This is to certify that the

thesis entitled

NUTRITION EDUCATION IN THE K-6 CURRICULUM-
TEACHERS' OPINIONS AND TECHNIQUES

presented by

Barbara Lynne Mutch

has been accepted towards fulfillment
of the requirements for

M.S. degree in Nutrition

Carolyn J. Lackey
Major professor

Date 1/8/81

NUTRITION EDUCATION IN THE K-8 CURRICULUM - TEACHERS' OPINIONS AND TECHNIQUES

By

Barbara Lynne Mutch

A THESIS

Submitted to
Michigan State University
in partial fulfillment of the requirements
for the degree of

MASTER OF SCIENCE

Department of Food Science and Human Nutrition

1980

NUTRITION EDUCATION IN THE K-6 CURRICULUM - TEACHERS' OPINIONS AND TECHNIQUES

By

Barbara Lynne Mutch

A THESIS

Submitted to
Michigan State University
in partial fulfillment of the requirements
for the degree of

MASTER OF SCIENCE

Department of Food Science and Human Nutrition

1980

ABSTRACT

NUTRITION EDUCATION IN THE K-6 CURRICULUM-
TEACHERS' OPINIONS AND TECHNIQUES

By

Barbara Lynne Mutch

Thirty-nine teachers, kindergarten through sixth grade, were interviewed about general teaching responsibilities, opinions on what students need to know about nutrition, reasons for including or omitting nutrition in their curriculum and nutrition education topics, techniques and resources. Fifty-four percent of teachers were currently including nutrition topics in their curriculum. Age, sex, years of teaching, college major, highest degree earned, previous food and nutrition training and nutrition knowledge made no significant difference in teacher's decision to include or omit nutrition. Lack of time, money and/or materials were cited as major reasons teachers were not teaching nutrition. The Daily Food Guide and snacks were the nutrition topics most frequently included in curricula. General nutrition knowledge was evaluated. The mean score was fifty percent. Age, sex, years of teaching, school location and previous food and nutrition training made no significant difference in teacher's nutrition knowledge scores.

ACKNOWLEDGEMENTS

I would like to express my sincere thanks to the following people:

To Dr. Carolyn Lackey for her patience, advice and support throughout this research and my graduate program.

To Drs. Kathryn Kolasa, Louise Sause and Jenny Bond for their assistance and advice which were invaluable to this research project.

To all of the Community Nutrition grad students for their help and support. Krista Dessert is especially thanked for her patience and time spent helping me with my data analysis; Janet Kiley and Amy Slonim for their friendship and sympathetic ears; and Jeri Pigott for her many hours editing the Thesis.

To all of the teachers and school personnel who so willingly agreed to participate in the project.

To the Michigan Agricultural Experiment Station, the Michigan Department of Education-Nutrition Education and Training Program and the Department of Food Science and Human Nutrition for financial assistance.

Finally, a very special thank-you to my husband Dale and son Nicolas for their support and understanding, and for helping me keep things in perspective.

TABLE OF CONTENTS

LIST OF TABLES

TABLE PAGE

LIST OF FIGURES

INTRODUCTION

The importance of nutrition education for school age children was emphasized during the White House Conference on Food, Nutrition and Health in 1969. The importance of nutrition education was further emphasized with the passage of Public Law 95-166, the National School Lunch Act and Child Nutrition Amendment of 1977. Section 19 of the Act related directly to nutrition education: "the proper nutrition of the Nation's children is a matter of highest priority, and there is a need to create opportunities for children to learn about the importance of the principles of good nutrition in their daily lives" (Public Law 95-166, 1977).

Childrens' attitudes about food and their food habits have been influenced by many factors (Bell and Lamb, 1973; Carver and Lewis, 1979; Perkins et al., 1980). The school can be a major influence on the food habit formation of young children. The elementary school teacher, therefore, has had an opportunity to play a role in students' food habit formation (Petersen and Kies, 1972).

Most information gathered to date about kindergarten through 6th grade nutrition education has been obtained via mail questionnaires (Carver and Lewis, 1979; Cook et al., 1977; Knudtson, 1972; Lackey and Kolasa, 1979; O'Farrell

and Kendrick, 1972; Perkins et al., 1980; and Petersen and Kies, 1972). The focus of these studies has been: the nutrition knowledge and attitudes of elementary teachers toward the teaching of nutrition and the school lunch program (Carver and Lewis, 1979; Knudtson, 1972; Perkins et al., 1980 and Petersen and Kies, 1972); the extent of classroom teaching of nutrition and teacher training in nutrition (Cook et al., 1977; Knudtson, 1972; O'Farrell and Kendrick, 1972; and Lackey and Kolasa , 1979); the degree of administrative and parental support for nutrition education (O'Farrell and Kendrick, 1972); and the teachers' approach to changing the food behavior of children (Petersen and Kies, 1972).

Two of the studies using a mail questionnaire procedure did not report response rates. When response rates were reported, the range was 47-85 percent. Since respondents may have differed from non-respondents, these samples may have been biased. This research used personal interviews with every teacher in two K-6 Michigan public schools, one rural and one non-rural.

Michigan was one of ten states that had legislated policy concerning nutrition in the public schools (Johnson and Butler, 1975). Michigan included nutrition as part of the Minimal Performance Objectives for Health Education (Michigan Department of Education, 1974). However, teachers are not required to include nutrition topics in their curriculum in Michigan. Some teachers may have included nutrition or other subjects that are not part of the school's

required curriculum. The nutrition education literature did not report reasons why a teacher would include a non-required or extra subject in their curriculum.

Information on resources used by teachers for food and nutrition lesson preparation is limited. The school nurse, materials and people from the National Dairy Council and several state Dairy Councils, textbooks, magazines, government literature, food manufacturer's literature, newspapers, film and filmstrips were the resources mentioned most frequently by teachers (Cook et al., 1977; Hoffman La-Roche, Inc., 1978; Kolasa and Lackey, 1979; and Lackey and Kolasa, 1979). More information on what resources teachers used and on how the resources are used is necessary for future planning.

The Department of Food Science and Human Nutrition at Michigan State University has been involved in two large nutrition education research projects: the Michigan School Breakfast Survey and the Nutrition Education and Training (NET) activities. The purpose of the 1978-79 Michigan School Breakfast Survey was to collect data, via personal interviews with K-12th grade Michigan students, on food behavior as it related to participation in school meals programs, snacking habits and the students' nutritional well being (Kolasa and Lackey, 1979). Views on meal programs, importance of nutrition and nutrition education were also collected, from school administrators,

food service employees and teachers using interviews and self administered questionnaires.

The Nutrition Education and Training (NET) activities have been funded by Public Law 95-166, the National School Lunch and Child Nutrition Amendment of 1977. Michigan State University's involvement with NET activities in 1978-79 included evaluation of NET pilot projects in Michigan which had a project coordinator who had conducted nutrition education activities and development of a valid and reliable nutrition knowledge test with broad application to various groups (Lackey and Kolasa, 1979; Lackey et al., 1979). NET activities for 1979-80 included the production of a videotape for food service employees to foster the development of self-esteem; development of instruction manuals for food service employees; production of a videotape for elementary school teachers to motivate them to include nutrition education in their curriculum; and development of a workbook to aid elementary teachers in teaching nutrition to their students.

The current research supplemented the work Michigan State University has previously been involved with concerning nutrition education in Michigan schools.

The objectives of this research were to: (1) identify reasons why teachers included any extra subjects, i.e. subjects they were not required to teach; (2) identify reasons why teachers included or omitted nutrition education in their curriculum; (3) document the techniques and

resources used to present nutrition topics and (4) test elementary teachers' nutrition knowledge.

An additional experimental hypothesis was proposed to be tested in this research project: elementary teachers (grades K-6) will score less than 75 percent on a 40 item true-false-multiple choice nutrition knowledge test (NKT). Teachers scored a mean of 56 percent in the pretesting of the NKT (Lackey et al., 1979). The 75 percent score chosen for this research project includes a safety margin.

OPERATIONAL DEFINITIONS

Nutrition Education Any activity in a classroom that includes food and/or nutrition information.

Food and Nutrition Education Topic Any lesson or activity which involves any of the ideas contained in the White House Conference on Food, Nutrition and Health Conceptual Framework (p.9) (White House Conference, 1969).

Teaching Techniques The methods, procedures, resources, and/or approach used to present topics.

Current Nutrition Teachers Teachers who included food or nutrition topics in their curriculum the present year.

Past Nutrition Teachers Teachers who had included food or nutrition topics in their curriculum in a past year but not during the present year.

Non-nutrition Teachers Teachers who have never included food or nutrition topics in their curriculum.

REVIEW OF LITERATURE

Nutrition Education

Nutrition has been defined as the science of food, the nutrients and other substances therein, their action, interaction, and balance in relation to health and disease and the process by which the organism ingests, digests, absorbs, transports, utilizes and excretes food substances (Michigan Department of Public Health, 1980). In addition, it is concerned with social, economic, cultural and psychological implications of food and eating. Nutrition provides one of the greatest opportunities for an individual to influence his health and well being.

Education is the "act or process of providing knowledge, skills, competence" (Webster, 1976). Nutrition education, therefore, provides information to enable people to choose food based on their understanding of their bodies' needs while considering the cultural, economic, personal and social implications. A broader goal for nutrition education has been to create awareness and interest, promote the acquisition of knowledge, provide motivation to change, and promote the adoption of new food-related behavior patterns to promote optimum health (Robinson, 1976; White House Conference, 1969).

The public has shown increasing interest in the relationship of nutrition and health. There also has been

an increased concern by both nutritionists and educators that children be given the knowledge and skills so they can function as nutritionally-literate decision makers (Guthrie, 1978). Nutrition education in the school environment is one way to provide children with this knowledge and skills.

The ideal nutrition education approach is to begin in early childhood and continue throughout the elementary and secondary school years (White House Conference, 1969). Callahan (1973) suggested that nutrition education be addressed through comprehensive, sequential, and integrated programs.

Nutrition Education Program Components

Suggested components of a comprehensive nutrition education program in schools included: (1) instruction on the nutritional value of foods and the relationship between food and human health, (2) assistance in development of positive attitudes toward food, (3) education of food service personnel in the principles and practices of good food service management, and (4) development and use of classroom materials and curricula (Guthrie, 1978; Public Law 95-166, 1977; Robinson, 1976; and White House Conference, 1969). Furthermore, school nutrition education programs need to include parents and other adults. Learning opportunities should be designed to accommodate cultural, economic, personal and family conditions (White House Conference, 1969).

Nutrition Education Topics

Some controversy and confusion currently exist as to what topics could and should be considered part of a school's nutrition education curriculum. The Nutrition Teaching and Nutrition Education panel at the White House Conference on Food, Nutrition and Health developed a "Conceptual Framework for Nutrition Education in the Schools" to be used as a resource in developing and evaluating curricula (White House Conference, 1969). This framework illustrated the diversity of food and nutrition topics for a school's curriculum.

Conceptual Framework for Nutrition Education in the Schools

1. Nutrition is the process by which food and other substances eaten become you. The food we eat enables us to live, to grow, to keep healthy and well, and to get energy for work and play.

