catering special meals							
Assuring food distribution and service records are kept							
IX. Sanitation and Safety: Assuring sanitation standards are followed							
Assuring safe food handling practices are followed							
X. Equipment Operation and Maintenance: Assuring proper operation and care of equipment							
Assuring records for equipment repair and maintenance are kept							
XI. Methods Improvement: Work simplification or other studies							
Implementing new approaches							
XII. Space Design and Equipment Selection: Planning space utilization and equipment placement							
Determining equipment specifications							
XIII. Educational Programs: Planning departmental educational programs							
Implementing departmental educational programs							
Utilizing appropriate teaching materials and resources to promote the learning process							

	ADEQUACY OF PREPARATION						
	Not part of first position	No preparation 0	Very inadequate 1	Somewhat inadequate 2	Adequate 3	Very adequate 4	Students need decision-making opportunities
XIV. Communication: Maintaining effective verbal and written communication							
Utilizing communication skills appropriate for age, educational, socio-culture level of individuals							
Maintaining adequate records and a system of regularly reporting the services provided							
Communicating changes to appropriate personnel							

Form B-2. Form Letter for Questionnaire for Assessment of Competencies Mailed to Panel of Experts

THE UNIVERSITY OF TENNESSEE
KNOXVILLE 37916
College of Home Economics

February 18, 1976

Dear

Almost everyone involved in the training of dietitians is constantly searching for new and better ways of preparing students for success on the job. For the Coordinated Undergraduate Program in Dietetics, research is being conducted to find innovative methods of preparing students for decision making in personnel management. Because of your expertise in food systems administration and your knowledge of the skills needed by the entry-level dietitian, we solicit your comments and opinions in completing the enclosed questionnaire.

This questionnaire is concerned with three competencies in food systems administration. These competencies, which deal specifically with personnel management, are taken from a list of "Suggested Terminal Performance Objectives and Enabling Objectives for ADA Competencies in Management," developed by the Task Force for Developing Competencies. These were received at the Food System's Management Educational Council, October 23, 1975, San Antonio, Texas.

It is recognized that "hands-on" experience in personnel management is often difficult to obtain in the training of dietetic students. Simulation of such personnel management experiences, by various techniques, is the one way of providing students with "low-risk" exposure to realistic management situations.

Please read the competencies outlined in the questionnaire carefully and then answer the four questions which follow. Feel free to make additional comments. Your answers to these questions will aid in directing research in the development of simulation experiences for personnel management.

We would appreciate your returning the questionnaire in the enclosed envelope by March 1, 1976. Than you very much for your help.

Sincerely,

/s/ Debbie Canter

Debbie Canter, R.D.
Clinical Instructor in Dietetics

Through: Betty L. Beach, Advisor and Director
Coordinated Undergraduate Program in Dietetics
Enclosure: Questionnaire

Form B-3. List of Personnel Management Competencies* Included in Questionnaire for Assessment of Competencies Mailed to Panel of Experts

COMPETENCY 1: Comprehend the field of labor economics including trade unionism, collective bargaining, wage determination, employment, unemployment and labor legislation and the effects on management-employee relationships.

The Learner Can:

TPO 1:1 Assess the effect of labor economics upon management-employee relationships.

EO 1:11 Explain the effect of various labor organizations on the food service operation.

EO 1:12 Define changes which could occur in a food service operation as a result of union policies.

EO 1:13 Discuss the following parameters of the wage structure in a food service operation:

- Job evaluation
- Promotional consideration
- Probationary periods
- Professional and technical education and experience
- Performance evaluation

EO 1:14 Explain the probable effect of current levels of unemployment on applicants for food service positions.

EO 1:15 Identify some of the expected effects of recent labor legislation upon the food service operation, e.g.:

- Occupational Safety and Health Act
- Equal Opportunities Act
- Minimum Wage Laws
- Withholding Tax
- Affirmative Action
- Social Security
- Employment Practices
- Workman Compensation Insurance
- Unemployment Compensation

COMPETENCY 2: Implement diplomatic methods of changing individual and group behavior utilizing the internal and external influences that affect the individual and the organization.

The Learner Can:

TPO 2:1 Determine the effect of current labor legislation on management employee relationships.

EO 2:11 Describe the legislative process.

EO 2:12 Determine ways that individual employees will be affected by current labor legislation.

EO 2:13 Construct a criterion reference form for evaluating management-employee relationships.

TPO 2:2 Demonstrate a commitment to the overall objectives of the organization for which one works.

