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THE APPLICATION OF THE PROBLEM-ORIENTED MEDICAL RECORD TO CLIENT NUTRITIONAL CARE: A SELF-INSTRUCTIONAL MODULE FOR DIETETIC STUDENTS

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THE APPLICATION OF THE PROBLEM-ORIENTED MEDICAL RECORD TO CLIENT NUTRITIONAL CARE: A SELF-INSTRUCTIONAL MODULE FOR DIETETIC STUDENTS

By

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ABSTRACT

THE APPLICATION OF THE PROBLEM-ORIENTED MEDICAL RECORD TO CLIENT NUTRITIONAL CARE: A SELF-INSTRUCTIONAL MODULE FOR DIETETIC STUDENTS

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A review of the literature on Problem-Oriented Medical Records (POMR) revealed that students in the health professions (1) learn optimal organization of medical care through use of the POMR, (2) prefer the self-instructional approach to learning and (3) that self-instructional materials on POMR specifically for dietetic students could not be identified or located. Therefore, a current self-instructional module on POMR needed to be developed for the dietetic student.

A module teaching POMR was developed according to the Hiob Model (1977), an approach to Instructional design. The design of the study to test the effectiveness of the module involved a comparison of a lecture and module treatment in learning the application of the POMR Concept to client nutritional care by comparing posttest results. Dietetic students involved in this study included twenty Coordinated Study Plan Students at Michigan State University (MSU), twelve Conventional Study Plan Students at MSU in the lecture and module groups and

fifteen Conventional Study Plan Students at another University to test the general utility of the module.

No significant difference between the lecture and module treatments was found. Dietetic students tested at the other university did not show a significant difference on their posttest scores compared to the MSU Dietetic Students. The goal of achievement of ninety percent on the posttest was achieved by a majority of all the students. All groups (module and lecture) had a significant gain from pretest to posttest indicating that learning did take place.

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CHAPTER I

INTRODUCTION

Medical Records

Communication in health care settings concerning clients can be expressed most usefully to health care providers through the medical record. This record is actually an historical document in that it contains present and past information concerning an individual. The medical record can be used in a court of law in connection with contested health care so is considered a legal document (Mason et al., 1977).

According to Weed (1969), the development and proper management of the medical record should be exposed to critical assessment by peers in the same way that scientific investigations are open to the evaluation of other scientists.

Mason et al. (1977) stated that "the traditional medical record has been used in American Health Care institutions for at least half a century" (p. 74). This traditional medical record is referred to as the Source-Oriented Record (SOR). The SOR is the kind of record with which most health professionals are all familiar (Easton, 1974). There is a place for everything about the client. In many hospitals the system for the SOR involves identifying color-coded pages with tabs noting the location where the information can be found. The organization then is based on the source of information obtained throughout the provision of

health care. Each person reading the SOR must mentally hold and sort data about the client from a variety of sources rather than focusing on the client's problems. Important observations by health care providers could be lost or taken out of context (Mason et al., 1977).

Lawrence Weed (1971) states that two fundamentals in working effectively at the community level are developing communication systems that are practical for use in caring for people and establishing standards for such a system so that problems and progress can be stated correctly. Weed (1971), credited with developing the concept of the Problem-Oriented Medical Record (POMR) emphasizes the point that good patient care depends upon the education of those involved in the care, and to a large degree education depends upon good records. He has highlighted the medical record as a teaching document that should enable the physician to learn while he cares for the patient. Therefore, Weed (1971) feels that the medical record need not be a static document of medical observations and activities grouped in the meaningless order of source. Rather, medical observations and activities of the client should be ordered with respect to the client's problems to which they pertain. The medical record can be problem-oriented and can be a structured, creative tool for facilitating comprehensive and highly specialized care.

Hurst and Walker (1972) state that the Problem-Oriented format will not solve all of the problems in approaching patient care and education, but feel that it is a system that must be looked at carefully. The POMR is a handle that all health care providers can grasp to aid in the assessment of medical care. Hurst and Walker (1972)

support the guidelines set forth by Weed (1972) for POMR use. Weed (1972) suggests that the medical record reveal an identifiable Data Base from which a Complete Problem List should evolve. The problems on the Problem List are identified by title and number. The Problem List, placed in front of the medical record, is easily read by all providers. An Initial Plan should be developed for each problem appropriately identified by number and title. Progress Notes must be written in the same format. This record structure must be adhered to and will in no way interfere with the delivery of care. It is the framework from which excellence can be achieved (Weed, 1972).

The American Hospital Association (1976) states that POMR is an approach to medical record keeping organized around each client's health problems. All professionals caring for the client deal with identified problems and contribute plans for each problem. The integration of care provided to the individual client by each professional discipline is facilitated through regular and systematic recording in the client's medical record of care given. Such documentation must include pertinent findings and actions taken, client's progress and response to therapy, and concluding instructions of the client and/or family on physical activity, medication, diet and follow-up care. The client's medical record is an information sharing-tool that promotes and assists in coordinating the activities of all health team members contributing to the client's care.

Medical Records in Education of Health Professionals

Medical Students

Attempts to have medical students and practitioners learn the POMR Concept have been varied. In an attempt to put a systematic approach into learning about the POMR, Bashook et al. (1975) devised instructional materials to be used in two instructional formats: self-instruction and workshop. The majority of medical students in these two medical schools received the traditional instructional methods of lecture, laboratory and clerkship experience. One hundred and six medical students from the second year classes of these two medical schools were divided into two groups. Within each group, the students were divided again into two groups with one section of the group learning about POMR through use of a self-instructional handbook and the other section learning about POMR by attending a workshop. Students participating in each instructional format received the same case material, overview sessions, written description of essential concepts and examples of the mechanics of problem orientation. The only difference in instructional format was the use of workshop versus a self-instructional handbook. Each instructional approach extended over the same four week period. In the fifth week all the students received a SOR to convert to a POMR format. The converted record measured their performance. Within all the groups tested, there was a 95 percent performance level on this conversion from SOR to POMR.

These authors report they have taught the POMR to more than twenty-five groups of practicing physicians as well as medical students

using the same instructional materials. Affective feelings toward these teaching sessions have shown that physicians prefer the workshop format because they seem to like repeated stimulation in learning a new technique that is provided on a constant interchange during a workshop session. Medical students, in direct contrast to practitioners, seemed to prefer the self-instructional format.

Another study, conducted by Margolis et al. (1976), on POMR was a workshop with twenty-three members of the Ambulatory Pediatric Association. The goal of the workshop was to help the participants learn not only how to write a problem list and problem-oriented notes, but also how to approach the practical problem of converting their medical records to a problem-oriented system. The workshop involved use of a pretest, up to three hours spent on going through self-instructional materials on POMR and a posttest which was parallel but not identical to the pretest. Both tests had two parts, (a) assessment of basic knowledge about the POMR and (b) problems requiring the use of this knowledge. Criteria for scoring were developed in advance and each test paper was graded by each of three medical staff members. A T-test was statistically significant. Several individuals scored close to zero on the pretest and close to the top on the posttest. One scored lower on the posttest than on the pretest and several remained at about the same level on the posttest. These results show that although the self-instructional format was an effective learning device for the group as a whole, learning was not guaranteed for each individual. Possibly with repeated use of self-instructional materials on POMR, more of these students could master the POMR concept.

Nursing Students

Modifying and applying Weed's (1972) basic concepts to nursing has outstanding advantages (Walter et al., 1976). It is a guide to organizing care around the patient's needs. It provides a systematic method of problem-solving and decision-making. It does this and yet allows the practitioner the freedom to make independent nursing judgments about problems and actions. The primary focus of nursing's unique contribution to health care is the impact of health-related issues and problems on client life-style and their management of the demands of daily living.

Various studies have been conducted with teaching the POMR concept in nursing. Bertucci et al. (1974) compared traditional and problem-oriented recording in medical records of registered nurses. In their study, nurses in the POMR and traditional group were given patient situations typical of hospitalized medical-surgical patients. They were instructed to write a nurse's note from the case material. Notes were scored on the basis of inclusion of Subjective and Objective Data, Assessment, Direct and Indirect Intervention and Plans. Mean overall scores for nurses in the problem-oriented group were significantly greater than in the traditional group as were the mean scores for inclusion of each portion of the format.

Mitchell and Atwood (1975), conducted a study with 165 sophomore nursing students in one baccalaureate program. These students were divided into two groups. One group was taught and used traditional narrative recording and the other group used problem-oriented recording. All other content related to the basic problem-solving process was the

same for both groups. Both groups were taught to record data, conclusions, actions and evaluations relative to any one patient problem together. In theory, only the structured format of recording varied. Variables such as instructor's experience, existing use of the problem-oriented format by some physicians, student academic achievement, type of patient population were matched between groups in an attempt to control their influence. Dependent variables studied included the number of problems identified, number of problems of nursing, medical and procedural focus and a score representing the quality of organization of the progress note. Medical, nursing and procedural focus refers to whether the patient problem was judged within the primary focus of nursing (daily living), medicine (pathology) or related to a therapeutic procedure (e.g., irrigation). Quality of organization scores reflected the recording of components of problem-solving from the data collection stage through evaluation of action. It was predicted that the experimental group would be superior to the control group by (1) identifying more problems (2) identifying more problems of nursing focus (while the control group would identify a higher proportion of problems within the medical and procedural foci) (3) identify more potential problems and incorporate plans and actions more frequently.