2. Food is made up of certain chemical substances that work together and interact with body chemicals to serve the needs of the body.

   a. Each nutrient has specific uses in the body.
   b. For the healthful individual the nutrients needed by the body are usually available through food.
   c. Many kinds and combinations of food can lead to a well-balanced diet.
   d. No natural food, by itself, has all the nutrients needed for full growth and health.

3. The way a food is handled influences the amount of nutrients in the food, its safety, appearance, taste, and cost; handling means everything that happens to food while it is being grown, processed, stored, and prepared for eating.

4. All persons, throughout life, have need for about the same nutrients but in varying amounts.

   a. The amounts needed are influenced by age, sex, size, activity, specific conditions of growth, and state of health, altered somewhat by environmental stress.
   b. Suggestions for kinds and needed amounts of nutrients are made by scientists who continuously revise the suggestions in the light of the findings of new research.
   c. A daily food guide is helpful in translating the technical information into terms of everyday foods suitable for individuals and families.

5. Food use relates to the cultural, social, economic and psychological aspects of living as well as to the physiological.

   a. Food is culturally defined.
   b. Food selection is an individual act, but it is usually influenced by social and cultural sanctions.
   c. Food can be chosen so as to fulfill physiological needs and at the same time satisfy social, cultural, and phychological wants.
   d. Attitudes toward food are a culmination of many experiences, and the present.

6. The nutrients, singly and in combination of chemical substances stimulating natural foods, are available in the market; these may vary widely in usefulness, safety of use, and economy.

7. Food plays an important role in the physical and psychological health of a society or a nation just as it does for the individual and the family.

   a. The maintenance of good nutrition for the larger units of society involves many matters of public concern.
   b. Nutrition knowledge and social consciousness enable citizens to participate intelligently in the adoption of public policy affecting the nutrition of people around the world.

The variety of nutrition topics included in an elementary school's curriculum has been diverse, but rarely incorporated the number of topics contained in the White

House Conference framework. Some of the most frequently cited topics were food groups, nutrients, meal planning, balanced diets, good breakfasts, snacks, diet and health, sugar and tooth decay, label reading, food handling, cultural foods, weight loss diets, athletes' diets, and food safety (Baker, 1972; Grogan, 1978; Hicks, 1978; Kolasa and Lackey, 1979; Niedermeyer and Moncrief, 1975; Spitze, 1971; and Wodarski et al., 1980).

Nutrition Teaching Techniques

Many teaching techniques and methods have been employed to present nutrition topics. Techniques included experiments, record keeping, taste testing, bulletin board displays, demonstrations, pre and posttests, food classification-schemes, assigned reading, audiovisuals, puppet shows, games, visual aides, dramatics, peer-teaching, cooking, school cafeteria laboratories, inquiry, discussion, discovery, simulation, debate, food surveys, scrapbooks and field trips (Baker, 1972; Head, 1974; Hicks, 1979; Niedermeyer and Moncrief, 1975; Sodowsky, 1973; Spitze, 1971; Stackhouse, 1979; and Wodarski et al., 1980).

Reasons why teachers chose a specific technique for teaching nutrition have not been explored in detail. Methods and techniques which increase nutrition knowledge and reinforce reading, math, spelling, and/or measurement skills, however, are desired by teachers (Wodarski et al., 1980).

When nutrition was integrated into other curriculum areas, other learning skills may have been simultaneously reinforced.

Teacher Training in Nutrition

The kinds and amounts of nutrition education training for teachers, either preservice or inservice, has varied. Acquiring a basic nutrition course at the undergraduate level for teacher certification would be ideal, but unrealistic (Callahan, 1973).

> As teacher education institutions have sought to respond to seemingly ever increasing demand to equip educators with competencies to deliver programs for an expanding array of society's concerns and problems, the competition for time and priority in both the preservice and inservice preparation of school teachers, counselors, and administrators, has become a chronic constraint. (Pourchot and Ellis, 1978).

To further complicate the issue, there are conflicting reports on the effect of nutrition courses and/or training on teachers nutrition knowledge and on the likelihood that a teacher would choose to teach nutrition. It has been concluded that inclusion of nutrition courses in the college curriculum of an elementary school teacher or previous nutrition training resulted in increased nutrition knowledge (Carver and Lewis, 1979). This assumption has not been supported by other researchers (Petersen and Kies, 1972). Exposure to a nutrition or foods course in high

school or college, or an inservice workshop, however, was significantly related to the likelihood that a teacher would choose to teach nutrition (Cook et al., 1977).

Researchers have reported that elementary teachers not only have minimal nutrition knowledge, but relatively no preparation for methods of teaching nutrition in the classroom (Carver and Lewis, 1979; Cook et al., 1977; Head, 1974; and Petersen and Kies, 1972). Nutrition education methods could be learned either in preservice courses or inservice training workshops. The latter appeared to be the preferred and more realistic option (Callahan, 1973; Cook et al., 1977; Grogan, 1978; Niedermeyer and Moncrif, 1975; and Sodowsky, 1973). Promoting interest and awareness for the need of nutrition education is precursory to the implementation of inservice training workshops (Callahan, 1973; Cook et al., 1977; and, Grogan, 1978).

Several types of nutrition education inservice workshops have been documented in detail (Callahan, 1973; Grogan, 1978; Lackey and Kolasa, 1979; Niedermeyer and Moncrief, 1975; and Sodowsky, 1973). Characteristics of successful workshops may include: (1) compensation for the teachers, such as money, continuing education credit, or credit toward a salary increment; (2) avoidance of workshops that followed a full day of teaching; (3) limitation of class size (15-18); (4) scheduling of action-oriented format with no "gaps;" (5) choice of topic areas that fulfilled the needs of teachers; (6) distribution of useful

materials and resources; and (7) presentation of innovative, interdisciplinary curriculum guides (Callahan, 1973; Grogan, 1978; Lackey and Kolasa, 1979; and Sodowsky, 1973).

Nutrition Knowledge and Attitudes of Elementary Teachers

Several researchers reported that elementary teachers scored low on nutrition knowledge tests (Carver and Lewis, 1979; Knudtson, 1972; Lackey et al., 1979; and Petersen and Kies, 1972). Teachers tended to score higher on general nutrition items while missing those related to food composition (Petersen and Kies, 1972). A lack of knowledge of the concepts of energy and vitamins was also reported (Knudtson, 1972). However the nutrition knowledge tests used in some of these studies lacked standardized test instrument development, and/or had low reliability coefficients.

A valid and reliable 40-item test of general nutrition knowledge was developed at Michigan State University that has broad application to various groups of people, including teachers (Lackey et al., 1979). This nutrition knowledge test was pretested with a random sample of K-12 teachers in Michigan and with members of the Society for Nutrition Education (SNE). The Kuder-Richardson 20 reliability for this sample was .93, which indicated a highly reliable test. The mean score for SNE members was 47 and teachers 28. Fifty points were possible.

Petersen and Kies (1972) reported that little relationship existed between teachers' nutrition knowledge and favorable attitudes toward teaching nutrition. The relationship of nutrition knowledge to nutrition teaching behavior has not been reported in the literature.

There are conflicting reports on the effect of attitudes on behavior. Acock and Scott (1980) believed that attitude directly influenced behavior. Researchers who reviewed the literature investigating the relationship between attitude test responses and corresponding behavior found little evidence to support the use of attitude measures as predictors of behavior (Fishbein and Ajzen, 1971; Wicker, 1971).

The relationship between attitudes toward teaching and actual teaching practices were explored for science and science teaching. Elementary teachers become "science specialists" not because of more positive attitudes toward science, but due to more positive attitudes toward the teaching of science (Earl and Winklejohn, 1977). With respect to nutrition teaching behavior, teachers' attitudes on the importance of nutrition education were found to be significantly related to the teaching of nutrition (Cook et al., 1977).

Many teachers have agreed that nutrition should be included in the elementary school curriculum. Florida teachers favored a mandated nutrition education program (O'Farrell and Kendrick, 1972). In Michigan, 100 percent

of the teachers surveyed indicated that comprehensive health education should include nutrition education (Kolasa and Lackey, 1979). Sixty-three percent of 910 Nebraska teachers felt nutrition should be taught as part of an integrated curriculum (Petersen and Kies, 1972). Perkins and co-workers (1980) reported moderate agreement by teachers to the statement that "a greater emphasis on nutrition education is needed in the school curriculum." Egan and co-workers (1980) compiled a report for educators and nutritionists who were members of the Task Force on Pregnant Women, Children and Adolescents, National Conference on Nutrition Education. This group generally acknowledged that teachers in all schools should teach nutrition, and some individuals and groups felt that nutrition education as well as preparation of prospective teachers in nutrition education should be mandated by the appropriate authorities.

Future Planning

Suggestions and recommendations for future planning of nutrition education training, both preservice and inservice, have been numerous and sometimes conflicting. Sodowsky (1973) proposed that a course presenting nutrition information and innovative teaching methods as well as ideas to integrate nutrition into the curriculum be required for certification of the elementary school teacher. Other

educators have recognized the need for more college level courses, but did not recommend making them a required part of the curriculum (Pourchot and Ellis, 1978). Callahan (1973) felt the requirements of a basic nutrition course for teacher certification was unrealistic.

Researchers have agreed that planning of future nutrition education training and program implementation address the need (1) to give nutrition education a high priority both in the training of teachers and in the elementary curriculum; (2) for qualified people with adequate backgrounds in education and nutrition to teach nutrition education to teachers; (3) for the development of curriculum guides for teachers' use which integrate and sequence nutrition topics and activities; (4) for the development of resource centers and professional libraries which contain nutrition information; (5) for adequate funding; and (6) for support and cooperation by school administrators, teachers, parents, students and the community (Bowman, 1979; Callahan, 1973; Grogan, 1978, Head, 1974; Johnson and Butler, 1975; O'Farrell and Kendrick, 1972; Pourchot and Ellis, 1978; and Sodowsky, 1973).

Status of Nutrition Education in Michigan Public Schools

The White House Conference on Food, Nutrition and Health, and the National Nutrition Education Act of 1974 prompted a study by Johnson and Butler (1975) in the area of nutrition education. Their research explored the current

involvement of departments of public instruction in nutrition education in all 50 states. They found that ten states had legislated policy concerning nutrition in the public schools; Michigan was one of these. Michigan included nutrition as part of the Minimal Performance Objectives for Health Education (Michigan Department of Education, 1974).

The nutrition education activities of nine Michigan schools which had participated in Nutrition Education and Training (NET) pilot projects were documented (Lackey and Kolasa, 1979). A statewide survey to collect information on current nutrition education programs and practices in Michigan public schools has not been conducted. Therefore, it is difficult to discuss the status of nutrition education in Michigan public schools.

Personal Interview vs. Mail Questionnaire

Most information concerning nutrition education programs in elementary schools and teachers' knowledge and attitudes toward nutrition and nutrition education have been collected via mail questionnaires (Carver and Lewis, 1979; Cook et al., 1977; Knudtson, 1972; Lackey and Kolasa, 1979; O'Farrell and Kendrick, 1972; and Perkins et al., 1980).