EO 2:21 Describe formal and informal groups in an organization.

EO 2:22 Weigh the alternatives in a given situation and select the objectives that will optimize individual and group development.

EO 2:23 Values and the overall objectives of the organization.

TPO 2:3 Assess the need for change.

EO 2:31 Identify forms of organizational stress affecting the individual.

EO 2:32 Describe the effect of change on the organization.

EO 2:33 Determine aspects of stress which should be relieved.

TPO 2:4 Plan for change.

EO 2:41 Plan for alternative solutions to relieve stress.

EO 2:42 Implement change.

EO 2:43 Evaluate the effect of change on the individual and on the organization.

COMPETENCY 3: Apply the principles and practices of management of personnel in the procurement, development, maintenance and utilization of an effective and satisfied working force in foodservice systems.

The Learner Can:

TPO 3:1 Interpret personnel policy and demonstrate the selection process for personnel.

EO 3:11 Describe personnel function of recruiting, interviewing, hiring, orienting, training, appraising, and terminating.

EO 3:12 Explain current labor legislation influencing the selection process.

EO 3:13 Relate job description to personnel classification.

EO 3:14 Describe personnel appropriate for a food service system.

TPO 3:2 Develop orientation, in-service training and education programs for personnel.

EO 3:21 Select and justify behavioral objectives, content and strategies for specific programs and personnel.

EO 3:22 Organize programs based on behavioral objectives.

EO 3:23 Implement programs.

EO 3:24 Apply evaluation techniques to programs.

TPO 3:3 Construct a personnel development and evaluation program for personnel.

EO 3:31 Insure that records are kept according to legal and institutional requirements.

EO 3:32 Measure productivity of personnel.

EO 3:33 Refine and develop reliable, valid, practical and objective instruments for the evaluation of personnel performance.

EO 3:34 Evaluate employee performance.

EO 3:35 Utilize interview process in counseling personnel.

EO 3:36 Plan a manpower schedule which encourages maintenance of the work force.

EO 3:37 Forecast and plan for future status of each employee.

TPO 3:4 Demonstrate human relations skills.

EO 3:41 Describe employees as individuals with hierarchical needs.

EO 3:42 Demonstrate clarity, conciseness and consistency in communicating written, oral, and nonverbal messages.

EO 3:43 Select language, vocabulary and communication techniques appropriate to the audience.

EO 3:44 Use basic elements of motivation.

EO 3:45 Relate motivational techniques to employee productivity/job satisfaction.

EO 3:46 Construct a criterion reference form for evaluating personnel performance.

*Taken from: Task Force for Developing Competencies, Food Service System's Management Education Council: Suggested terminal performance objectives and enabling objectives for ADA competencies in management. Unpublished paper. Am. Dietet. Assoc., Chicago, 1975.

Form B-4. Questionnaire for Assessment of Competencies Sent to Panel of Experts

PLEASE ANSWER THE FOLLOWING QUESTIONS:

1. Do you feel that this competency is one that should be emphasized in the training of an entry-level generalist dietitian?

   Competency 1 YES NO

   Competency 2 YES NO

   Competency 3 YES NO

2. Do you feel that our students presently have clinical experiences which lead to the attainment of this competency?

   Competency 1 YES NO

   If your answer was NO, please indicate below which enabling objectives under that competency you feel should be emphasized with our students.

   Competency 2 YES NO

   If your answer was NO, please indicate below which enabling objectives under that competency you feel should be emphasized with our students.

   Competency 3 YES NO

   If your answer was NO, please indicate below which enabling objectives under that competency you feel should be emphasized with our students.

3. Do you feel that simulated experiences would be appropriate in helping our students better attain this competency?

   Competency 1 YES NO

   Competency 2 YES NO

   Competency 3 YES NO

4. Realizing that all of the competencies are important, please rank these three competencies according to which one you feel is most crucial for our students to gain additional experience in. Indicate this competency by placing a number 1 beside it; the next most crucial by placing a number 2 beside it; and, the least crucial by placing a number 3 beside it.