The results were as predicted in all but one hypothesis: there was no difference in the mean number of potential problems in each group. A score was derived from the sum of problem scores for each recording sample. The significantly higher mean scores of the experimental group for identifying more problems, identifying more problems of nursing focus and incorporating plans and actions more frequently

does reflect the large number of problems carried to the level of plan, action and in the case of some students, evaluation.

Dietetic Students

There are several openings in the POMR format in which the dietitian/nutritionist might participate. Diagnostic, treatment, and client education plans can all be used by the dietitian in dietary treatment of the client and progress notes revolving about the nutritional aspects of the case can and should be written (Voytovich, 1973). Walters and DeMarco (1973) state that the POMR should be used by the dietitian/nutritionist as a documentation process and as a procedure for evaluating dietary treatment. If the prescribed dietary treatment is less than optimal for the client, then her role is that of identifying the "problem" for the physician on the client's medical record.

In the Dietetic Coordinated Undergraduate Program at the University of Alabama, it was decided to incorporate the POMR concept into the dietetic curriculum. A self-instructional unit on the POMR was prepared for these dietetic students which consisted of readings on the POMR. There were no pretests or posttests included in the unit to measure learning and no available data as to whether or not this unit successfully assisted the dietetic student in using the POMR (Stitt, 1974).

Implications for Dietetic Students

From the literature cited, it can be derived that students in the health professions (1) learn optimal organization of medical care through use of the POMR, (2) prefer the self-instructional format for learning and (3) dietetic students need to be able to communicate nutritional information in an equivalent manner.

This thesis study was designed to develop and test a self-instructional unit on the POMR Concept as related to the dietitian's use in recording nutritional care.

CHAPTER II

RELATED LITERATURE

Introduction to Individualized Instruction

In recent years there has been an increased interest in individualized instruction, to make it the fastest growing movement in education today (Gross, 1976; Novak, 1973). The interest is based on the realization that each individual is unique and learns in ways and at a rate different to others. What is needed is instructional systems which can make higher education available to large numbers of students and at the same time offer an individualized learning experience (Goldschmid and Goldschmid, 1973).

Historical Overview

An historical overview of individualized instruction was written by Klaus (1971). He discusses the alternatives to conventional instructional methods (past to present) and how they have been related to student learning.

Education programs designed around concepts of individual progress and rewarded practice have had ancient usage. Stecchini reported that Socrates was greatly concerned with the individual learner and stressed importance of learner participation and self-direction and even designed an automated instructional device to help students learn good handwriting (Klaus, 1971).

One of the most widely publicized of all early attempts to provide self-directed instruction on a comprehensive scale was Washburne's Winnetka Plan introduced into the Winnetka, Illinois, public schools in the 1920s. The basis of the Winnetka Plan was the division of instruction into units or modules each with its own aims and tests of learning progress. Text materials and workbook exercises were prepared for each module to permit students to study content on their own and at an individualized pace (Klaus, 1971).

Pressey, in 1924, suggested a somewhat different approach to individualization. His aim was not to reduce the teaching function of classroom personnel but to enhance it by eliminating the burdens of routine drill. He developed a simple apparatus which automatically gave and scored a test and would teach informational and drill material more efficiently (Klaus, 1971).

The next wave of interest in individualized instruction was stimulated by Skinner. This approach was to develop a method of instruction which would bring the individual learner's behavior under precise control through the use of frequent and individual reinforcements. An important consideration is the development of these instructional materials was that every effort was made to maximize success and minimize failure. Skinner maintained that the instructional materials should be presented to students by means of a machine in order to have control over reinforcement (Klaus, 1971). Glaser, Homme and Evans quickly demonstrated that machines were not all that essential in that it was feasible to use a 'programmed textbook' to provide adequate control (Klaus, 1971).

Programmed instruction is regarded by many educators as a tool for classroom use (Klaus, 1971). The advantages are in producing a degree of control over the learning process that cannot be attained by a teacher. Reinforced practice can result in learning and can do so with an efficiency and effectiveness that cannot be reproduced only by communicating information to a student (Klaus, 1971).

Modular Instruction

Among the various systems of individualized instruction proposed so far, modular instruction combines many advantages of a number of separate instructional innovations such as performance objectives, self-pacing and frequent feedback (Goldschmid and Goldschmid, 1973).

A module can be defined as a "self-contained, independent unit of a planned series of learning activities designed to help the student accomplish certain well-defined objectives" as defined by Goldschmid and Goldschmid (1973) (p. 18). While differences in definition exist, it seems to be greatly agreed that a module is an instructional package intended for self-study.

Creager and Murray point out that modules range from one to a few modules placed into a traditional course, through complete courses having a sequential approach through the use of modules, to courses that offer a choice of a certain number of modules from a larger set. They predicted that in the near future instructional programs may be designed around modules tailored to each student's individual needs (Klaus, 1971).

One purpose of modular instruction is to allow the student to proceed at his own rate. The belief that self-pacing is desirable is

based on the generally accepted assumptions that learners do not learn at the same rate and are not ready to learn at the same time (Burns, 1971).

Another purpose is to allow the student to choose his own learning mode. Choice among different learning modes is desirable, if we assume that learners solve problems and learning using different techniques based on previously learned behaviors (Burns, 1971). Modular instruction may therefore include a large variety of instructional activities, such as reading textbooks and articles, examining photographs and diagrams, viewing films and slides, listening to audiotapes, examining demonstration materials, participating in relevant "extra curricular" activities.

A third purpose of modular instruction is to provide a choice among a large variety of topics within any given "course" or discipline, if we assume that students do not possess the same pattern of interest and are not motivated to achieve the same goals (Burns, 1971).

A fourth purpose, according to Klingstedt, is to allow the student to identify his strengths and weaknesses and to "recycle" through remedial modules, have repetition, or a change in learning mode, if we assume that modular instruction saves student time and allows as many students as possible to attain the stated objectives (Goldschmid and Goldschmid, 1973).

Finally, a module should only be produced for content areas that will not be having significant changes each year since a great deal of time is spent in design and production of the module (Goldschmid and Goldschmid, 1973).

Kurtz and Klingstedt Model

Kurtz and Klingstedt have independently recommended a number of steps to be followed when designing a module and/or modularizing an entire course. Their steps include writing objectives, developing a sequence of instruction, designing tests, developing a rationale for the module, designing instructional activities, and establishing a resource center for readings and materials necessary to complete the module (Goldschmid and Goldschmid, 1973). This model may be summarized as follows:

Step 1: Instructional Objective

The instructional objective may be written in terms of behavior. Mager, in 1962, states that a behavioral objective was a collection of words or symbols describing an educational intent. An objective would communicate intent to the degree described in what the learner will know when the objective is being demonstrated. This behavioral objective contained the following items: (a) identification of the overall behavioral act (b) conditions under which the behavior occurs and (c) criterion of acceptable performance (Mager, 1962).

A look at current literature indicates that a turning point may be at hand with regard to behavioral objectives. There now appears to be more concern for exploring ways of redirecting the behavioral objective drive of recent years (McAshan, 1977; Dressel, 1977; Williams, 1977).

Most educators would agree that both process and content are important as educational outcomes. A force that may cause a change has its origin in the performance difference between education and

training. Education is often thought of as a preparation for rewarding living in the all-encompassing sense, while training usually is perceived in terms of more definable objectives. These attempts at writing the more profound educational outcomes have been less frequent and perhaps less satisfying than have attempts at writing training objectives.

Another force for redirecting behavioral objectives involves the relationship between objectives and human motivation. Many published lists of behavioral objectives appear to have little motivationally based organization. As a result the student may have difficulty at a personal level with such objectives.

The accountability movement represents another force affecting behavioral objectives. The issue revolved around what learning outcomes students, teachers and administrators should be accountable for. The political ramifications of accountability may require expanding the capacity of behavioral objectives to deal with all types of learning outcomes.

Dressel (1977) states that objectives need to cover overt and covert learning of students. Nonverbal covert mental processes are not measured because no observable product is seen, thus eliminating thought, judgment, feeling, creating and synthesizing, except as these are ultimately verbalized or revealed by an observable product.

The failure of behavioral objectives is seen when a total definition of behavior is used (including covert and overt aspects) that more nearly matches reality (McAshan, 1977).

A new concept being introduced is learning outcomes. They are the ends for which all enabling instructional activities are performed.

These learning outcomes are the prime purposes of education. All other components of the instructional program such as the enabling strategies and evaluation processes are merely means for producing learning outcomes or for evaluating successful achievement of learning outcomes.

Gagne (1970) states it this way: What is learned is something new that remains a part of the learner. These are capabilities of the learner that are the outcomes of learning.

Step 2: Instructional Sequence

To determine the optimal sequence of a stated competency it is necessary to carry out an analysis of that competence. Of particular interest is an analysis of the knowledge required of the learner, especially if the knowledge required is of a higher cognitive level and not merely of the memory type (Gagne, 1970).

a. Procedural Approach.--The particular approaches chosen for an instructional sequence will depend upon the kind of learning required in the instructional goal. One type of approach is the procedural approach. This involves doing a task description and task analysis (Davis, Alexander and Yelon, 1974). A task description identifies the steps (or actions) that must be taken to perform a task. These actions are always stated in the form of explicit and concrete action verbs such as explains, asks, lifts, calls, etc. The task analysis literally is an analysis of the task. It helps to clarify under which circumstances a task is to be performed. For example, what skills and abilities need to be known, and what resources are available to teach the task.