There are many advantages and disadvantages to using the mail questionnaire as a data collection method. Advantages include: (1) wide coverage for minimum expense;

(2) wide geographic contact; (3) greater validity possible due to larger and more representative samples; (4) greater uniformity in the manner in which questions are posed; (5) privacy for respondents and (6) less interviewer effect.

The disadvantages of mail questionnaires include (1) rate of non-returns; (2) differences of respondents and non-respondents which may bias the sample; (3) misinterpretation of questions; and (4) difficulty of follow-through on misunderstood questions or evasive answers (Miller, 1977). Due to these disadvantages, results from past studies provide only one view of the status of nutrition education in elementary schools and/or teachers' knowledge and attitudes toward nutrition and nutrition education.

An alternative data collection method is the interview, which represents a personal contact between an interviewer and a respondent, usually in the home or place of work. The advantages of the personal interview include:

> (1) high response rate; (2) The information secured is likely to be more correct than that secured by other techniques since the interviewer can clear up seemingly inaccurate answers by explaining the question to the informant; (3) Supplementary information about the informant's personal characteristics and environment can be collected. This information is valuable in interpreting results; (4) Scoring and test devices can be used; (5) Return visits to complete items on the schedule or to correct mistakes can usually be made; (6) The interviewer may secure more spontaneous reactions than would be the case if a written form were mailed out for the informant to mill over; (7) The personal interview may take long enough to allow the informant to become oriented to the topic under investigation. Thus recall of relevant material is facilitated; and (8) More of the informant's time can be taken for the survey than would be the case if the interviewer were not present to elicit and record information (Miller, 1977).

There are also several possible disadvantages to personal interviews. First, the transportation costs and the time requirement may be prohibitive. Second, unless the interviewers are properly trained, the data collected and recorded may be inaccurate and incomplete.

Summary

From this literature review it can be concluded that there is agreement among nutritionists and educators on the need for nutrition education for school age children. The need for a nutrition education program for elementary schools which is comprehensive, sequential and integrated is stressed. The White House Conference on Food, Nutrition and Health developed a "Conceptual Framework for Nutrition Education in the Schools" which provided a broad definition of what a nutrition education curriculum can encompass (White House Conference, 1969).

Limited information on teachers' knowledge and attitudes concerning nutrition and nutrition education, techniques used to present nutrition topics, and teachers' food and nutrition training was available. Most data of this type have been collected via mail questionnaires.

Teachers generally scored low on nutrition knowledge tests, but had a positive attitude toward the inclusion of nutrition education in the elementary school curriculum. The relationship among knowledge, attitudes, and nutrition teaching behavior has not been established, due to

conflicting reports. The techniques used to present nutrition topics are diverse. Teaching techniques which reinforce other learning skills are preferred by teachers.

The reported effects of teachers' preservice and/or inservice training in foods and nutrition and nutrition knowledge are still being debated. Food and nutrition training does increase the likelihood that a teacher will include nutrition in the curriculum.

METHODS AND PROCEDURES

This study was designed to collect information from K-6th grade teachers concerning nutrition education in their classroom curriculum. The research instruments developed for this project included an original pretested interview schedule, a nutrition interest checklist and an observation sheet for each classroom and for the school. A nutrition knowledge test (Lackey, et al., 1979) also was given to the teachers to be completed at their convenience. Data collection methods included a 30 to 45 minute interview with elementary teachers working in non-Title I public schools in Michigan and completion of observation sheets in each school by the investigator; completion of a nutrition knowledge test and nutrition interest checklist by each teacher. Specific factors studied were general teaching responsibilities, opinions on nutrution education in the K-6 curriculum, food and nutrition training of the teachers, individual reasons for including or omitting nutrition topics in the curriculum, specific nutrition topics included in the curriculum, techniques used to teach nutrition to the students in the classroom, and nutrition interests and knowledge of the teachers.

Development of Instruments

Interview Schedule

The interview schedule contained a series of 24 forced choice and 18 open-ended questions (Appendix A). The interview schedule was composed of five parts.

The first part contained questions on teachers' (1) general teaching responsibilities, (2) reasons for inclusion or omission of any "extra" or non-required subjects, (3) food and nutrition training, (4) opinions on what students needed to know about nutrition, (5) perceived impact on students' eating habits, (6) and opinions on where students learned about nutrition.

The first section on the interview schedule was administered to all teachers. Questions on teaching responsibilities and the inclusion of "extra" subjects were designed to obtain information on (1) teachers' teaching load, that is, how many subjects they were personally responsible for teaching to their students, (2) the prevalence of non-required or "extra" subjects and (3) reasons why a teacher would decide to include something "extra". The questions on food and nutrition training provided information on each teacher's food and nutrition background. Questions eliciting teachers' opinions on students' nutrition education needs and students' sources of nutrition information were designed for two reasons: (1) to gather general information on teachers' perceptions of nutrition

related to their students' needs and (2) to see if teachers' opinions were related to their teaching of nutrtion and the specific nutrition topics that they included.

The next three sections of the interview schedule were administered to selected teachers, based upon whether they were currently including nutrition topics, had included nutrtion in the past, or had never included nutrition topics. The teachers were grouped, at this point, and designated as a current, past or non-nutrition teachers (according to the criteria defined in the operational definitions).

The second part of the interview schedule was administered to current nutrition teachers. Questions in this section included nutrition topics which were part of the individual teacher's curriculum, reasons for including these topics, teaching methods and techniques used to present nutrition topics, resources used to help teach nutrition topics, and the amount of preparation and class time set aside by the teachers for nutrition related topics each school year. These questions were included in the interview schedule to describe what, why and how much nutrition education was currently being taught in the sample schools' classrooms.

Questions to obtain information on how teachers set priorities, and to elicit suggestions on methods or resources which would help teachers teach nutrition and ways non-nutrition teachers could be encouraged to include

nutrition were included. These questions were designed to provide information for future planning of nutrition education programs in schools.

The third part of the interview schedule was designed to be administered to past nutrition teachers. These were teachers who had taught nutrition at some time in their teaching career, but not the current year. The same questions were asked of the past nutrition teachers as were asked of the current nutrition teachers for two reasons: (1) to obtain information on past nutrition education teaching practices and methods, and (2) to compare the past nutrition teachers' methods and practices to current nutrition teachers. Past nutrition teachers also were asked why they no longer included nutrition topics in their curriculum.

The fourth section of the interview schedule was developed for non-nutrition teachers, that is, those teachers who had never included a nutrition topic in their curriculum. Questions in this section included data on (1) whether non-nutrition teachers had ever considered including nutrition in their curriculum, and (2) if yes, what were the reasons they hadn't yet, or (3) if no, why. Suggestions on resources or assistance the non-nutrition teachers would like or need in order to teach nutrition were solicited, too.

The final section of the interview schedule contained questions on demographic data for all teachers. Demographic characteristics were chosen through consideration

of which characteristics might be associated with the teachers' decision to include or omit nutrition topics in their curriculum. Therefore, the school's participation in school breakfast and school lunch programs, as well as the individual's age, sex, number of years teaching, college degree major and minor, and highest degree earned were chosen. The final interview section also included a comment section. The comment section allowed and encouraged the teachers to express feelings and opinions which may not have been addressed during other parts of the interview. Issues such as basic nutrition philosophies and other nutrition related beliefs were recorded. This type of information was important as a supplement to other data.

All teachers completed section one and five of the interview schedule. Each teacher also completed one additional section. Current nutrition teacher were administered section two, past nutrition teachers section three and non-nutrition teachers section four of the interview schedule.

Nutrition Interest Checklist

A nutrition interest checklist (NIC) was developed to record information on teachers' personal nutrition interests and their interest in teaching specific nutrition topics (Appendix A).

The NIC contained two sections. The first part consisted of a list of 16 food and nutrition topics. These topics were compiled from a review of current nutrition education literature (Cook et al., 1977; Guthrie, 1978; and Niedermeyer and Moncrief, 1975) and the White House Conference "Conceptual Framework for Nutrition Education in the Schools" (White House Conference, 1969). Three columns were placed next to the list of topics with the following headings:

"Interested and would like more information," "Interested but do not want more information," and "Not interested enough to seek more information." This section was developed to determine teachers' personal interest in the 16 nutrition topic areas. Space was also provided for "other" topics.

The second part of the checklist asked teachers to select five food and nutrition topics that they would teach in their classrooms. The five topics were chosen from the 16 previously listed food and nutrition topics. The information from the NIC was designed to determine if teachers' reported personal nutrition interests and nutrition teaching interests were associated with teachers' perceptions of what students needed to know about nutrition and current or past nutrition topics included in the curriculum.

The NIC was not patterned after another research instrument. It was designed specifically for this research project.

Observation Sheets

Two types of observation sheets were developed. (Appendix A). They were designed to record visual evidence of nutrition education in the schools. One observation sheet was for the lunchroom, library and hallways, the other was for each teacher's classroom. Space was provided for a description of the classroom, titles of texts and a description of the teacher, students or other people present in the room.

The decision to record observations was made after evaluating the possible need for information to supplement and/or explain some of the responses on the interview schedule (Crane and Angrosine, 1974).

Probe Cards

Probe cards were developed to assist the teachers in recalling selected information during the interview (Appendix C). These cards contained the same response choices as the interview schedule. The probe cards were made of 4" x 6" white cardboard; the information was in large type for easy reading. The white cards were attached to colored paper and then heat-laminated with plastic.

Consent Form

A Consent Form was developed to explain to the teachers that their participation is voluntary, they could end the interview at any time and the information provided would be treated confidentially. (Appendix B).

Research Instrument Revisions

The interview schedule, nutrition interest checklist, and observation sheets underwent several revisions. The first draft of the interview schedule contained questions which had been discussed in nutrition education literature as well as original questions developed by the investigator. This draft was long, lacked focus and contained some poorly written questions. Several revisions were made following suggestions from the major professor and other committee members.

The first draft of the nutrition interest checklist contained topics, which when evaluated, overlapped. Two revisions were made to develop a comprehensive list of more explicit nutrition topics. The observation sheets required only one revision to clarify possible locations of nutrition education materials in the schools.

Nutrition Knowledge Test

A 40 item true-false and multiple-choice test of general nutrition knowledge was used to measure the teachers'

nutrition knowledge. (Appendix A). The decision to use the Nutrition Knowledge Test (NKT) as one of the research tools was based on the NKT's previous validity and reliability testing (Lackey et al., 1979). The development of the NKT included the use of test specifications and review items, the use of item analysis and reliability testing.

Pretesting

The interview schedule was pretested for clarity, length and ease of administration with three elementary teachers at Wardcliff Elementary School in Okemos, Michigan. Several revisions were made to increase clarity, shorten the interview and facilitate the recording of data.

The interview schedule, nutrition interest checklist and observation sheets were reviewed and critiqued by twelve Michigan State University, Food Science and Human Nutrition, Community Nutrition graduate students and faculty at a group meeting.

Interview Training

One of the disadvantages of using a personal interview for data collection is the possibility of recording inaccurate and incomplete information, due to improperly trained interviewers. To minimize this possibility, the interviewer participated in two interview training sessions.

The sessions were conducted by Drs. Carolyn Lackey and Kathryn Kolasa (Assistant and Associate Professors at Michigan State University, respectively), who had training and experience in personal interviewing.