   Competency 1 _____

   Competency 2 _____

   Competency 3 _____

APPENDIX C

Table C.1. Relationship of Terminal Performance Objectives* and Enabling Objectives* to Class Lecture Topics, Required Readings, and Specific Objectives to Be Met with Case Study Simulations

Terminal Performance Objectives and Enabling Objectives	**Class Lecture Topics**	**Required Readings**	**Specific Objectives to Be Met**	**Case Study Number, Title, and Synopsis**
The learner will be able to construct a personnel development and evaluation program for personnel. 1. Measure productivity of personnel. 2. Evaluate employee performance. 3. Plan a manpower schedule which encourages maintenance of the work force.	Analysis of Staffing Needs Job Descriptions Recruitment Scheduling	Konnersman, P.N.: Forecasting production demand in the dietary department. Hospitals, J.A.H.A. 43: 85, 1969. Uhrich, R.V. and Noort, A.J.: Production demand forecasting. Hospitals, J.A.H.A. 37(3): 106, 1971. Walker, J.W.: Forecasting manpower needs. Har. Bus. Rev. 47(2): 152, 1969. Hayden, R.J.: Performance appraisal: a better way. Pers. J. 52: 606, 1973.	After completion of the case study, the student should: 1. Understand some of the problems which may occur in a food service operation due to underproductivity and wasted time and energy. 2. Realize how an analysis of the problem situation may lead to improved working conditions and greater employee satisfaction.	Case Study 1 Sally's Staffing Problem Sally Smith is the section leader of the salad unit in a university food service operation. Complaints from customers about the poor quality of salad products leads the student, acting as Sally's superior, to investigate the problem. Alternatives to solution, including review of job description, scheduling, work sampling, etc., are presented to aid the student in the analysis of the problem situation.

Table C.1 (continued)

Terminal Performance Objectives and Enabling Objectives	Class Lecture Topics	Required Readings	Specific Objectives to Be Met	Case Study Number, Title, and Synopsis
The learner will be able to interpret personnel policy and demonstrate the selection process for personnel 1. Describe personnel functions of recruiting, interviewing, hiring, orienting, training, appraising, and terminating. 2. Relate job description to personnel classification. 3. Describe personnel appropriate for a food service system.	Employee Selection and Promotion	O'Donovan, T.: Matching job to employee. Hospitals, J.A.H.A. 46 (Nov. 1): 62, 1972. Kleiber, F.M.: How to select a supervisor. Supervision 35(May): 30, 1973. Smith, R.D.: Models for personnel selection decision. Pers. J. 52 (Aug): 688, 1973.	After completion of the case study, the student should: 1. Be aware of some of the factors which must be considered in selecting the right person for a job. 2. Understand the importance of good interpersonal relationships and communication within a food service operation.	Case Study 2 A Problem of Promotion The student is placed in the position of director of dietary in a small hospital. As a result of the resignation of the production manager, the student is faced with the selection of a replacement, considering both promotion from within the department or hiring of a new production manager from outside the organization.

Table C.1 (continued)

Terminal Performance Objectives and Enabling Objectives	**Class** Lecture Topics	Required Readings	Specific Objectives to Be Met	Case Study Number, Title, and Synopsis
The learner will be able to develop orientation, in-service training, and education programs for personnel 1. Select and justify behavioral objectives, content, and strategies for specific programs and personnel. 2. Organize programs based on behavioral objectives. 3. Implement programs. 4. Apply evaluation techniques to programs.	Types of Training Needs Identifying the Need for Training Task Analysis	Craig, D.: Guiding the change process in people. J. Am. Dietet. Assoc. 58(Jan): 22, 1971. Griffith, R. T.: Effect on turnover of training food service employees. J. Am. Dietet. Assoc. 65: 43. 1974. Schaeffer, B.: Teaching aids for dietary personnel. Hospitals, J.A.H.A. 44(Sept. 16): 74, 1970. Schneider, C.E.: Training and development programs: what learning theory and research have to offer. Pers. J. 53 (April): 288, 1974.	After completion of the case study, the student should: 1. Realize that there are many methods of providing training for food service employees. 2. Recognize the importance of including food service workers in the decision-making process for training. 3. Understand some of the factors which should be considered in choosing the proper training method.	Case Study 3 Determining Training Needs for a Food Service Operation The student takes the role of a consultant to the dietitian of a small hospital who has to choose a training program for her employees. Alternatives presented encourage the student to analyze the "pros and cons" of different types of training programs.