Gagne has demonstrated that inadequate treatment of some necessary skills frequently causes instruction to fail. Gagne's theory (1970) predicts that if a student has not mastered necessary prerequisite behaviors, either he will be unable to perform the terminal behavior, or he will do so with great difficulty.

This thesis is not revolutionary--it has been assumed that students must be able to master the basic skills before they advance to more complex tasks. What is new about the theory is the procedure Gagne uses to identify the prerequisite behaviors.

b. Hierarchical Approach.--This method, which follows a hierarchy to sequence instruction, identifies the elements which should be included in an effective instructional unit (Haynes, 1971).

Gagne stresses that a hierarchy is composed of capabilities which are intellectual skills (cognitive strategies), and he has stressed equally that hierarchies are not composed of entities of verbalizable knowledge, such as "the student should be able to list at least seven types of supporting material." The achievement of objectives of verbalizable knowledge involves a certain sequence but it is not the same kind of sequence as that involved in cognitive skill acquisition, where each higher skill is dependent on certain subordinate skills. Because mastery of the terminal behavior is dependent on previous mastery of each of these skills, they can be considered the beginning of a hierarchy.

Step 3: Diagnostic Measures

Educational measurement historically has been norm-referenced. That is, the performance of an individual learner is compared with the

performance of other learners to determine how much has been acquired. The newer type of tests being devised to assess instructional outcomes, particularly in individualized settings, are criterion-referenced. In contrast to norm-referenced measures, criterion-referenced tests compare the performance of an individual with some external absolute standard (Klaus, 1971).

A very flexible definition of a criterion-referenced test has been proposed by Glaser and Nitko (1971): " . . . a test that is deliberately constructed so as to yield measurements that are directly interpretable in terms of specific performance standards" (p. 653). According to Glaser and Nitko (1971),

> the performance standards are usually specified by defining some domain of tasks that the student should perform. Representative samples of tasks from this domain are organized into a test. Measurements are taken and are used to make a statement about the performance of each individual relative to that domain (p. 653).

Step 4: Rationale for the Module

A rationale for the module is stated. This involves the value of a particular unit and explains to the student why it is beneficial to him to achieve the stated objectives.

Step 5: Instructional Activities

These activities are designed to help the student acquire the competencies stated in the objectives. They may include the use of laboratories, viewing of slides or films, the listening of tapes, etc.

Step 6: Posttest

A posttest is designed to measure the student's achievement of the objectives. There should be close correlation between test items and objectives.

Step 7: Resource Center

A resource center should be established to provide access to all readings and/or materials necessary to complete the module.

Hiob Model

The trend toward individualization has resulted in the development of a diverse collection of alternative models.

The model used for this study is A Systematic Program for Module Design: The MSU Dietetic Model (Hiob, 1978). This model is a general systems approach model for designing instructional materials. Each component of the model is based upon theoretical or research outcomes which demonstrate the effectiveness of the component. The steps of this model are graphically presented in Figure 1.

These seven steps to the Hiob (1978) Model were used to develop the self-instructional module on the application of the POMR Concept to Client Nutritional Care.

The model uses various steps discussed in this chapter in the Kurtz and Klingstedt Model (Goldschmid and Goldschmid, 1973). A description of each step follows:

Step 1: Specify Learning Outcomes

The learning outcome is a statement which indicates what it is students will be able to do after they have completed the lessons of

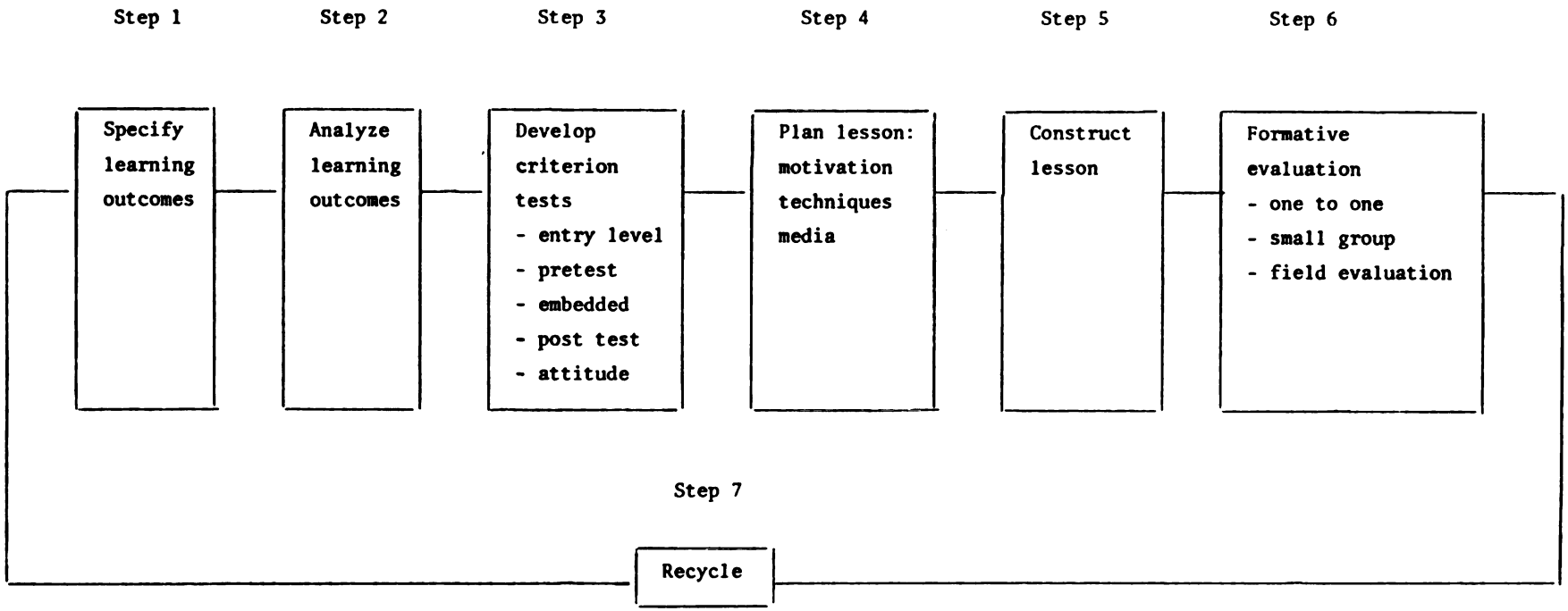

Figure 1. A Systematic Program for Module Design: The MSU Dietetic Model. (Hiob, F.: Unpublished manuscript, Michigan State University, 1978).

the module. It should describe the major culminating or synthesizing behavior which results from completing the lesson. Learning outcomes are clearly specified and contain the following:

1. the performance required by the student
2. the conditions under which the student must perform
3. the minimum acceptance level of performance

Step 2: Analyze Learning Outcomes

This technique is according to Gagne (1970) and identifies the subordinate skills which are required for the student to achieve the learning outcome. By asking the question, "What does the student have to know or be able to do, so that simply given instruction, he can perform the required task?" the designer can identify one or more critical subordinate skills which will be required of the learner prior to attempting instruction of the final task. As all the subordinate skills of the final learning outcome are developed, they can be placed into a vertical map leading to the final learning outcome.

Step 3: Criterion-Referenced Tests

There are basically four kinds of criterion-referenced tests used in this model. The first is an entry test. This test is designed to measure skills which the designed has identified as being critical to beginning the instructional materials. The second type of test is a pretest. A pretest is criterion-referenced to objectives which the designer intends to teach in the module. The third and most common test used is the posttest. The fourth type of test is an embedded test. This is not necessarily a single test, but rather represents clusters

of criterion-referenced test items which are interspersed throughout the instructional package. These items are intended for practice by students prior to taking the posttest. Embedded test items provide learners with the opportunity to interact with material presented to evaluate themselves and to receive feedback.

Steps 4 and 5: Plan and Construct Lessons

Instructional strategies are developed for presenting information to the student in each lesson of the module, including student participation, testing and feedback.

When constructing the lessons of the module, an appropriate form of media selection is used that is operable by the learner and capable of being produced by the designer.

Step 6: Evaluation

Testing of the module can involve three types:

1. Formative
    (a) one to one
    (b) small group
2. Summative
    (a) field

In the one to one testing the designer chooses three learners who are typical of the target population for the module and sits individually at each learner's side as each learner goes through the module. The designer encourages the student to comment on any aspect of the materials and makes revisions on the spot. After the materials have been revised on the basis of information from the one to one

evaluation, a group of approximately five to eight randomly selected learners is selected which is again from the target population. It is explained to this group of learners that the module is in a formative stage of development and the developer is seeking feedback from the learners on how the module can be improved. Then, the learners work with as little intervention as possible and give feedback at the completion of work. The field evaluation involves a group of approximately twenty learners who will complete the module following written or verbal instructions of the module. Evaluation of the learner will be done in the form of the posttest.

There are numerous models and checklists for product development processes. All models strongly advocate the use of formative evaluation as stated by Baker and Alkin (1973):

> . . . at the core of each model, regardless of its esotericism or practicality, is the realization and recognition that product development and formative evaluation are intertwined as snake and staff and that product revision depends upon the generation of formative evaluation of data (p. 404).

Step 7: Revision

Revision of the module is based on learner feedback and achievement of the learning outcome(s). By utilizing all the student suggestions and performance during the evaluations, the module can then be made into a final professional product.