To develop the investigator's interviewing skills, a complete dietary interview and an interview using the interview schedule for this project were conducted. The videotaping equipment in the Dietetic Instructional Resource Center (DIRC) at Michigan State University was used for these practice sessions.

Approval of Research Involving Human Subjects

The complete procedure for data collection was approved by the Michigan State University Committee on Research Involving Human Subjects.

Sample Selection

One rural and one non-rural non-Title I, grades K-5th or K-6th public school in Michigan were chosen as sample sites. Both a rural and a non-rural school were chosen for two reasons: (1) to represent different types of communities in Michigan and (2) to see if any differences existed in the type of teachers employed at the schools, the type of resources available and/or the type of school curricula. Non-Title I schools were specified in the interest of homogenizing the sample. A Title I designation entitled a school to extra funding, which could have an

effect on the school's curriculum and available resource materials. Every teacher was to be interviewed, to provide a complete and accurate description of the status of nutrition education in these schools. If a sample was chosen by eliciting volunteers or by asking the administrator to choose teachers to be interviewed, there would be a greater chance of obtaining a non-representative or biased sample; the interviewed teachers may differ from the non-interviewed teachers.

Suggestions for possible sample schools were elicited from (1) Michigan Nutrition Education and Training (NET) coordinators, who were contacted through Regional Educational Media Centers (REMC), and (2) from Dr. Louise Sause, professor, College of Education, Michigan State University, who has many professional and personal contacts with administrators and teachers in Michigan schools.

Administrators at potential sample schools were contacted by phone and/or by letter. (See Appendix B). At that time, information on how to obtain approval to conduct a research study in the school was requested. Once the appropriate person was contacted, the research was briefly described. If the administrator responded favorable to the initial contact, an appointment was made by Dr. Carolyn Lackey, Associate Professor, Food Science and Human Nutrition, Michigan State University, and the researcher, to visit the school. A more in depth description of the research was presented at that time. The principal or superintendent was given a copy of all the data collection

instruments, as well as an abstract of the research proposal.

Final selection of the sample sites was based on the willingness of the administrators and teachers in all K-6th classrooms to participate. The schools chosen were: (1) Laingsburg Community School, Laingsburg with 24 K-6th grade teachers, and (2) Edgewood Elementary School, Okemos, with 17 K-5th grade teachers.

Data Collection

All interviews were conducted in the school building during the teachers' work day. The interviews were conducted in the teachers' classrooms or in the lounge. Probe cards were used to assist the teachers in recalling selected information during the interview (Appendix C).

Nutrition Interest Checklist and Nutrition Knowledge Test

Following each interview a coded copy of the Nutrition Knowledge Test (NKT) and nutrition interest checklist (NIC) were left with each teacher for completion at their convenience (Appendix A). A brief description of the NKT and NIC and directions for their completion were provided verbally.

It was requested that the NKT and NIC be returned within a two week period. The secretary in the front office of each school was given an envelope, in which teachers were asked to place their completed forms. If a teacher

had not returned his/her forms within the two week period, copies of the NKT and NIC and a postage-paid return envelope were supplied. If the forms were still not returned after approximately two more weeks, a reminder letter was sent with additional copies of the NKT and NIC and another return envelope.

Observation Sheets

Visual evidence of nutrition education in the schools was noted on two observation sheets (Appendix A). A coded observation sheet for classrooms was completed by the researcher following each interview.

A second observation sheet was completed for each school. The presence of nutrition education materials in the library, lunchroom, hallways and resource rooms was recorded.

Informed Consent

A letter introducing the researcher, briefly describing the research to be conducted and providing a number to call in case of questions, was developed (Appendix B). The letter was taken to all interviews, in the event anyone questioned the investigator's presence. All teachers participating in the study were asked to sign the Consent Form prior to the interview. By signing the form, the teachers indicated that they understood the project,

participated willingly, knew they could end the interview at any time, and knew the information provided would be treated confidentially (Appendix B).

Fieldnotes

Fieldnotes were kept in addition to the data recorded in the interview schedule. Length of interview, general observations and impressions relating to the interview and respondent, weather conditions and the investigator's physical condition and state of mind were all recorded. Some of the information recorded in the fieldnotes was used to supplement the information gathered from the observation sheets.

Data Analysis

Information collected on the interview schedule, nutrition interest checklist and Nutrition Knowledge Test was coded by the researcher. The data was key punched onto cards at Michigan State University's data preparation center. The data were analyzed on a Ceyber 750 computer using programs in the Statistical Package for the Social Sciences (Nie et al., 1975) and RPX programs (Standard Research, Inc., 1980). Frequencies were calculated for all variables.

Contingency table analysis were performed on selected variables utilizing sub-program cross-tabs from SPSS. The difference test used was Chi square with $P \leq .05$ as the

significance level. Z- and t-tests were computed to evaluate differences between means of samples and to evaluate differences between proportions for selected variables.

The Nutrition Knowledge Test underwent item analysis at the Michigan State University scoring office. The item analysis included an index of difficulty and an index of discrimination based on the differences in groups having the upper and lower 27% of total scores.

RESULTS AND DISCUSSION

The Sample

Names of potential sample elementary schools were obtained from two REMC (Regional Education Media Centers) coordinators and a Michigan State University Professor in the Education Department, Dr. Louise Sause. A total of six schools or school districts were contacted through referrals by the REMC coordinators and education professor. All schools requested a copy of the interview schedule be mailed to them before they could make a decision.

A rural school in Fowler, Michigan agreed to participate in the research. However, after the researcher made an initial visit, it was determined that this school did not meet the sample criteria; the 4th, 5th, and 6th grade students spent half days in a private school. Three schools in Grand Rapids and the surrounding area, which met the sample criteria, declined to participate in the research study. One of these schools provided a reason for their declination; the Grand Rapids Director of the Office of Curriculum Planning and Evaluation stated that his distrct was "already involved in nearly a dozen other studies," and could not participate this year. Secretaries from the other two

schools phoned the researcher to report that their principals did not want to participate.

Following an initial contact by Dr. Louise Sause, a rural school in Laingsburg, Michigan (population 1,733) agreed to meet with the researcher and project director, to discuss the research. A copy of the research instruments and abstract of the research proposal were presented. After this meeting the principal gave the researcher permission to interview the teachers in his school. The researcher met with the superintendent to explain the research. He gave his approval.

Following an initial contact by Dr. Louise Sause, the principal of a non-rural school in Okemos, Michigan (population 13,462), Edgewood Elementary, agreed to meet with the researcher and project director to discuss the research. A copy of the research instruments were presented and explained. The principal approved the research project. The teachers also approved the project at a faculty meeting. For the remainder of this discussion Laingsburg Community School will be referred to as the rural school and Edgewood Elementary School as the non-rural school.

Interviews with 39 elementary teachers were completed between March 5 and May 8, 1980, from a possible 41 contacts, a completion rate of 95%. Completed Nutrition Knowledge Tests and nutrition interest checklists were received from all 39 teachers.

Twenty-three of the 39 interviews were with K-6th grade teachers at the rural school. One teacher at the rural school declined to be interviewed because she "had nothing to do with teaching science or nutrition to the students." (This teacher therefore was not counted as one of the 39 interviewed teachers).

Sixteen of the 39 interviews were with K-5th grade teachers at the non-rural school. One teacher at the non-rural school did not want to be interviewed, but agreed to self administer the interview schedule, nutrition interest checklist and Nutrition Knowledge Test. The information obtained from the self administered interview was not completed. A completed interview was not pursued from this teacher due to her apparent apprehension to being interviewed. (This teacher, therefore, was not counted as one of the 39 interviewed teachers).

The average length of an interview was 30 minutes. If the teacher had never included nutrition in his/her curriculum, the interview required 10 minutes. Four interviews lasted 45 minutes.

Sample Characteristics

The 39 teachers were comprised of 33 females and 6 males (Table 1). Fifty-one percent of the 39 teachers were 30 years of age or younger. There were two first year teachers in the sample, both teaching at the non-rural school. The mean number of years teaching was 8, 11 and

TABLE 1. SELECTED DEMOGRAPHIC CHARACTERISTICS OF TEACHERS INTERVIEWED AT TWO SCHOOLS (K-6TH) IN MICHIGAN.

	Rural School (n=23)		Non-Rural School (n=16)		Total (n=39)	
Characteristics	n	%	n	%	n	%
Sex						
Male	4	17	2	13	6	15
Female	19	83	14	87	33	85
Age (years)[1]						
21-25	5	22	1	6	6	15
26-30	9	39	5	30	14	36
31-35	2	9	3	19	5	13
36-40	3	13	2	13	5	13
41-45	1	4	2	13	3	8
51-60	3	13	3	19	6	15
Years Teaching						
First year	0	0[a]	2	13[b]	2	5
2-5	11	48[a]	2	13[b]	13	33
6-10	7	30	4	25	11	28
11-15	2	9[c]	3	19[d]	5	13
16-20	0	0[c]	5	30[d]	5	13
21-25	3	13	0	0	3	8

[1] none of the teachers were 46-50 years of age

[a,b] significant at $p \leq .05$

[c,d] significant at $p \leq .01$

9 for the rural, non-rural and total sample, respectively. Sixty-one percent of the 39 teachers had been teaching from 2-10 years.

Several t-tests for differences between proportions were performed to determine if there were differences in the distribution of males and females, age, and number of years teaching for the rural and non-rural teachers. No significant differences were found for sex or age between the rural and non-rural teachers. There were significantly more teachers at the rural school who had been teaching two to five years ($p \leq .05$) and significantly more non-rural teachers who had been teaching 16-20 years ($p \leq .01$) (Table 1).

The sample characteristics, sex, age, and numbers of years teaching for the teachers in this study were compared to the same sample characteristics for all K-6th grade teachers in Michigan (Schrauban, 1980). The Z test and t-test for differences between proportions were performed. The proportion of males to females, mean age and mean number of years teaching did not differ significantly between the teachers in this study and all K-6th grade teachers in Michigan.

Most (91%) of the rural school teachers and 69 percent of the non-rural school teachers reported earning college credits in addition to their bachelor degrees (Table 2). Thirty-one percent of the non-rural school teachers reported hours past a Master's degree, with one teacher reporting a doctorate degree. None of the rural school teachers reported hours past a Master's degree.

TABLE 2. EDUCATIONAL BACKGROUND OF TEACHERS INTERVIEWED AT TWO SCHOOLS (K-6th) IN MICHIGAN.

	Rural School (n=23)		Non-Rural School (n=16)		Total (n=39)	
Characteristics	n	%	n	%	n	%
Highest degree earned						
B.A.and B.S.	2	9	5	31	7	18
B.A. or B.S plus additional hours	14	61[a]	4	25[b]	18	46
M.A.	7	30	2	13	9	23
M.A. plus additional hours	0	0[c]	4	25[d]	4	10
Ph.D.	0	0	1	6	1	3
College Major						
El. ed./math, science	3	13	2	13	5	13
El. ed/fine arts	4	17	1	6	5	13
El. ed/social studies	4	17	0	0	4	10
El. ed./language arts	2	9	2	13	4	10
El. ed./physical ed.	1	4	2	13	3	8
Special education	2	9[e]	1	6[f]	3	8
Elementary ed.	0	0[e]	3	19[f]	3	8
Others	7	30	5	30	12	30

[a,b,e,f] significant at $p \leq .05$

[c,d] significant at $p \leq .01$

College degree majors and minors were varied with no pattern emerging at either school. Five teachers (13%) had a stated science emphasis in their elementary education majors (Table 2).