Table C.1 (continued)

Terminal Performance Objectives and Enabling Objectives	Class Lecture Topics	Required Readings	Specific Objectives to Be Met	Case Study Number, Title, and Synopsis
The learner will be able to demonstrate human relations skills. 1. Describe employees as individuals with hierarchial needs. 2. Demonstrate clarity, conciseness, and consistency in communicating written, oral, and nonverbal messages. 3. Select language, vocabulary, and communication techniques appropriate to the audience. 4. Use basic elements of motivation. 5. Relate motivational techniques to employee productivity/job satisfaction.	Performance Appraisal Motivation Theory	Scott, R.D.: Job expectancy--and important factor in labor turnover. Pers. J. May: 360, 1972. Oberg, W.: Make performance appraisal relevant. Har. Bus. Rev. Jan.-Feb.: 61, 1972. Wohlking, W.: Effective discipline in employee relations. Pers. J. Sept.: 489, 1975. Leskover, E.W.: A guide for discussing the performance appraisal. Pers. J. 46: 150, 1967.	After completion of the case study, the student should: 1. Realize that conflicts between employees can affect the morale and productivity of the whole operation. 2. Understand the role of the manager or supervisor in counseling employees as well as some of the problems which may be encountered.	Case Study 4 The Feud The student assumes the role of director of a small dietary department in which two employees of long-standing constantly bicker and disrupt the operation. In considering the solutions, the student is encouraged to utilize human relations skills to solve the problem.

*Task Force for Developing Competencies, Food Service Systems Management Education Council: Suggested terminal performance objectives and enabling objectives for ADA competencies in management. Unpublished paper. Am. Dietet. Assoc., 1975.