Summary

Many forms of individualized instruction have been discussed here. Throughout time, various people have been innovative in developing individualized instructional methods for learners.

The Hiob Model (1978) for modularized instruction incorporates the majority of concepts reported in the current literature: criterion-referenced tests, learning outcomes and the performance of formative evaluation. For these reasons the Hiob Model (1978) was used for this study instead of the Kurtz and Klingstedt Model (Goldschmid and Goldschmid, 1973). Further, the Hiob Model (1978) was used in order to aid in the validation of it for use with learning skills at the cognitive level.

CHAPTER III

PURPOSE, GOAL AND HYPOTHESES

Purpose

A self-instructional module on the Problem-Oriented Medical Record (POMR) was developed for dietetic students because a review of the literature has shown that (1) there were no available materials on POMR specifically for the dietetic student and (2) self-instruction is the preferred approach. The purpose of this module was to develop a concise method for learning the application of the POMR Concept to client nutritional care through the use of dietetic problems, plans of action for client behavior and SOAP progress notes of nutritional care implementation.

Goal of the Self-Instructional Module

It was determined that an achievement level of ninety percent accuracy on the module posttest would indicate that the dietetic student had demonstrated the application of the POMR Concept to client nutritional care. The level of ninety percent was chosen because dietetic students need to easily apply the POMR process to client nutritional care in their first entry-level position as a dietitian. Reaching ninety percent on the posttest, which would be compared to above average performance, would increase the probability of transfer of learning of the POMR process for use with future nutritional clients.

After completing the self-instructional module on the POMR, the dietetic student should be able to achieve a ninety percent level of accuracy on the posttest covering the following areas:

1. Dietetic Problems--concise statement of food or nutritional problem of the client

2. Plan of Action for Client Behavior--initial plan for client care including diagnostic, therapeutic and client education sections

3. SOAP Progress Note of Nutritional Care Implementation--recording of progress of the client in solving his/her dietetic problem written in the SOAP format

Hypotheses

Given the goal of the self-instructional module on POMR, the following hypotheses were written.

A. Null Hypothesis: Dietetic students at MSU and the University of Hawaii given a self-instructional module or equivalent lecture presentation to learn the application of the POMR concept to client nutritional care will show no significant gain in score from pretest to posttest (both tests measuring equivalent content) to indicate that learning has taken place.

Alternative Hypothesis:

Dietetic students at MSU and the University of Hawaii given a self-instructional module or equivalent lecture presentation to learn the application of the POMR concept to client nutritional care will show a significant gain in score from pretest to posttest (both tests measuring equivalent content) to indicate that learning has taken place.

B. Null Hypothesis: Dietetic students at MSU given a self-instructional module to learn the application of the POMR concept to client nutritional care will show no significant difference in achievement on the posttest compared to dietetic students given an equivalent lecture presentation to learn the application of the POMR concept to client nutritional care and same posttest.

Alternative Hypothesis:

Dietetic students at MSU given a self-instructional module to learn the application of the POMR concept to client nutritional care will show a significant difference in achievement on the posttest compared to dietetic students given an equivalent lecture presentation to learn the application of the POMR concept to client nutritional care and same posttest.

It was further hypothesized that the POMR module would be useful to dietetic students at other universities. In order to have instructional materials useful for a variety of dietetic curriculums, the module's design needs to be learned and applied in an equivalent manner by other dietetic students. The POMR module was tested with dietetic students at the University of Hawaii and their posttest results were compared with Michigan State University dietetic students. This approach is written in Hypothesis C.

C. Null Hypothesis: Dietetic students at MSU given a self-instructional module to learn the application of the POMR Concept to client nutritional care will show a significant difference in achievement on the posttest compared to dietetic students at the University of Hawaii given the same self-instructional module to learn the application of the POMR Concept to client nutritional care and same posttest.

Alternative Hypothesis:

Dietetic students at MSU given a self-instructional module to learn the application of the POMR Concept to client nutritional care will not show a significant difference in achievement on the posttest compared to dietetic students at the University of Hawaii given the same self-instructional module to learn the application of the POMR Concept to client nutritional care and same posttest.

CHAPTER IV

DESIGN OF THE STUDY

Selection of the Sample

To be eligible to be in this study, dietetic students needed to have completed certain prerequisites. These included completion of HNF 102 - Nutrition for Man, HNF 221 - Food and the Consumer and HNF 222 - Laboratory for Food Management. Before starting the module or attending the lecture, the dietetic student was required to read the Medical Record Chapter from the Dynamics of Clinical Dietetics textbook (Mason et al., 1977).

During Fall Term 1977, the designer worked with the Clinical Faculty of the Coordinated Study Plan at MSU to determine which of the student groups would be used for this study. HNF 302 for the Coordinated Study Plan had twenty students enrolled and the concept of the medical record was to be taught in Winter Term 1978. Thus, the designer had twenty non-volunteers for part of the study. These students would receive a grade for their performance on the posttest and knew that they would have an immediate application of this POMR knowledge in their clinical field experiences. In following this thesis study design, a comparison lecture group was needed. So ten of these twenty Coordinated Study Plan Dietetic Students were randomly assigned to the module group and ten randomly assigned to the lecture group.

Dietetic students in the Conventional Study Plan who participated in this study were selected Winter Term 1978. The designer obtained volunteers from various nutrition classes being taught winter term. Upon obtaining twenty volunteers, they were randomly assigned (10 and 10) to the lecture and module groups.

These students did not receive a grade on their performance on the posttest and overall were not having an immediate application of this POMR knowledge in the near future.

The designer had an opportunity to select dietetic students at the University of Hawaii for this study also. Fifteen students volunteered for this study and received only the module treatment. These students were in a Conventional Dietetic Curriculum and were required to have completed an introductory nutrition course and introductory food preparation course. Before starting the POMR module, these University of Hawaii dietetic students were required to read the Medical Record Chapter from the Dynamics of Clinical Dietetics textbook (Mason et al., 1977). The University of Hawaii dietetic students did not receive a grade for their performance on the posttest and overall were not going to have an immediate application of this POMR knowledge in the near future.

Design of the POMR Module

The seven steps of A Systematic Model for Module Design: the MSU Dietetic Model (Hiob, 1978) were used to develop the self-instructional module on the application of the POMR Concept to client nutritional care. A detailed description of each step follows:

Step 1: Specify Learning Outcomes

The learning outcome for the POMR Module is:

> Given nutritional information about a client, the student dietitian will write the dietetic problem, plan of action and SOAP progress note with ninety percent accuracy according to the performance criteria.

In order to evaluate this learning outcome, performance criteria were developed for the posttest. These criteria pertain to writing dietetic problems, plans of action and SOAP progress notes, and are a total of one-hundred points. They can be found in Table A-1 of Appendix A.

Step 2: Analyze Learning Outcomes

After the learning outcome was determined, the designer determined the subordinate skills necessary for achievement of the final learning outcome. Subordinate skills leading to the final learning outcome were arranged in the following hierarchy.

1. Discriminate between the dietetic problem categories
2. Identify the dietetic problem categories
3. Classify the dietetic problem categories
4. Generate the dietetic problem
5. Identify the dietetic solution
6. Generate the dietetic solution
7. Identify components of the plan of action
8. Classify the plan of action
9. Generate the plan of action
10. Identify the subjective and objective information of the progress note

11. Generate the subjective and objective information of the progress note

12. Generate the dietetic problem, subjective and objective information of the progress note

13. Generate the assessment of the progress note

14. Generate the dietetic problem, subjective and objective information, and assessment of the progress note

15. Generate the dietetic problem, subjective and objective information, assessment and total plan of the progress note

As the subordinate skills were written, they were placed into a vertical cognitive map to show the sequence of learning to be achieved by the student (Figure 2). Steps one through four represent lesson one of the module, steps five through nine represent lesson two of the module and steps ten through fourteen represent lesson three of the module. The module starts with step one and sequentially goes through step fourteen in reaching the final learning outcome (fifteen). Pre-entry skills represent the prerequisites the student must master before entering the module.

Step 3: Criterion-Referenced Tests

For the POMR module, the entry behavior test and pretest were combined into one test. This test measured an assessment of basic knowledge about the POMR and followed the hierarchy of the embedded test questions of the POMR self-instructional module. The embedded tests were interspersed through the lessons of the module and were representative of the pre- and posttest questions. The posttest questions consisted of three essay questions all measuring the same criterion: dietetic problems, plans of action and SOAP progress notes using a