All of the teachers reported that their school participates in the National School Lunch Program, but does not participate in the School Breakfast Program.

Teaching Responsibilities

The teaching responsibilities at the two schools differed substantially. At the rural school grades K-4 are either team taught in quads,[1] are taught by one teacher in a contained classroom, or are taught by one teacher in a quad. With the team teaching arrangement one teacher, for example, is responsible for the science and social science curriculum; another teacher is responsible for reading and arithmetic. Two grades are frequently combined so that the science/social science teacher teaches both 3rd and 4th graders during different times of the day (Table 3).

The entire K-4 curriculum at the rural school is taught by the classroom teachers; there are no specialty teachers such as a physical education teacher. Therefore within each quad or in a contained classroom the teachers/teacher must each teach physical education, music and art.

---

[1] A quad is a large "open" type classroom which is divided by half walls into four activity areas. Children can be in all four areas, each group doing something different.

TABLE 3. DISTRIBUTION OF GRADES TAUGHT BY TEACHERS INTERVIEWED AT TWO SCHOOLS (K-6th) IN MICHIGAN.

	Rural School (n=23)		Non-Rural School (n=16)		Total (n=39)	
Grades	n	%	n	%	n	%
Kindergarten	2	9	1	6	3	8
1st	3	13	1	6	4	10
2nd	4	17	2	13	6	15
3rd	3	13	2	13	5	13
4th	1	4[a]	2	13[b]	3	8
5th	0	0[a]	3	19[b]	3	8
K-4th	1	4[c]	0	0[d]	1	3
K-5th	0	0[c]	5	30[d]	5	13
3rd & 4th	2	9	0	0	2	5
4th, 5th, & 6th	1	4[e]	0	0[f]	1	3
5th & 6th	6	26[e]	0	0[f]	6	15

[a,b,e,f] significant at $p \leq .05$

[c,d] significant at $p \leq .01$

The 5th and 6th grades at the rural school are team taught in "open"[2] classrooms. The students spend a half day in homeroom where they receive communication skills, and arithmetic and a half day in assigned or elective courses. Each homeroom teacher has 5th graders for a half a day and 6th graders the remainder of the day. The assigned courses include human ecology, science, social science, art and physical education. Human ecology is

[2] An "open" classroom is a very large room which was divided into classrooms by temporary walls usually made of bookcases, bulletin boards, tables.

taught by a specialist rather than one of the open classroom teachers. The other assigned courses are taught by homeroom teachers. The elective courses include band, woodshop and music. Each of these courses are taught by one of the homeroom teachers.

The rural school teachers, especially K-4th, had little time away from their students. The teachers arrived at school between 8 and 8:15 a.m. The students arrived in class at 9 a.m. The period between 8 and 9 a.m. was the teachers scheduled preparation time. The students were in school from 9 a.m. till 2:30 p.m., with one half hour for lunch. The teachers' work day ended a few minutes after 2:30 p.m. Since there were no specialty teachers, the classroom teachers had total responsibility for their students for 5 of the 5½ hours they were in school. The teachers were not required to eat with the students. There were a couple of exceptions to this: (1) the teachers who team taught usually had less contact with the students depending on their teams arrangements; (2) the teachers rotated recess duty so that about a half hour of free time was available to each teacher twice a week; and (3) some of the 5th and 6th grade teachers had more flexible schedules due to the varied responsibilities.

The non-rural school teachers had different teaching responsibilities. All grades, K-5, are taught in contained classrooms with only one teacher per classroom (Table 3). Students received as part of the standard curriculum,

communication skills, social studies, arithmetic, science, spelling, health and art from their classroom teacher. Specialty teachers taught physical education, reading, media skills, and music to the students, in physical areas separate from the contained classroom. For example, music is taught in the music room, media skills in the media laboratory and physical education in the gym. All students had music and physical education. Students with special needs received reading and language tutoring from a reading specialist. The media laboratory was open to any student who had completed his/her classroom work. The classroom teachers gave permission to their students to go to the media laboratory on an individual basis. The librarian was the media specialist and instructed the children in this area.

The non-rural school teachers' day began at about 8:30 a.m. and ended at about 3:30 p.m. The students' school day began at 9 a.m. and ended at 3:20 p.m. with one half hour for lunch. The teachers were not required to eat with the students. The teachers had preparation periods before the students arrived in the morning, and when the students were at music and physical education class. The non-rural school teachers also rotated recess duty so free time was available twice a week.

The available preparation time for non-rural teachers and the rural, team teachers were similiar. The rural, contained classroom teachers had less available preparation

time during each school day. The amount of preparation time available did not make a significant difference in the teachers decision to include "extra" subjects (determined by t-tests for difference between proportions).

Teachers Food and Nutrition Training

Thirty-two (82%) of the teachers had some type of food or nutrition training (Table 4). A high school home economics course was the most frequently mentioned (41%) source of food and nutrition training. Dairy Council of Michigan workshops and Girl Scouts were mentioned by 33 and 28 percent, respectively, of the teachers as sources of food and nutrition training. A Z-test indicated that significantly more rural school teachers (48%) reported attending a Dairy Council of Michigan workshop than non-rural teachers (13%) ($p < .05$).

Inclusion of "Extra" Subjects

Each teacher was asked if he/she included any subjects, topics or activities in their classroom that other teachers do not include. For example, an "extra" subject that he/she included in their curriculum. Initially, many teachers were hesitant to reply. Several were not sure what other teachers taught and others had taught an "extra" subject for so long that they did not differentiate it from their standard curriculum. Other teachers did not

TABLE 4. TYPE OF FOOD AND NUTRITION TRAINING REPORTED BY THIRTY-TWO TEACHERS WHO HAD RECEIVED FOOD AND NUTRITION TRAINING

Type of food or nutrition training	Rural School (n=23)		Non-Rural School (n=16)		Total (n=39)	
	n	%	n	%	n	%
High School Course						
Home Economics	8	17	8	23	16	19
Science	1	2	1	3	2	2
Other	2	4	3	9	5	6
College Course						
Home Economics	1	2	2	6	3	4
Methods	3	7	0	0	3	4
Nutrition	2	4	0	0	2	2
Child Development	1	2	1	3	2	2
Science	1	2	1	3	2	2
Other	3	7	2	6	5	6
4-H	3	7	1	3	4	5
Girl Scouts	5	11	6	17	11	13
Inservice/Workshops						
Dairy Council	11	24[a]	2	6[b]	13	16
Other	3	7	3	9	6	7
Other						
Personal Study	1	2	2	6	3	4
Night Class	0	0	2	6	2	2
Other	1	2	1	3	2	2

[a,b] significant at $p \leq .05$

necessarily include an extra topic but put extra emphasis on a standard curriculum subject.

Language skills were mentioned by 25 percent of the teachers as being a topic they emphasized. Other extra topics included social/emotional skills (17%), physical science (13%), drama (11%), natural science and social science (9% each), music (7%), nutrition and crafts (6% each), and motor skills (4%). Eight (21%) of the teachers reported including no extra topics.

The two most frequently cited reasons for deciding to include the "extra" topics or for putting extra emphasis on a standard curriculum subject were "an interest of the teacher" and a "recognized student need" (23% each). Other reasons for including extra topics were teachers' training or knowledge (13%), suggestion from another teacher (12%), current interest of educators (10%), student interest (8%), in curriculum of previous teacher and assigned to it (6% each).

A t-test indicated no significant difference between the two schools in the percentage of teachers who did not include any "extra" topics, 22 percent at Laingsburg and 19 percent at Edgewood. It appeared that the decision to include an "extra" subject was not always based on the availability of time. The teacher's personal interest, recognition of student need, and/or training seemed to be the important factor in making the decision to include "extra" subjects.

Teachers' Opinions

Students' Nutrition Knowledge Needs

Most of the interview questions were about nutrition education. Teachers were asked what they felt students needed to know about nutrition. Most (77%) of the teachers felt students needed to know about the Daily Food Guide or, as the teachers most often replied "The Basic Four" (Table 5). "Junk" food versus "good" food was the next most frequently mentioned topic (38%). The teachers who mentioned this topic frequently had specific foods in mind that they considered "junk" food such as sugar, candy, fast food, salted snack foods, and snack cakes. Fruits and vegetables were most often cited as the "good" foods.

The teachers who only gave one or two responses to what they felt students needed to know about nutrition frequently mentioned "eating right" (18%) which was coded within the Daily Food Guide category. There were no significant differences in the topics mentioned by the teachers in the rural versus the non-rural school.

The frequent mention of the Daily Food Guide as the topic which teachers felt students needed to know about could be expected. The Minimal Performance Objectives for Health Education in Michigan developed by the Michigan Department of Education (1974) stresses the identification of the Basic Four Food Groups as the minimum nutrition knowledge needed for students in grades 1-3. Inservice programs for teachers in several Michigan schools included or were

TABLE 5. PERCEIVED STUDENT NUTRITION KNOWLEDGE NEEDS REPORTED BY TEACHERS INTERVIEWED AT TWO SCHOOLS (K-6th) IN MICHIGAN

	Rural School (n=23)		Non-Rural School (n=16)		Total (n=39)	
Topic	n	%	n	%	n	%
Daily Food Guide	17	27	13	28	30	27
"Junk" food vs. "good" food	7	11	8	17	15	14
Nutrition and health related issues	7	11	6	13	13	12
Meal patterns	6	9	5	11	11	10
Basic Need for food	8	13	2	4	10	9
Nutrients and their function in the body	6	9	3	6	9	8
Weight control	3	5	3	6	6	5
Snacks	4	6	2	4	6	5
Others - Food preparation, dental health, introduce to new foods	2	3	3	6	5	5
Consumerism	3	5	1	2	4	4
Don't Know	1	2	1	2	2	2

completely based on the Basic Four Food Groups (Lackey and Kolasa, 1979). Since the curriculum guides and inservice programs have been stressing the Basic Four, the teachers felt students must need to know about it.

The mention of the "junk" food issue may reflect the past and present media coverage. The media, television, radio, newspapers, and magazines, have included many "junk" food related reports and commentaries, which has made this a popular food and nutrition issue, for adults and children.

Impact on Students Eating Habits

The teachers were asked if they believed that they, as a teacher, could have an impact on students eating habits. All 39 teachers (100%) replied that yes, they could have an impact, however, the degree of perceived impact varied. When asked to quantify the amount of impact, 44 percent responded the impact would be a little, 28 percent a lot, 26 percent medium and 2 percent "it depends". The values used to quantify the amount of impact were subjective evaluations made by each teacher.

About half of the teachers (54%) felt they could affect students' eating habits through their influence as an authority figure. Other ways which the teachers felt they could have an impact were to include nutrition information in the curriculum (41%), make the children aware of their eating habits (21%), eat with the students (18%), have tasting parties (13%), and/or take "bad" food away

from students (5%). There were no significant differences between the rural and non-rural school teachers in responses to questions concerning their impact on students eating habits.