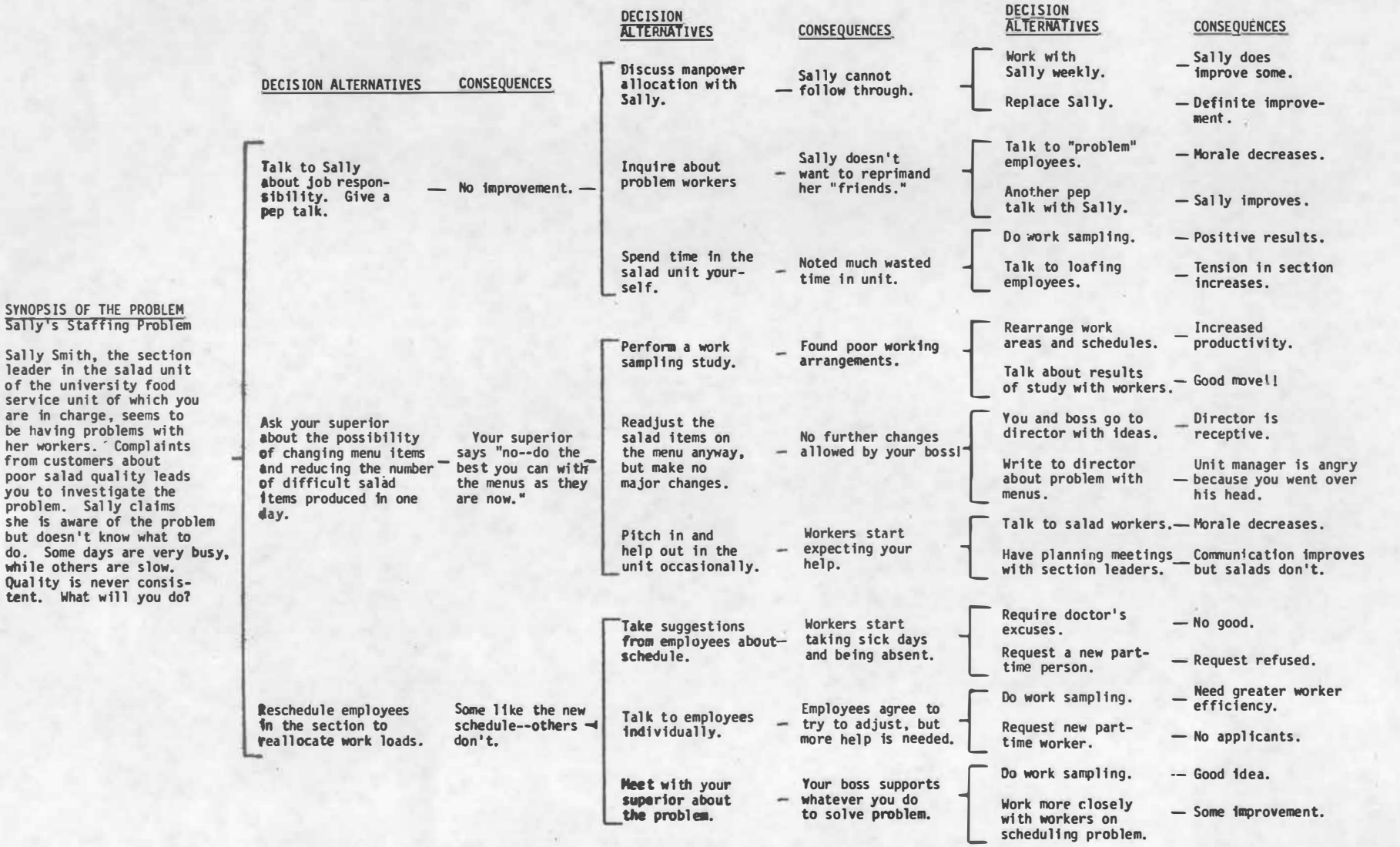

Figure C.1. Sample of Summary Sheet Used to Brief Group Discussion Leaders on Each Case Study Simulation.

APPENDIX D

Form D-1. Answer Sheet for Use with Case Study Simulations

Student Name _____ Time Beginning _____

Social Security Number _____ Time Ending _____

Date _____

Number of Case Study _____

Choice #1 Alternative Selected 1 2 3

Rationale for Decision _____

_____

_____

_____

Choice #2 Alternative Selected 1 2 3

Rationale for Decision _____

_____

_____

_____

Choice #3 Alternative Selected 1 2 3

Rationale for Decision _____

_____

_____

_____

Choice #4 Alternative Selected 1 2 3

Rationale for Decision _____

_____

_____

_____

Overall Reaction to Case Study (Benefits to you, suggestions for improvement, etc.)

Comments or Questions for Discussion:

Form D-2. Self-Perception of Confidence (SPOC) Scale

Social Security Number _____ Date _____

Self-Perception of Confidence Scale*

In the working situation, there are many potential areas where you may feel uncomfortable based on your experience and knowledge. Please indicate the level of comfort you feel at this point in time if you were in the situation described. This isn't going to affect your grade! Your honest and accurate reporting will be greatly appreciated!

Directions: Please place your personal rating in the blank next to each situation described. The ratings are as follows:

(1) very uncomfortable	(2) fairly uncomfortable	(3) neutral	(4) fairly comfortable	(5) very comfortable

HOW COMFORTABLE DO YOU FEEL:

_____ 1. Reprimanding an employee for improper conduct?

_____ 2. Correcting an employee on work techniques?

_____ 3. Praising an employee for doing a good job?

_____ 4. Justifying a poor performance evaluation to one of your employees?

_____ 5. Justifying a good performance evaluation to one of your employees?

_____ 6. Advising an employee to resign?

_____ 7. Hiring a new employee?

_____ 8. Counseling an employee about a problem?

_____ 9. Suspending an employee for some specified period of time because of improper conduct?

_____10. Discussing personal problems that employees may have which are affecting work performance?

_____11. Promoting an employee to a new position within your department?

_____12. Demoting an employee to a lower position within your department?

_____13. Exercising authority over employees who are older than you are?

_____14. Interviewing a person for a position in your department?

_____15. Asking your supervisor or boss for advice?

Form D-3. Profile Data Sheet for Use with Students in FSA 4140, Food Systems Personnel Development

PROFILE DATA SHEET

NAME _____

SOCIAL SECURITY NUMBER _____

AGE _____

(Please Check One)

Graduate Student _____ Undergraduate Student _____

What is your major? _____

What is your grade point average? _____

Have you taken any other courses at UT or anywhere else which deal with personnel management?

Yes _____ No _____

If yes, please give name of course and grade received.

Have you ever held a job where you supervised other people?

Yes _____ No _____

If yes, briefly describe the position(s).

Have you ever had experience with computer-assisted instruction?

Yes _____ No _____

If yes, please explain.

VITA

Deborah Dean Canter was born in Detroit, Michigan, on August 2, 1950, and moved to Union City, Tennessee, at an early age. She graduated from Union City High School in 1968. In June, 1972, she received a Bachelor of Science degree from The University of Tennessee, Martin, with a major in Home Economics Education.

After beginning graduate studies at The University of Tennessee, Martin, the author transferred to The University of Tennessee, Knoxville, in September, 1973. She served as graduate teaching assistant for three quarters prior to becoming a part-time clinical instructor with the Coordinated Undergraduate Program in Dietetics. Miss Canter received the Master of Science degree with a major in Food Systems Administration in August, 1974. The author is a member of the American Dietetic Association, the Institute of Food Technology, the American School Foodservice Association, Omicron Nu, Phi Upsilon Omicron, and Phi Kappa Phi.

She is the daughter of Mr. and Mrs. John Raymond Canter of Union City, Tennessee.