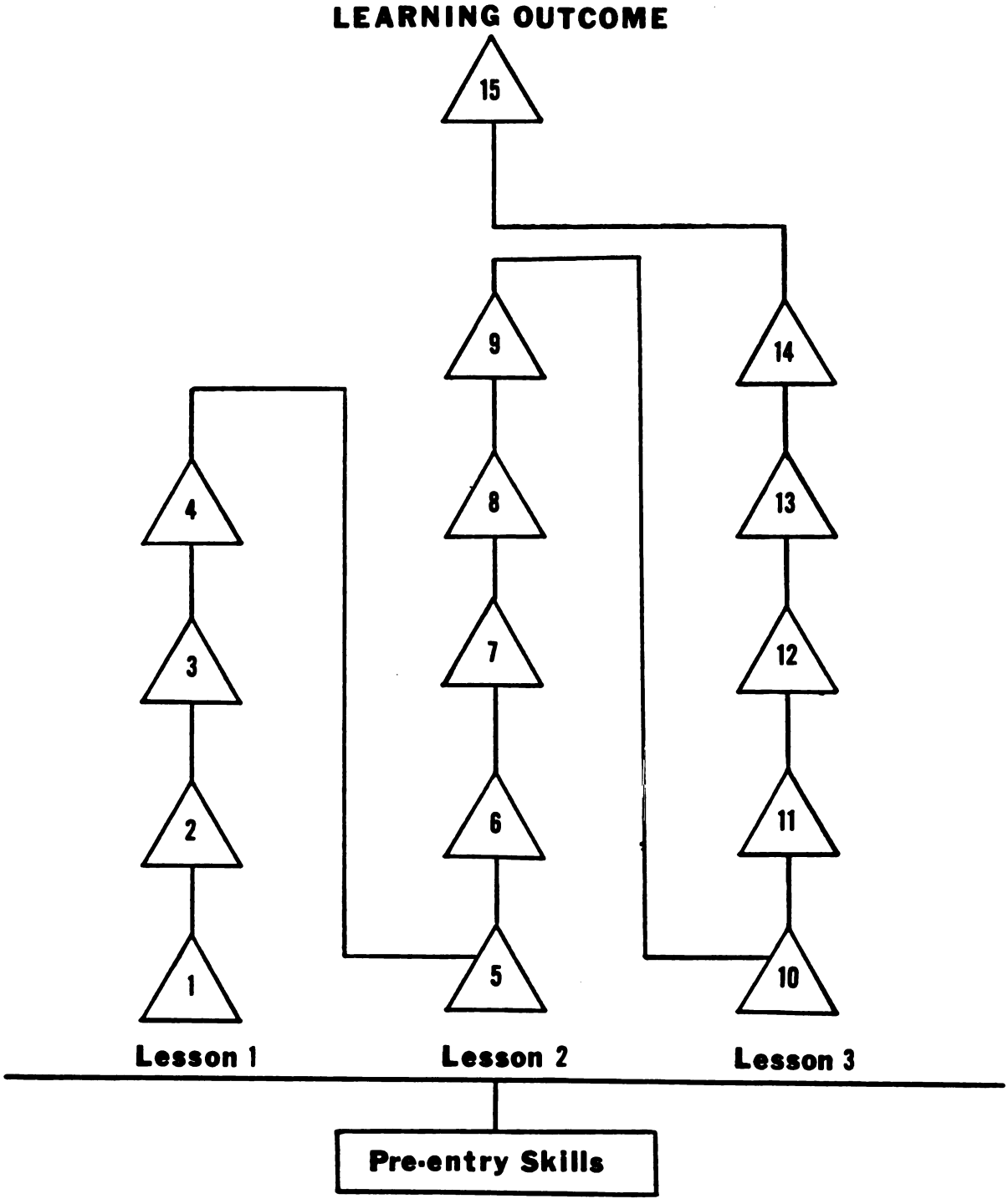

Figure 2. Cognitive Map for POMR Module. The subordinate skills are completed sequentially (one through fourteen) in order to achieve the final learning outcome (fifteen).

case study approach. All of these criterion referenced tests were paper and pencil exercises.

The pretest and posttest were parallel covering the same content material but used different nutritional case study characters. Each test was based on a one-hundred point grading scale. The case studies in the pretest were graded according to the same performance criteria used on the posttest.

Steps 4 and 5: Plan and Construct Lessons

In order to have the students motivated for high achievement in the POMR module, the designer used some techniques that would elicit positive affective feelings about the content material. Music was used on the audio tape to introduce and end each lesson and cartoon features were interspersed through the lessons. In the lessons, the designer tried to avoid the use of educational jargon and state the purpose of each lesson in words that would be understood by the students.

Content information on the POMR was presented by use of a student booklet and slide tape presentation. The booklet presented the content information in short paragraphs and case studies with embedded tests used at various intervals. These test questions were written on separate sheets where the student could also record the answers. Answers to the embedded test questions were presented on slides and in the booklet. The slide tape was also used to present various types of content information. Instructions for proceeding back and forth between the booklet and slide tape were given on the slides and in the booklet.

One consideration for the production of a module is the ability of the designer to produce materials in a particular format. The format used was the most compatible for the designer's experience with media and the resources available for the module use.

The photographic slides used in the slide tape presentation were produced by use of a copystand at the Instructional Resource Center at MSU. This involved typing out word messages on 6" by 9" cards with the primary typewriter to fit within the lens dimensions of the camera. A storyboard was used in deciding on the types of slides and corresponding script to be used. The audiotape was recorded by use of a Wollensack tape recorder and stereo music was interspersed at the appropriate times (according to the script) with mixing techniques. The slides were synchronized to the tape so that the student would not have to advance the slides manually. The student booklet had various kinds of type styles used in it to draw attention to specifics, e.g., italic type was used for directions for the student and various concepts being presented.

Testing of the POMR module was conducted in the Dietetic Instructional Resource Center in the Human Ecology Building. This resource center is equipped with study carrels providing audio playback tape units, slide carousels and earphones. Each student going through the module could sit at a separate carrel with very few distractions.

Step 6: Evaluation

Before doing the final testing of the module, a formative evaluation was conducted. Formative specifically expresses that it is in the developmental process toward an appropriately sequenced final product.

First of all, a one-to-one formative evaluation was conducted. Three dietetic students representative of the target population sat independently side-by-side with the designer and went through each step of the module to clarify it and correct any misunderstandings. Changes were made as the student went through it.

In the small group formative evaluation, seven dietetic students representative of the target population went through the module independently and gave feedback to the developer. Changes were made in the module after this evaluation also and then the module was ready for final testing which is termed summative evaluation.

The lecture was given by a Registered Dietitian who was shown the pretest and posttest questions in advance of giving the lecture in order to develop a lecture with a similar sequence as the module. Further consultation was given to the lecturer from the designer as was needed. Both the lecture and module were kept at a two hour time limit. Self-instructional materials are usually self-paced but since the lecture treatment had a two hour time limit, the same time limit was used with the module treatment. An equal time limit was used for both treatments. The pretest was completed to familiarize the student with the concepts of the study and after each student completed the module or attended the lecture treatment, he/she received a glossary of terms concerning the POMR to review before completing the posttest.

Because the posttest was a subjective essay test, it was evaluated by two Registered Dietitians according to the performance criteria. (Table A-1, Appendix A). The graduate committee of the designer advised her to use two posttest evaluators in order to ensure unbiased

test results. The designer was one of the evaluators plus one of the clinical instructors in the dietetic coordinated study plan at MSU.

Experimental Design

This experiment contained the following components:

Hypothesis A:

1. MSU dietetic students were given the lecture and module treatments plus pretest and posttest and the University of Hawaii dietetic students were given the module treatment plus pretest and posttest.

Hypothesis B:

1. MSU dietetic students were given the lecture treatment and posttest according to the type of student
   a. Conventional Study Plan
   b. Coordinated Study Plan
2. MSU dietetic students were given the module treatment and posttest according to the type of student.
   a. Conventional Study Plan
   b. Coordinated Study Plan

Hypothesis C:

1. MSU dietetic students were given the module treatment and posttest according to the type of student
   a. Conventional Study Plan
   b. Coordinated Study Plan
2. University of Hawaii dietetic students were given the module treatment and posttest according to the type of student.
   a. Conventional Study Plan

Independent Variables

Learning of the application of the POMR Concept to client nutritional care.

1. Treatment
    a. lecture
    b. self-instructional module
2. Curriculum
    a. MSU Dietetic Students in Conventional Study Plan
    b. MSU Dietetic Students in Coordinated Study Plan
    c. University of Hawaii Dietetic Students in Conventional Study Plan
3. University Setting
    a. Michigan State University
    b. University of Hawaii

Dependent Variables

Pretest of the application of the POMR concept to client nutritional care.

Posttest of the application of the POMR concept to client nutritional care.

Analysis of Data

Two-tailed T-test at significance level of .05.

Kuder-Richardson Formula used for an estimate of reliability of Rater Variance on Essay Test Scores.

Limitations of the Study

This study has limitations which are noted.

1. The sampling of dietetic students in each group (Coordinated Study Plan and Conventional Study Plan at MSU and Conventional Study Plan at the University of Hawaii) were both small and varied.

2. The prerequisites of completed course work of both the MSU and the University of Hawaii dietetic students were similar but not the same. It is not known whether competency was equivalent.

3. Amount of prior experience with mediated instruction was not determined as a component of participation, thus the module may prove more or less difficult for some students.

4. The dietetic students at the University of Hawaii may have had different cultural backgrounds than MSU dietetic students. Varied interpretations of the instructional materials could result.

5. The designer would be available to administer the pre and post-tests for the MSU students, but was not available for the University of Hawaii dietetic students.

6. The comparison between the equivalent content material presented in the module and the lecture cannot definitely be determined.

7. Some students were graded on their performance in the study whereas others were volunteers. The graded students may have been more motivated to do well.

8. The two posttest evaluators may interpret the performance criteria differently.

9. The lecturer is an instructor of the MSU Dietetic Coordinated Study Plan students whereas the Dietetic Conventional Study Plan students at MSU are not familiar with her. This may produce varied results on the posttest.