The potential for a teacher to have an influence on a student's habit formation is greater during the early elementary years than during a later time (Petersen and Kies, 1972). The teachers in this sample recognized this potential. They frequently mentioned that the students respected them; the students often tried to emulate the teachers' habits and behavior. This was particularly obvious when the teacher ate with the students. They reported that students would at least try everything the teacher ate.

Where Students Learn About Nutrition

A few more teachers felt that students learned about nutrition practices and principles outside the school (95%) than inside the school (87%). The difference was not statistically significant as indicated by a t-test. When asked from whom, outside the school, students learned about nutrition, parents (46%), family (21%), mother (10%), peers (8%), and the doctor (3%) were the cited sources. Eighteen percent of the teachers did not know from whom students learned nutrition outside of the school. Other possible sources of nutrition information, outside the school, included television/media (56%), neighborhood, garden and health food store (5% each) and Girl Scouts (3%).

Inside the school 64 percent of the teachers felt the students learned about nutrition practices and principles from them, personally, while 36 percent felt that another teacher helped the students learn about nutrition. Another 8 percent felt that peers were the students' sources of nutrition information and 10 percent of the teachers had no answer.

It was suggested that nutrition be incorporated into specific subjects, such as health (28%), science (21%), home economic (13%) and social science (8%). Integrating nutrition into the total curriculum was suggested by 28 percent of the teachers. Thirteen percent of the teachers favored teaching nutrition as a separate subject.

Other responses for where inside the school students learned about nutrition included the lunchroom (10%), another grade (5%), and during nutrition week (3%). There was no significant differences in the responses the rural versus non-rural school teachers gave in the questions concerning where students learn about nutrition.

The teachers in this research sample believed that their students did need to know something about nutrition. Knowledge of the Daily Food Guide was the most often cited topic. The teachers also believed that they could have an impact on their students' eating habits through authority figure influence and by presenting nutrition information. The home, including mother, parents and family, and the media, were recognized as sources of nutrition information

for the students outside of school. Inside school, a teacher was the most frequently reported source of nutrition information.

Nutrition in the Curriculum

Following the more general section of the interview schedule, the teachers were divided into three groups depending on their responses to two questions: (1) Do you currently include any nutrition education topics or (2) have you taught nutrition topics in the past. There were 21 (54%) teachers currently including nutrition, 12 (31%) teachers who had taught nutrition in the past, and 6 (15%) teachers who had never taught nutrition. (Table 6). A Chi-square test indicated that the observed distribution of current, past and non-nutrition teachers for the total sample was significantly different ($p \leq .02$) than what would be expected by chance. The teachers will be referred to as current, past or non-nutrition teachers for the remainder of this discussion, as defined in the Operational Definitions (p.6).

There was nc significant differences in the number of current, past and non-nutrition teachers at the rural and non-rural school. There were few significant differences found between the rural and non-rural school teachers. Those found were within the categories of years of teaching, highest degree earned, college major, grades taught, and food and nutrition training.

TABLE 6. DISTRIBUTION OF CURRENT, PAST AND NON-NUTRITION TEACHERS INTERVIEWED AT TWO SCHOOLS (K-6th) IN MICHIGAN

	Rural School (n=23)		Non-Rural School (n=16)		Total (n=39)	
Characteristics	n	%	n	%	n	%
Currently include nutrition topics (current)	11	48	10	62	21	54[a]
Have included nutrition topic in the past (past)	10	43	2	13	12	31[b]
Have never included nutrition topics (non-nutrition)	2	9	4	25	6	15[c]

[a,b,c] significant at $p \leq .05$

However, Chi-square tests indicate that the teacher's age, sex, years of teaching, college major or minor, grade taught, highest degree earned and previous food or nutrition training made no significant difference in the teacher's decision to include nutrition topics. Therefore, the rural and non-rural school teachers will be considered as one sample for the remainder of the discussion.

The teachers who had taught nutrition in the past but were not including any nutrition related topics this year reported why they no longer included nutrition. The reasons cited included lack of time (24%), no room in an

already tight curriculum (20%), included in another course (16%), lack of money, lack of materials, lack of teacher cooperation, not required in new curriculum, and being new to the school (8% each).

One-half of the non-nutrition teachers had never considered including nutrition topics. They would, however, consider teaching nutrition if they were a science teacher (25%), they had more experience in nutrition (25%), there were a teacher consensus that would compel them to teach nutrition (25%) or there were more time or an extended day (25%). The non-nutrition teachers who had considered including nutrition cited indecision on when to begin a program (33%), lack of experience (33%), and lack of school support (33%) as reasons why they had not begun teaching nutrition.

Several teachers were not sure what was meant by nutrition education. Two teachers reported during the interview that they did not include any nutrition related topics in their curriculum. Through observations, in the days following the interviews, it became clear that these teachers were currently including nutrition topics, but apparently did not recognize them as such. For example, one teacher was overheard talking to the secretary in the front office about the Indian soup his class had prepared while they were studying India in social studies. Another teacher was observed filling a baby food jar with peanut butter in the kitchen at school. Another teacher asked

what he was doing, and he explained that he used the preparation of a peanut butter and jelly sandwich as a lesson in giving and taking directions.

Several teachers reported, initially, during the interview, that they included no nutrition topics but seemed rather unsure. The investigator explained what a nutrition education topic could include as defined in the operational definitions (p.6). The teachers promptly changed their previous negative response. The most frequently overlooked nutrition related activity was tasting parties or snack parties, where the teacher may introduce the students to new foods. One teacher commented on why she initially did not consider her inclusion of a vegetable and fruit classification exercise as nutrition education. She said that she thought of nutrition education as being "more formal and detailed."

Other researchers have reported larger percentages of teachers including nutrition topics in the curriculum than the 54 percent reported in this research sample. Petersen and Kies (1972) reported 86 percent of the teachers responding to their mail questionnaire were currently including nutrition in the classroom. Cook and coworkers (1977) reported similar results where 75 percent of the teachers they surveyed via mail questionnaire had taught foods or nutrition in their classroom during that year.

The differences in the percentage of current nutrition teachers reported in the literature and that found in

this research could be the result of different survey methods. Since the response to the mail questionnaire is voluntary, it is conceivable that more current nutrition teachers would respond due to their involvement in nutrition education. This would bias the sample making it non-representative of the total teaching population (Miller, 1977). Petersen and Kies (1972) and Cook and coworkers (1977) reported response rates of 47 percent and 61 percent, respectively.

All of the teachers in two schools were surveyed via personal interviews for the current research. The two teachers who did not want to be interviewed (non-respondents) did not include nutrition. The percentage of current nutrition teachers would be 51 percent if these two teachers were included as sample subjects. The response rate for the total potential sample of 41 teachers was therefore 95 percent or 39 teachers. The current research is representative of the teaching population in the two sample schools.

Researchers have reported that a teacher's exposure to a high school nutrition/foods course, a college nutrition/foods course or an inservice nutrition workshop was significantly related to the teacher's decision to teach nutrition. The present research did not support this finding. Chi square tests indicate that previous food or nutrition training made no significant difference in the teacher's decision to include nutrition topics in the classroom.

In summary, about one half (54%) of the teachers in the research sample were currently including nutrition topics in their curriculum. This is a smaller percentage of teachers than has previously been reported in the literature. Lack of time, money, and materials were the reasons most often cited by past nutrition teachers for no longer including nutrition topics. Some confusion existed as to what was meant by nutrition education. Teachers occasionally overlooked or did not recognize food and nutrition activities they included in their classroom as being nutrition education.

Nutrition Topics

Current and past nutrition teachers cited the Daily Food Guide, or more specifically, the Basic Four Food Groups as the topic most frequently included in their curriculum (Table 7). Snacks, for the current teachers, and meal patterns for the past teachers, were also frequently mentioned. Eleven of the current (52%), and seven of the past (58%) nutrition teachers who mentioned the Basic Four Food Groups or Daily Food Guide as a topic students needed to know about, did include it in their nutrition education curriculum. However, chi-square tests indicate that these observations are not significant.

The current nutrition teachers' decision to include the nutrition topics in Table 7 was based on the interest and concern of the teacher (35%), a recognized student need

TABLE 7. NUTRITION TOPICS TAUGHT BY CURRENT AND PAST NUTRITION TEACHERS INTERVIEWED AT TWO SCHOOLS (K-6th) IN MICHIGAN.

	Current Teachers (n =67)		Past Teachers (n=29)	
Topic	n	%	n	%
Daily Food Guide	16	24	10	34
Snacks	10	15	1	3
Dental health	8	12	1	3
Nutrient function	6	9	3	10
Health related issues	5	7	0	0
Food preparation	5	7	0	0
Consumerism	4	6	0	0
Food composition	3	5	2	7
Basic need	2	3	2	7
Meal patterns	2	3[a]	6	20[b]
Weight control	2	3	1	3
Others	4	6	2	7
Don't remember	0	0	1	3

[a,b] significant at $p \leq .01$

(27%), availability of materials (16%) and the ability of the nutrition topic to fit into another lesson (8%). Fourteen percent of the current nutrition teachers reported that the inclusion of specific nutrition topics "just happened". The decision to include specific nutrition topics, for the past nutrition teachers, was based on availability of materials (50%), a recognized student need (27%), the interest and concern of the teacher, and training the teacher had acquired (11% each). A t-test for differences between proportions indicated that there were significantly ($p < .02$) more past nutrition teachers who based their decision to include nutrition topics in the availability of materials (50%) than current nutrition teachers (16%). There were no significant differences in the other categories.

The literature contained several reports on nutrition topics which nutrition education specialists and consultants have chosen to include in elementary school curricula (Baker, 1972; Grogan, 1978; Head, 1974; Sodowsky, 1973; Wodarski et al., 1980). Numerous nutrition topics were mentioned in these reports. The topics included: the function of nutrients, sugar and tooth decay, label reading, refined vs. unrefined foods, food composition, meal planning, snacking, additives, Daily Food Guide, social and psychological development of food habits and fortification. No reports on the nutrition topics teachers chose to include in their classroom were found.

Grogan (1978) reported that teachers expressed similar reasons for including specific nutrition topics in

their classrooms as did teachers in the current research. The teachers also felt that nutrition topics should address the "pressing needs and interests of students".

Teaching Techniques

Many teaching methods were employed by the current nutrition teachers (Table 8). Lecture/discussion and taste testing were most often used. Cooking, singing, art projects and food sorting activities were the "other" teaching methods reported. The past nutrition teachers remembered most often using the lecture/discussion method.

TABLE 8. TYPES OF TEACHING METHODS USED TO PRESENT NUTRITION TOPICS BY CURRENT AND PAST NUTRITION TEACHERS INTERVIEWED IN TWO SCHOOLS (K-6th) IN MICHIGAN

	Current Teachers (n=97)		Past Teachers (n=32)	
Method	n	%	n	%
Lecture/discussion	17	18[a]	11	34[b]
Taste testing	17	18	5	16
Films/filmstrips	15	15	7	22
Demonstrations	14	14	3	9
Experiments	13	13	2	6
Bulletin boards	7	7	0	0
Self-paced materials	6	6	1	3
Food preparation	3	3	1	3
Others	5	5	2	6

[a,b] significant at $p \leq .05$

A combination of teaching techniques was preferred by most teachers. The decision on which technique to use depended on the topic, availability of materials and the class atmosphere.