CHAPTER V

RESULTS/DISCUSSION

These null hypotheses have been written: (A) dietetic students at MSU and the University of Hawaii given a self-instructional module or equivalent lecture presentation to learn the application of the POMR concept to client nutritional care will show no significant gain in score from pretest to posttest (both tests measuring equivalent content) to indicate that learning has taken place, (B) dietetic students at MSU given a self-instructional module to learn the application of the POMR concept to client nutritional care will show no significant difference in achievement on the posttest compared to dietetic students at MSU given an equivalent lecture presentation on POMR and same posttest and (C) dietetic students at MSU given a self-instructional module to learn the application of the POMR concept to client nutritional care will show a significant difference in achievement on the posttest compared to dietetic students at the University of Hawaii given the same self-instructional module and same posttest.

Also an achievement at the Mastery level of ninety percent accuracy on the posttest would indicate that the dietetic student can apply Problem-Oriented Medical Record (POMR) knowledge into accurately writing a dietetic problem, plan of action and SOAP progress note.

When the hypothesis predicts that differences will exist in the data and allows this difference to be in either direction (larger or smaller), a two-tailed test of its null hypothesis is performed since the difference can fall in either tail of sampling distribution (Nie et al., 1975).

The T-test provides the capability of computing whether or not the difference between two sample means is significant. Two types of tests may be performed.

1. Independent samples: the cases are classified into two groups and a test of mean differences is performed for specific variables.

2. Paired samples: for paired observations arranged casewise, a test of treatment effects is performed. An example would be the same (or similar) individual being measured before and after treatment.

The goal of the T-test statistical analysis is to establish whether or not a difference between two samples is significant. "Significant" is used to mean "indicative of" or "signifying" a true difference between the two samples (Nie et al., 1975).

A significance level for testing the null hypothesis was chosen and set at equal to or less than .05. This significance level is exactly the probability of rejecting the null hypothesis when it is true (Nie et al., 1975).

If it is known whether the two populations have the same variance, an F test of sample variances may be performed. The null hypothesis with alternative hypothesis and a significance level α' is chosen. An α' level of .05 was chosen. From the sample variances, F was computed. If the probability for F is greater than α', the t value based on the pooled-variance estimate is used to determine probability.

If the probability for F is less than or equal to α', the t value is based on the separate variance estimate to determine probability (Nie et al., 1975).

Results of Hypothesis Testing

Each hypothesis is presented along with a report of findings. Five of the pretests of the Michigan State University Conventional Study Plan Dietetic Students were misplaced so the data from these students could not be included in the analysis of data.

Hypothesis A: Dietetic students at MSU and the University of Hawaii given a self-instructional module or equivalent lecture presentation to learn the application of the POMR concept to client nutritional care will show no gain in score from pretest to posttest to indicate that learning has taken place.

This hypothesis was tested using the dependent T-test. Results are reported on Table 1.

Findings: The null hypothesis was not supported. There was a significant gain from pretest to posttest for all groups ($\alpha < .001$). The pretest scores for both treatments showed greater deviation compared to the deviation in the posttest scores, which may also indicate that more students learned the POMR concept in an equivalent manner.

Hypothesis B: Dietetic students at MSU receiving the self-instructional module on POMR will not show a significant difference in achievement on the posttest compared to dietetic students at MSU given an equivalent lecture presentation on POMR and same posttest.

This hypothesis was tested using the independent T-test. As the dietetic curriculum had two offerings, the Coordinated Study Plan

Table 1.--Results of T-test for Difference Between Pretest and Posttest Percentage Mean Scores in Lecture and Module Treatments for Michigan State University and the University of Hawaii Dietetic Students.

Group	Pretest	Posttest	Difference (Posttest-Pretest)	T Value	df	p
Lecture (N = 15)						
Mean	67.2667	90.5333	23.2667	8.03	14	.001[a]
Standard deviation	9.354	6.621	11.222			
Standard error	2.415	1.710	2.897			
Module (N = 32)						
Mean	61.5000	93.4063	31.9063	11.72	31	.001[a]
Standard deviation	15.268	5.223	15.395			
Standard error	2.699	.923	2.721			

[a]Significant at $\alpha < .001$.

and Conventional Study Plan, the data were collected separately for students enrolled in each plan. Results are reported on Table 2.

Findings: The null hypothesis was supported. The difference in achievement on the posttest scores for the module and lecture groups was not significantly different. Further analysis revealed that the Conventional Study Plan students in the module group had the lowest standard deviation. The Coordinated Study Plan students in the module treatment may have been a more homogeneous group. The pretest scores were analyzed at the same time the posttest scores were analyzed and so were also included on Table 2. There was a significant difference in pretest scores between the lecture and module groups of the MSU Coordinated Study Plan students (.001) whereas pretest scores in the lecture and module treatments for the MSU Conventional Study Plan students were not significantly different.

Hypothesis C: Dietetic students at Michigan State University receiving the self-instructional module on POMR will show a significant difference in achievement on the posttest compared to dietetic students at the University of Hawaii given the same self-instructional module and posttest.

This hypothesis was tested using the independent T-test. As the dietetic curriculum had two offerings, the Coordinated Study Plan and Conventional Study Plan, the data were collected separately for students enrolled in each plan. Results are recorded on Table 3.

Findings: The null hypothesis was not supported. The differences in achievement on the posttest percentage mean scores were not significant.

Table 2.--Independent T-test for Difference in Pretest and Difference in Posttest Percentage Mean Scores Between Lecture and Module Treatments for Michigan State University Coordinated (Coord.) and Conventional (Conv.) Study Plan Students.

Test	Lecture		Module		T Value	df	Two-Tail prob.
	MSU Coord. (N=10)	Hawaii Conv. (N=5)	MSU Conv. (N=10)	Hawaii Conv. (N=7)			
Pretest							
Mean	66.2000		49.3000		3.98	18	.001[ab]
		69.4000		75.2857	1.04	10	.322[a]
Standard deviation	10.486	7.092	8.367	11.2041			
Standard error	3.316	3.172	2.646	4.173			
Posttest							
Mean	92.8000		95.3000		1.15	11.57	.273[c]
		86.4000		91.4286	1.17	10	.270[b]
Standard deviation	6.426	4.690	2.452	9.519			
Standard error	2.032	2.098	.775	3.598			

[a]Significant at $\alpha < .05$.

[b]A pooled variance estimate was used.

[c]A separate variance estimate was used.

Table 3.--Independent T-test for Difference in Pretest and Difference in Posttest Percentage Mean Scores in Module Treatment for Michigan State University Coordinated (Coord.) and Conventional (Conv.) Study Plan Dietetic Students and the University of Hawaii Conventional (Hawaii Conv.) Study Plan Students.

Test	Module		Module		T Value	df	Two-Tail prob.
	MSU Coord. (N=10)	Hawaii Conv. (N=15)	MSU Conv. (N=7)	Hawaii Conv. (N=15)			
Pretest							
Mean	49.3000	63.2000			2.71	23	.013[ab]
			75.2857	63.2000	1.93	20	.068[b]
Standard deviation	8.367	14.644	11.041	14.644			
Standard error	2.646	3.781	4.173	3.781			
Posttest							
Mean	95.3000	93.0667			1.70	23	.102[c]
			91.4286	93.0667	.44	6.82	.673[c]
Standard deviation	2.452	3.615	9.519	3.615			
Standard error	.775	.933	3.598	.933			

[a]Significant at $\alpha < .05$.

[b]A pooled variance estimate was used.

[c]A separate variance estimate was used.

Further analysis (Table 3) revealed that the pretest percentage mean scores of the Michigan State University Coordinated Study Plan students and the University of Hawaii Conventional Study Plan students were significantly different (.013). In comparing the Conventional Study Plan students at Michigan State University and the University of Hawaii Conventional Study Plan students, it is seen that neither their pretest or posttest percentage mean scores were significantly different as also seen on Table 3.

The dietetic students at Michigan State University and the University of Hawaii achieving ninety percent on the posttest are recorded on Table 4. The majority of students in each group achieved the ninety percent criterion level.

Reliability of Posttest Evaluators

The calculation of a Reliability Coefficient was used for estimating the reliability of the two independent evaluators of the posttest (Ebel, 1972).

The formula is:

$$r = \frac{n\Sigma xy - \Sigma x\Sigma y}{\sqrt{[n\Sigma x^2 - (\Sigma x)^2]\ [n\Sigma y^2 - (\Sigma x)^2]}}$$

The results of the formula indicated that the reliability coefficient was .69 indicating that the two evaluators had sixty-nine percent reliability. The score can range from zero to one with scores near one indicating high reliability between raters.

Table 4.--Number of Dietetic Students in Lecture and Module Treatments of Conventional and Coordinated Study Plan Students at Michigan State University and the University of Hawaii Achieving Ninety Percent on the Posttest.

Treatment	Number of Students	Number of Students Achieving 90% on Posttest
Lecture		
MSU		
Conventional	5	4
Coordinated	10	9
Module		
MSU		
Conventional	7	5
Coordinated	10	9
Module		
University of Hawaii		
Conventional	15	14
TOTAL	47	41

Comments

The students' feelings (affect) regarding the module were recorded. They felt that more time was needed to be spent on the Assessment Component of the SOAP Progress Note and less time on learning about Dietetic Problems. The students felt that they derived benefit from the embedded test questions while going through the module. The affective aspects of the module (music, cartoons and statements about their success, e.g., You're Doing Fine!) were enjoyed by all of the students and recommended to be left in the module. The dietetic students at the University of Hawaii thought that the cartoons of lesson two of the module needed to be more relevant to the content. Students reported there was confusion when they had to move back and forth between the slide tape and student booklet but this confusion decreased as the student kept going through the module. Also clarity as to whether or not only one answer is acceptable for the embedded test questions is needed. Those students attending the lecture treatment felt that the lecture was lengthy and repetitious but that the case study examples used were helpful. The students overall felt that they learned how to write SOAP notes in the correct format.

CHAPTER VI

CONCLUSIONS/RECOMMENDATIONS

Conclusions

Major conclusions from this study concern Hypotheses A, B and C. Null Hypothesis A states that dietetic students at MSU and the University of Hawaii given a self-instructional module or equivalent lecture presentation to learn the application of the POMR concept to client nutritional care will show no gain in score from pretest to posttest (both tests measuring equivalent content) to indicate that learning has taken place. Hypothesis A was rejected since there was a significant gain in score from pretest to posttest to indicate that learning had taken place. Null Hypothesis B states that dietetic students at MSU given a self-instructional module to learn the application of the POMR concept to client nutritional care will show no significant difference in achievement on the posttest compared to dietetic students given an equivalent lecture presentation to learn the application of the POMR concept to client nutritional care and same posttest. Null Hypothesis B was accepted since there was not a significant difference in posttest percentage mean scores between the module and lecture groups in either the Coordinated Study Plan or Conventional Study Plan dietetic students at Michigan State University. Null Hypothesis C states that dietetic students at MSU given a

self-instructional module to learn the application of the POMR concept to client nutritional care will show a significant difference in achievement on the posttest compared to dietetic students at the University of Hawaii given the same self-instructional module to learn the application of the POMR concept to client nutritional care and same posttest.

Null Hypothesis C was rejected since the posttest scores of the dietetic students at the University of Hawaii receiving the module treatment were not significantly different than the posttest scores of the Michigan State University dietetic students in the module groups. The University of Hawaii's dietetic students' high posttest scores may be accounted for by the fact that they were being offered an opportunity to participate in a project being offered by another large mainland university. These students could have developed interest and curiosity with a desire to perform well.

Forty one of the forty seven students (93%) participating in this study were able to achieve at the ninety percent criterion level on the posttest regardless of being in the lecture or module group. Over ninety percent of the University of Hawaii dietetic students achieved ninety percent on the posttest which may indicate that the POMR module has the potential of being used with other dietetic programs with their students achieving the ninety percent criterion level on the same posttest.

The raters of the posttest for all groups showed a sixty nine percent reliability coefficient between each other. The use of the performance criteria checklist used in scoring the posttests probably

accounted for this reliability and further clarification of the criteria may yield higher results.

Recommendations

A major recommendation would be that the module be revised for clearer understanding based on the comments of the students. The whole module is being reviewed by the designer's Graduate Committee Members and Clinical Faculty of the Coordinated Study Plan in Dietetics at Michigan State University in order to convert it from a prototype into a Professional Instructional Module.

A self-instructional module should be produced using a content area that does not change frequently in order to have the time spent in design and production worthwhile.

Evaluation of more pre- and posttests of the module with more dietetic students could be conducted to increase the validity of the module.

It appears that the hierarchical process used to develop a final learning outcome (Hiob, 1978) has application for other types of cognitive learning in order to develop a sequential path leading the student to mastery of a subject. This thesis study has shown that the hierarchical process is successful in aiding the dietetic student in learning the application of the POMR concept to client nutritional care and, in the designer's opinion, be applied to the development of other materials in the cognitive domain in dietetic curriculums.

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APPENDICES

APPENDIX A

PERFORMANCE CRITERIA FOR LEARNING OUTCOME

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PERFORMANCE CRITERIA FOR LEARNING OUTCOME

Table A-1.--Performance Criteria for Learning Outcome.

LEARNING OUTCOME:

Given nutritional information about a client, the student dietitian will write the dietetic problem, plan of action and SOAP progress note with ninety percent accuracy according to the following criteria:

Dietetic Problem Statement:

Points		
(6)	_____ conciseness	
	written in up to 6 words:	6 points
	written in up to 7-10 words:	4 points
	written in up to 11-14 words:	2 points
	written in greater than 14 words:	0 points
(6)	_____ accuracy:	
	dietetic problem statement must have the same nutritional meaning as the possible answers given for the dietetic problem on the answer sheet	

Plan of Action

Diagnostic Component

(4) _____ presence of diagnostic component of plan

Points

(4) _____ data suitable for diagnostic category

(4) _____ data fits nutritional information of client

or

(12) _____ no diagnostic entry

Therapeutic Component

(4) _____ presence of therapeutic component of plan

(4) _____ data suitable for therapeutic category

(4) _____ data fits nutritional information of client

or

(12) _____ no therapeutic entry (if applicable)

Client Education Component

(4) _____ presence of client education component of plan

(4) _____ data suitable for client education entry

(4) _____ data fits nutritional information of client

or

(12) _____ no client education entry (if applicable)

SOAP Progress Note

Subjective Information

(2) _____ presence of subjective entry
and
(2) _____ complete and accurately classified objective information written about the client

or

(4) _____ no subjective entry (if applicable)

Points

Objective Information

(2) _____ presence of objective information
and
(2) _____ complete and accurately classified subjective information written about the client

or

(4) _____ no objective entry (if applicable)

Assessment

(4) _____ presence of assessment

(4) _____ accuracy of assessment based on subjective and objective information

Plan of Action

Diagnostic Component

(4) _____ presence of diagnostic component of plan

(4) _____ data suitable for diagnostic category

(4) _____ data fits nutritional information of client

or

(12) _____ no diagnostic entry

Therapeutic Component

(4) _____ presence of therapeutic component of plan

(4) _____ data suitable for therapeutic category

(4) _____ data fits nutritional information of client

or

(12) _____ no therapeutic entry (if applicable)

Points	Client Education Component
(4)	_____ presence of client education component of plan
(4)	_____ data suitable for client education entry
(4)	_____ data fits nutritional information of client
or	
(12)	_____ no client education entry (if applicable)
100	

APPENDIX B

MODULE PRETEST AND POSTTEST

APPENDIX B

MODULE PRETEST AND POSTTEST

PRETEST: PROBLEM-ORIENTED MEDICAL RECORD STUDY

1. Which of the following is not one of the components of the POMR?

   _____ a. defined data base

   _____ b. progress notes

   _____ c. food intake record

   _____ d. the initial plans

   _____ e. complete problem list

2. What are the three (3) sections of the Initial Plans Component of the POMR?

   a.

   b.

   c.

3. Long standing food habits are more likely to be changed if:

   _____ a. authority is used

   _____ b. a three-day fast is initiated

   _____ c. new foods are gradually added to existing food patterns

   _____ d. a person feels threatened

4. The elements of the Narrative Progress Notes are the Subjective (S), Objective (O), Assessment (A), and Plan (P) Categories which are abbreviated as SOAP.

   In this exercise match S, O, A, and P with their descriptions

   _____ a. contains verifiable information such as laboratory test results

   _____ b. contains the strategy for client education, diagnostic and therapeutic procedures

   _____ c. an analysis of the problem based on both Subjective and Objective data

   _____ d. the client's perception of the Problem

5. Which of the following is a component of the POMR?

   _____ a. source-orientation

   _____ b. nutritional care plan

   _____ c. defined data base

   _____ d. meal plan for the client

   _____ e. discharge instruction

6. The food intake of an individual may be affected by:

   _____ a. cultural background

   _____ b. family income

   _____ c. food advertising, fads, prejudices

   _____ d. both a and c

   _____ e. all of the above

7. In the POMR, the Diagnostic section of the Plan for the client is:

   _____ a. used to educate the client about the Dietetic Problem

   _____ b. designed to increase the information known about the client

   _____ c. overall plan for nutritional care

8. A daily menu consists of:

Orange juice (1/2 cup), 2 toast with butter, 1 cup milk, coffee;

Ham (2 oz.) sandwich, 1/2 cup fruit cocktail, 2 sugar cookies and coffee, 1 cup milk;

Meatloaf (3 oz.), 1/2 cup mashed potatoes, brown gravy, 1/2 cup green beans, tossed salad with french dressing, 1/2 cup chocolate pudding and tea

For an adult woman this daily menu:

_____ a. fails to meet the RDA for protein

_____ b. fails to meet the RDA for calcium

_____ c. includes more than an adequate amount of calories

_____ d. is adequate according to the four food groups

9. Match the following Categories of Dietetic Problems with Actual Dietetic Problems:

Categories of Dietetic Problems:

1. Nutritional Misconceptions
2. Inadequate Nutritional Intake
3. Economical Food Selection
4. Food Handling and Preparation Methods
5. Cultural and Religious Implications for Food Selection

Actual Dietetic Problems:

_____ a. unable to eat due to lack of appetite

_____ b. unable to stay within a food budget

_____ c. uses vitamin E to slow the aging process

_____ d. incorrect preparation of vegetables

_____ e. incomplete nutrient consumption due to use of vegetarian diet

10. Sara Smart told the Clinical Dietitian that she (Sara) spends most of her food money on beef, pork, fresh vegetables, ready-to-eat rolls, fresh fruit and readily prepared pies and cakes. There are five (5) members in Sara's family and one refrigerator with a small freezer. Sara usually doesn't have enough food money to last through the whole month.