Head (1974) reported that the majority of teachers in her research sample felt tasting parties had been the most effective technique for introducing new food to students. Other researchers have reported other teaching techniques and strategies which have been successful in presenting nutrition topics (Baker, 1972; Grogan, 1978; Sodowsky, 1973; Wodarski et al., 1980). Games, simulations and discovery projects were preferred methods. They were seen as more actively involving students and were viewed as more likely to overcome disinterest and be effective (Grogan, 1978). The teachers in the current research also recognized the need to, at times, employ teaching methods which would be activity oriented. The class atmosphere was a factor in their decision in which teaching methods to use.

Resources

The teachers were asked if they ever used any resource people to help them teach nutrition, and if they did who they were and how they were used. Current nutrition teachers used mothers/parents (41%), another teacher (30%), and Dairy Council of Michigan staff (22%) as resource people. Food service personnel were mentioned by 10 percent of the current nutrition teachers. The past

nutrition teachers mentioned Daily Council of Michigan staff (46%), a nurse (36%), and another teacher (18%) as their resource people. Resource people were never used by 19 percent of the current nutrition teachers and 50 percent of the past nutrition teachers.

Mothers/parents were used as guest speakers or as teacher aides, to help prepare food in the classroom. Nurses were also used as guest speakers. Other teachers and Dairy Council of Michigan staff were used as reference people and as a source of materials. Food service personnel were seen as gatekeepers to the kitchen facilities.

Both current and past nutrition teachers used National Dairy Council and Dairy Council of Michigan resource materials most often as a resource aid (33 and 48% of the teachers, respectively). Other nutrition education resource materials reported by both groups of teachers included popular and professional magazines (20 and 19% respectively), popular and text books (18 and 10% respectively), health department materials (9 and 5% respectively), food industry materials (9 and 5% respectively), and Cooperative Extension Service bulletins (7 and 5% respectively). Materials from the Center for Science in the Public Interest, newspapers, cookbooks and education supply companies also were reported as resource aids. The resource materials were used as handouts for the students, references for the teacher or for classroom display on bulletin boards.

The resources the teachers reportedly used in the current research were similar to the resources used by

teachers in other reports (Cook et al., 1977; Head, 1974; Sodowsky, 1973).

Class and Preparation Time

The teachers were asked to estimate how much class time they set aside for nutrition related topics each school year and how much time it took to prepare to teach these topics. The current nutrition teachers reported estimates of the amount of class and preparation time spent on nutrition related topics was twice the amount of estimated time reported by the past nutrition teachers. (Table 9).

TABLE 9. PREPARATION AND CLASS TIME SPENT ON NUTRITION TOPICS BY CURRENT AND PAST NUTRITION TEACHERS INTERVIEWED AT TWO SCHOOLS (K-6th) IN MICHIGAN

	Current Teachers (n=21)		Past Teachers (n=12)	
Characteristic	%	hrs/school year	%	hrs/school year
Class time spent on nutrition related topics				
Good[1] estimate	62	16	42	8
poor estimate	24	16	42	7
no idea	14	0	16	0
Preparation time spent on nutrition related topics				
Good estimate	42	12	33	6
poor estimate	24	4	42	2
no idea	34	0	25	0

[1]The good and poor classifications were subjectively determined by each interviewed teacher.

Many of the teachers had an extremely difficult time estimating how much time they spent on nutrition. The administration in both schools did not require the teachers to keep track of the amount of time they spent on specific topics or subjects. A few teachers had developed detailed lesson plans so could make good estimates of time. Other teachers used a random approach to teaching "whatever happens, happens".

Cook and coworkers (1977) found that teachers (grades K-6th) taught an average of 9.7 hours of food and nutrition during 1974-1975. The current nutrition teachers in the present research reported that they spend 60 percent more class time on nutrition related activities than the teachers in the Cook and coworkers' (1977) study. However, as mentioned earlier, it was often difficult for the teachers to estimate the time spent on nutrition related topics.

Addition of new topics

Teachers are frequently asked to add new topics to their curriculum. Curriculum changes are influenced by changing public interests and opinions on what an "education" should include. Nutrition is a subject which teachers may be (or have been) asked to add.

If another topic was introduced that a current nutrition teacher was required to add to their curriculum, 19 percent of the respondents replied that they would have to

eliminate a topic they were teaching now. They would eliminate what they did not enjoy teaching (25%), the last subject of the day (25%), or by setting priorities based on perceived student needs (50%). Of the 67 percent of the teachers who felt that they would not have to eliminate a topic to make room for a new topic, 85 percent would integrate the new topic into the existing curriculum, and 15 percent would spend less time on other subjects. Fourteen percent of the current nutrition teachers did not know how they would handle the introduction of a new topic.

Incorporating Nutrition Into The Curriculum

Current and past nutrition teachers gave suggestions concerning what it would take to get non-nutrition teachers to include nutrition education in their classrooms. The suggestions cited included accessible materials (29%), in-service (24%), more time (12%), a developed program/set curriculum (12%), teacher encouragement (10%), and resource people (7%). Other suggestions mentioned were more money, accurate knowledge of nutrition, and an awareness of student's needs.

Current, past and non-nutrition teachers gave suggestions on what they might need to assist them in including nutrition in their classrooms. The most frequently mentioned need was accessible materials (46%), such as workbooks, texts, recipes, pamphlets and visuals. Money was reported as a

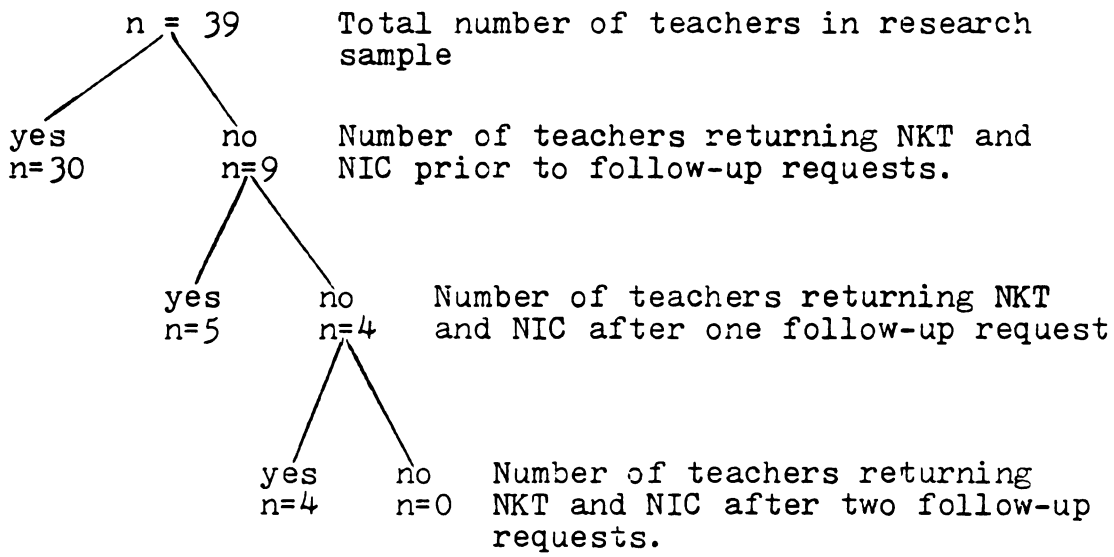
frequent need of current and past nutrition teachers. Other suggestions for incorporating nutrition into the classroom included, the need for more time, knowledge and preservice training; more teacher and administration support for nutrition activities; a standard nutrition curriculum; and a state mandate for the inclusion of nutrition education in all elementary schools.

Similar teacher needs for incorporating nutrition into the curriculum have been reported in the literature (Cook et al., 1977; Grogan, 1978; Head, 1974; Sodowsky, 1973; Wodarski et al., 1980). Poor physical facilities in the classroom or school, lack of available printed materials and insufficient time were limitations identified by some teachers (Head, 1974). Cook and coworkers (1977) found that when unprompted, only 6 percent of the teachers they sampled said they wanted a food or nutrition workshop. However, when prompted by a question on the questionnaire over half of the teachers said they would attend a nutrition workshop. The teachers in the current research sample gave unprompted responses to this question. Twenty-one percent of the teachers mentioned inservice or workshops as a possible method of assisting them incorporate nutrition into their classroom.

Other Research Instruments

A complete set of data, including an interview, Nutrition Knowledge Test and nutrition interest checklist were obtained from each of the 39 teachers in the research sample (Figure 1).

FIGURE 1. RATE OF RESPONSE FOR NKT AND NIC BY TEACHERS INTERVIEWED AT TWO SCHOOLS (K-6th) IN MICHIGAN



Nutrition Knowledge Test

All 39 teachers completed a 40 item true-false and multiple-choice computer scored Nutrition Knowledge Test (NKT), (Appendix A). Each item was valued at 2.5 points. The mean score on the NKT was 50.5, the mode 47.5, with a range of 25 to 87.5 (Tables 10 and 11). One hundred points

TABLE 10. NUTRITION KNOWLEDGE SCORES OF TEACHERS INTERVIEWED AT TWO SCHOOLS (K-6th) IN MICHIGAN

Descriptive Statistics	Current Teachers (n=21)	Past Teachers (n=12)	Non-Nutrition Teachers (n=6)	Total (n=39)
Mean	52.6	51.2	40.2	50.5
Mode	47.5	60.0	32.5	47.5
Range	25.0-87.5	32.5-62.5	30.0-65.0	25.0-87.5
Standard Deviation	14.2	9.9	13.6	13.4

TABLE 11. DISTRIBUTION OF NUTRITION KNOWLEDGE SCORES OF TEACHERS INTERVIEWED AT TWO SCHOOLS (K-6th) IN MICHIGAN

NKT Test Score	%	Percentile Rank
25	3	1
27.5	3	4
30	3	6
32.5	8	12
35	3	17
37.5	5	21
42.5	5	26
45	5	31
47.5	15	41
52.5	8	53
55	13	63
57.5	3	71
60	13	78
65	5	87
67.5	8	94
87.5	3	99

were possible. The standard deviation was 13.4. When the mean test scores for current, past, and non-nutrition teachers were compared, no significant difference existed. However, the difference between the mean test scores for the 21 current nutrition teachers (52.6), and the six non-nutrition teachers (40.2), was nearing significance ($p \leq .09$). Current nutrition teachers who included 5 or more nutrition topics in their curriculum averaged 55.0 on the NKT, compared to 52.0 for the current nutrition teachers who included less than 5 topics. The difference was not significant.

The high NKT score of 87.5 was an outlier. The next highest score was 67.5. The teacher with the 87.5 score was the human ecology teacher, a specialist in foods and nutrition.

Mean item difficulty was 50, with a range of 18-92 (Table 12). Test items of greatest difficulty for the sample teachers were those concerning the definitions of nutrients and enrichment, Recommended Dietary Allowances, fat soluble vitamins, and calorie needs during pregnancy. Test items which were of lowest difficulty for this sample were those concerning the function of carbohydrate and sodium, general nutrient needs and one item on the Daily Food Guide.