    CHOOSE THE DIETETIC PROBLEM:

    _____ a. Inadequate Dietary Intake

    _____ b. Inappropriate Food Preservation

    _____ c. Inappropriate Use of Food Budget

11. Maria Gonzalez went to the Community Health Center for a physical exam. When talking with the Dietitian, Maria said that the Gonzalez family likes to eat a lot of tamales, tortillas, chili and a variety of beans (pinto, soy and navy). They drink mostly soft drinks and coffee. Marie feels that the family eats well and doesn't need any other types of foods.

    WHAT BEST DESCRIBES MARIA GONZALEZ'S DIETETIC PROBLEM?

    _____

12. Geriatric George believes in using Vitamin E tablets to help him stay young. A diet history done with George reveals that he eats a variety of foods also.

    Dietetic Problem: Misuse of Vitamin E

    Which Dietetic Solution would be best to correct Geriatric George's Dietetic Problem? Put an X by the correct answer.

    _____ a. will take Vitamin E once a week

    _____ b. will include more fiber in his diet

    _____ c. will discontinue Vitamin E use

    _____ d. will take only a B complex tablet

13. <u>Nutritional Information</u>:

    Martha Ryan has been in an Extended Care Facility (ECF) for a month. During the past month she has expressed dislike of the foods

served to her. Martha says that the foods just aren't prepared the way she likes them. Martha's relatives bring her candy and cookies to eat and Martha usually eats all of it.

Dietetic Problem: Rejection of Extended Care Facility Meals

WRITE YOUR ANSWER FOR THIS QUESTION:

What is the best Dietetic Solution for Martha Ryan's Dietetic Problem?

_____

_____

14. Place an X in the blank by the Diagnostic, Therapeutic, and Client Education Statements which are accurately stated:

_____ a. Client Education: have client learn about Vegetarian Diets

_____ b. Client Education: given a list of foods the client will identify the dairy foods

_____ c. Therapeutic: None

_____ d. Therapeutic: client will be given ideas for easy to fix foods

_____ e. Diagnostic: have client learn quick methods of food preparation

15. Nutritional Information

Sara Smart told the Clinical Dietitian that she (Sara) spends most of her food money on beef, pork, fresh vegetables, ready-to-bake rolls, fresh fruit and readily prepared pies and cakes. There are five members in Sara's family and one refrigerator with a small freezer. Sara doesn't have enough food money usually to last through the month.

Dietetic Problem: Misconceptions of Economical Food Selection

Dietetic Solution: Client will learn methods of economical food selection

PUT AN X BY THE CORRECT ANSWER:

What is the best Plan of Action for Sara?

_____ a. Diagnostic: have social worker assess client's financial status

Therapeutic: client will prepare an economical meal

Client Education: have client start looking for a larger, second-hand refrigerator

_____ b. Diagnostic: None

Therapeutic: talk with client about economical food selections

Client Education: client will allocate a certain amount of money for the food budget for the month and will report how she uses the money

16. Nutritional Information:

Bill Blake is 60 years old and lives alone at home. He has to prepare his own meals which consist mainly of toast, cold cereal, pork and beans, salami sandwiches, t.v. dinners, ice cream and various puddings. His favorite beverages are coffee with cream or hot tea. At times Bill will buy pet food to eat when he doesn't feel like cooking. Bill receives a Social Security Check each month and could afford inexpensive foods that are a good representation of normal nutrition.

WRITE YOUR ANSWERS FOR THE FOLLOWING QUESTIONS:

What best describes Bill Blake's Dietetic Problem?

_____

What is a suitable Dietetic Solution for the Dietetic Problem?

_____

_____

What is the best Plan of Action?

Diagnostic: _____

Therapeutic: _____

Client Education: _____

_____

17. PUT AN S BY THE SUBJECTIVE INFORMATION AND O BY THE OBJECTIVE INFORMATION:

_____ a. Client says that onions give him stomach pain

_____ b. Present weight: 135 pounds. Height: 5' 10" as seen in the POMR

_____ c. "I hate to eat liver."

_____ d. Dietitian observes that little or no food is left on Mary's tray after meals

_____ e. Client has lost 8 lbs. in 4 weeks as seen when the Dietitian weighed him

_____ f. Client says that he does not add any sugar to his foods

18. Nutritional Information:

Mariz Gonzalez went to the Community Health Center for a physical exam. When talking with the Dietitian, Marie said that the Gonzalez family likes to eat a lot of tamales, tortillas, chili and a variety of beans. They drink mostly soft drinks and coffee at meals. Maria feels that the family eats well and doesn't need any other kinds of foods.

What best describes Maria's Dietetic Problem? WRITE YOUR ANSWER

_____

What Subjective information can you write about Maria Gonzalez?

S: _____

_____

_____

_____

What Objective Information can you write about Maria Gonzalez?

O: _____

_____

_____

_____

What Assessment can you write from the Subjective and Objective Information?

A: _____

What Plan of Action is now best for Maria Gonzalez?

Diagnostic: _____

Therapeutic: _____

Client Education: _____

_____

REVIEW THE ANSWERS FOR THE PRETEST

POSTTEST: PROBLEM-ORIENTED MEDICAL RECORD STUDY

READ THROUGH THE FOLLOWING NUTRITIONAL INFORMATION CASE STUDIES AND WRITE THE DIETETIC PROBLEMS, INITIAL PLANS AND SOAP PROGRESS NOTES.

Nutritional Information:

The Dietitian did a Diet History with Genial George. George says that he usually skips Breakfast and eats the following foods during the day:

Coffee Breaks: Orange Crush (12 oz.)
Coffee: 5-6 cups with sugar
Chocolate candy bars

Afternoon snack: Cooked White Rice (1 cup) with whole milk (1/2 cup) and sugar
Coffee

Evening Meal: 1-2 Alcoholic Beverages: Martini or Beer
Meat (Veal, Pork or Beef) 6 oz.
Potatoes (fried or baked) 1 cup
Cooked Vegetable (1/2 cup): carrots, broccoli, asparagus, cauliflower
Cake (Angel food, Chocolate, Yellow)
2 glasses Water

EVALUATE ALL DIETS ACCORDING TO THE FOUR FOOD GROUPS

What best describes George's Dietetic Problem? WRITE YOUR ANSWER AND BE AS SPECIFIC AND CONCISE AS POSSIBLE

_____

What would be the best Initial Plan of Action for George? WRITE YOUR ANSWER

Diagnostic: _____

_____

Therapeutic: _____

_____

Client Education: _____

_____

_____

New Nutritional Information: Genial George

Genial George came back to see the Dietitian and showed her a menu that he wrote for himself to determine if it is adequate according to the Basic Four Food Groups:

Menu:

Mid-Morning Snack: Coffee
Grapefruit or Orange

Afternoon Snack: Cooked White Rice (1 cup) with whole milk (1/2 cup) and sugar
Chocolate Candy Bar

Evening Meal: 2 Beers
Meat Serving (Veal, Pork or Beef) 6 oz.
Vegetable (carrots, broccoli, cauliflower or asparagus) 1/2 cup
Cake Dessert

WRITE THE DIETETIC PROBLEM AND SOAP PROGRESS NOTE FOR GENIAL GEORGE:

Dietetic Problem: _____

Subjective Information: _____

_____

_____

_____

Objective Information: _____

_____

_____

Assessment: _____

_____

Plan:

Diagnostic: _____

Therapeutic: _____

Client Education: _____

_____

Nutritional Information:

Marsha Mash told the Dietitian that she (Marsha) uses a large quantity of liquid to cook her vegetables in and is sure to cook the vegetables till they are quite tender. Marsha also said that she adds pennies to jars of canned pickles to preserve the green color of the pickles.

What best describes Marsha's Dietetic Problem? WRITE YOUR ANSWER.

Dietetic Problem: _____

What is the best Initial Plan for Marsha's Dietetic Problem?

Diagnostic: _____

Therapeutic: _____

Client Education: _____

_____

New Nutritional Information:

Marsha Mash spoke with the Dietitian again about her cooking methods. She said that she now cooks vegetables with less liquid and does not cook the vegetables till they are very tender. Marsha also mentioned that she adds baking soda to her green vegetables to preserve the green color.

WRITE THE DIETETIC PROBLEM AND SOAP PROGRESS NOTE FOR MARSHA MASH:

Dietetic Problem: _____

Subjective Information: _____

_____

_____

Objective Information: _____

_____

_____

Assessment: _____

_____

Plan:

Diagnostic: _____

Therapeutic: _____

Client Education: _____

_____

Nutritional Information:

Joe Best recently got laid off from work and now gets an unemployment check each month which is partially used for buying good. His family spends their food money on t.v. dinners, frozen desserts, powdered milk, fresh vegetables and fruits, various bakery breads, ice cream, and puddings. Joe's family has always eaten well and had enough to eat, but the unemployment check now cannot cover food costs.

What best describes Joe's Dietetic Problem? WRITE YOUR ANSWER.

Dietetic Problem: _____

What is the best Initial Plan for Joe's Dietetic Problem?

Diagnostic: _____

Therapeutic: _____

Client Education: _____

_____

New Nutritional Information:

Joe Best told the Dietitian that he made up a food budget plan for two weeks and tried it but still did not have enough money to cover his food costs. Joe said that he would like more help in trying to make his money cover the family's food costs.

WRITE THE DIETETIC PROBLEM AND SOAP PROGRESS NOTE FOR JOE BEST:

Dietetic Problem: _____

Subjective: _____
Info.

_____

_____

_____

Objective: _____
Info.

_____

Assessment: _____

_____

Plan:

Diagnostic: _____

Therapeutic: _____

Client Education: _____