Other NKT items concerning the Daily Food Guide were of moderate difficulty with difficulty indices of 51-67. Items concerning sources of nutrients and nutrient information were of moderately low difficulty for the teachers with item difficulty indices of 31-50.

TABLE 12. NKT ITEM RESPONSE SUMMARY DATA FOR TEACHERS INTERVIEWED AT TWO SCHOOLS (K-6th) IN MICHIGAN

Item Difficulty Indices	Number of Items	Percentage
90-100	1	2
81-90	1	2
71-80	4	10
61-70	7	17
51-60	8	20
41-50	5	13
31-40	8	20
21-30	4	10
11-20	2	5
00-10	0	0

Discrimination Indices	Number of Items	Percentage
90-100	0	0
81-90	1	2
71-80	1	2
61-70	1	2
51-60	5	13
41-50	4	10
31-40	10	25
21-30	4	10
11-20	2	5
00-10	9	22
Less than 00	3	7

Mean item discrimination was 32, with a range of -40 to 90. Thirteen test items had a discrimination score of less than 30. A discrimination score of less than 30 indicates that the item did not discriminate well between those who knew the answer and those who did not. (Ebel, 1979). A negative discrimination score indicates that there were more correct responses to the test item from persons with the lower 27 percent of total scores than from persons with the upper 27 percent of total scores. The remaining 27 NKT items had discrimination scores of 30 or greater, indicating that these items were discriminating between those who knew the answer and those who did not. The mean item discrimination for the test was low but acceptable.

The Kuder Richardson 20 (K-R 20) reliability coefficient for this sample group was .71. The K-R 20 reliability coefficient for the final pretesting in the development of the NKT was .93 (Lackey et al, 1979). The sample for the final pretesting was composed of Society for Nutrition Education (SNE) members, and two groups of Michigan teachers. The sample included some people with training in nutrition and some without, so variance increased, which increased the reliability coefficient.

The pretest sample also was divided by groups. K-R 20's were calculated for the SNE members and the two groups of teachers. The respective K-R 20's were .73, .73, and .59. The lower reliability coefficients indicate that

the pretest sample groups displayed more similar knowledge in nutrition within their groups (Ebel, 1979).

The teachers in the current research sample also displayed similar nutrition knowledge. This resulted in less variance in their test scores. The K-R 20 was therefore similar to the pretest sample when it was divided by groups.

Variance of test scores influences reliability. The greater the variance on a test the higher the reliability. When testing people with similar knowledge scores should vary relatively little resulting in a lower reliability (Lackey et al., 1979).

A test designed to compare individuals requires a higher degree of reliability ($\geq .90$), then a test designed to compare groups (.75 to .80). A reliability of .71 can be tolerated if the test results are to be used for group survey purposes (Tinkleman, 1971). One of the uses of the NKT results from the current research was to compare the nutrition knowledge of this group of teachers to other groups. Therefore, the K-R 20 of .71 calculated for the current research sample was low but acceptable.

Chi square tests indicate that the teacher's age, sex, years of teaching, school location, and previous food or nutrition training made no significant difference in the teacher's NKT score.

Nutrition Interest Checklists

All of the 39 teachers completed a nutrition interest checklist (NIC). The teachers were personally most interested and wanted more information on consumerism, weight control, safety of the food supply, drugs and nutrient interactions, and nutrition and health related issues (Table 13). Topics of least personal interest were food from farm to table, legislation related to food, and international food habits and issues.

Topics of greatest interest for teaching to students in a nutrition education curriculum included basic need for food, Daily Food Guide, meal patterns and snacks (Table 14). Topics of least teaching interest were legislation related to food, drug and nutrient interactions, food from farm to table, nutrition and health, and international food habits and issues.

Eleven teachers (28%) who listed the Daily Food Guide as a topic they would teach to their students had reported that they were currently including it or had included it in the past. The basic need for food and snacks were mentioned by four (18%) teachers on the "would teach to students" checklist and on the "current or past nutrition topics included in the curriculum" variable.

The Daily Food Guide/Basic Four Food Groups was the most frequently reported topic that teachers felt students needed to know about, and would or did include in their nutrition education curriculum. The Dairy Council

TABLE 13. PERSONAL INTEREST IN SELECTED NUTRITION TOPICS BY TEACHERS INTERVIEWED IN TWO SCHOOLS (K-6th) IN MICHIGAN

Topic	Interested and would like more information %	Interested but do not want more information %	Not interested enough to seek more information %	No Response %
Consumerism (labeling, advertising, buying)	67	18	8	8
Weight control/obesity	64	26	8	3
Safety of the food supply (additives, sanitation)	62	21	13	5
Drug and nutrient interactions	62	18	13	8
Nutrient and health related issues	59	23	13	5
Snacks	56	23	15	10
Daily Food Guide (food groups, Recommended Dietary Allowance)	54	26	10	8
Dental Health	51	33	13	3
Nutrients and their function in the body	51	33	10	5
Athletics and nutrition	51	21	23	5
Basic need for food (energy, growth, repair)	39	49	5	8
Meal patterns (breakfast, lunch, dinner, etc)	39	36	18	8
Food composition (amount of nutrients in food)	39	33	21	8
International food habits and issues	36	39	21	5
Legislation related to food, nutrition and health	33	33	28	5
Food from farm to table (growing, processing, marketing)	31	31	33	5
Other books at K-2 level	3	0	0	97

TABLE 14. TOP FIVE NUTRITION TOPICS THAT TEACHERS INTERVIEWED IN TWO SCHOOLS (K-6th) IN MICHIGAN WOULD TEACH TO THEIR STUDENTS.

Topic	1st Choice %	2nd Choice %	3rd Choice %	4th Choice %	5th Choice %	Not Chosen %
Basic need for food (energy, growth, repair)	28	13	0	8	10	41
Daily Food Guide (food groups, Recommended Dietary Allowances)	15	10	8	3	3	61
Meal patterns (breakfast, lunch, dinner, etc.)	13	5	18	10	3	51
Snacks	10	10	21	21	5	33
Dental health	3	10	3	3	13	68
Nutrients and their function in the body	5	13	0	8	5	69
Consumerism (labeling, advertising, buying)	3	8	0	13	5	71
Weight control/obesity	3	5	8	8	5	71
Athletics and nutrition	3	0	3	5	13	76
Food composition (amoung of nutrients in food)	3	5	5	3	3	81
Safety of the food supply (additives, sanitation)	3	3	10	0	3	81
International food habits and issues	3	0	5	5	5	82
Nutrition and health related issues	0	8	3	3	3	83
Food from farm to table (growing, processing, marketing)	0	0	5	3	8	84
Drug and nutrient interactions	0	0	3	0	3	94
Legislation related to food, nutrition and health	0	0	0	0	3	97
No response	10	10	10	10	13	47

of Michigan had sponsored an inservice program in the rural school and had provided materials to teachers in the non-rural school. Since the Dairy Council programs and materials are based on the food group system, it could be expected that teachers would include it in their curriculum. The Dairy Council of Michigan also has activities on snacks and the need for food, the next most frequently mentioned topics by the teachers.

Teachers Philosophies

At the end of the interview, before the demographic data were collected, the teachers were asked if they wanted to talk about any nutrition issue we had not touched on yet or any basic philosophies or feelings that they wanted to share. If the teachers had not said much during the beginning part of the interview they usually reported more, as yet unexpressed feelings, than the teachers who had talked more during the interview.

Many teachers (64%) expressed concern for the nutritional well-being of the students. Fifteen of the teachers (38%) believed that nutrition should be taught in school, that it was extremely important, but that parents need to be taught also. Many felt they were "fighting a losing battle." One teacher suggested a parent inservice and expressed despair at the way they perceived the children were fed at home. However, the teachers expressed hope that even though the children may not have much control over

their family's food choices, the nutrition principles they are learning in school will affect their food choices later in life. The need to prepare students for real life situations was cited as a goal of several teachers. Their nutrition education philosophy was centered on providing the students with consumer skills and cooking experiences.

Students who come to school who have not eaten at home also was a concern of the teachers. The relationship between nutrition and performance was mentioned. The need for a complete health program for students, including nutrition and exercise, was suggested.

The teachers who wanted to include nutrition were searching for nutrition activities that were fun and could be incorporated into other subjects. Several teachers recognized the importance of nutrition education but felt they did not have the time to prepare for nutrition units.

Two teachers felt that nutrition education was not necessary or appropriate in school. They believed it was the responsibility of the parents. However, they did conclude, by saying that if their students displayed an urgent need, for example were starving or sick, they would "do something".

Ten of the teachers expressed their personal feelings about food. Two teachers discussed struggles with being overweight since childhood and general poor eating habits. Several teachers had strong feelings about the perceived benefits of health foods and Shaklee products

(vitamins and protein supplements). Two teachers were concerned about the possible harm of food addivites and their perception of "deceptive practices of food companies".

Observations In The Sample Schools

The Rural School

The rural school was on a shortened day, 9 a.m. - 2:30 p.m.; had no 'special' teachers such as art, reading, music, physical education; had no extra space or classrooms; and seemed to have limited funds for curriculum materials. Each of the rural teachers had to teach all subjects to their students, unless they team taught. If any food or extra materials were necessary for an activity, the teachers provided the money, from their own pocket or from a class collection.

The elementary school (grade K-4) was attached to the middle school (grades 5-8). A hallway ran the length of the entire complex. However, there was a recognized and respected invisible division between the two schools. The elementary students and teachers did not cross over into the middle school and vice versa. The invisible barrier kept the two schools separate in most respects. At noontime the barrier was broken because all students ate in the same cafeteria in the elementary school. There were two lunch periods, however, one for the elementary students and one for the middle school students.

The elementary school was shaped in an L. There were four quads and seven contained classrooms. There was also a classroom about 50 feet from the school building in a mobile unit. There was no teachers' lounge; it had been converted into a small classroom.

The rural school had three sets of the Dairy Council of Michigan "Food...Your Choice" curriculum kits. About ten copies of each of three different science texts for 3rd and 4th graders, which had nutrition units, were being used by two teachers in the rural school. One of three upper elementary (5th and 6th) science texts had one nutrition unit, of which the teacher was unaware. Three rural school teachers had hot plates in their rooms, one had a popcorn popper and another had a hot pot with packages of cocoa for the students. All of the rural teachers had sinks with running water in their classrooms. One kindergarten classroom had a refrigerator.

The Non-Rural School

The non-rural school had many teaching specialists, room and money for elective activities. The school was divided into five sections (1) the kindergarten area with classroom and lounge area; (2) the activities area for the gym/lunchroom and music room; (3) the lower grade area with five classrooms, an art room and a large "community area" which all classes could use; (4) the upper grade area with

six classrooms and a small "community area" and (5) the library and media center.

The non-rural school did not have any texts with nutrition units in them. However, one of the teachers who was on the "text buying advisory committee" mentioned that the new texts for next year did have "a few" nutrition units. They were not available for review. She also stated that "state mandates govern what type of texts we buy because more money is allocated for mandated subjects. If nutrition were mandated, we'd spend more money on materials."

The kindergarten classroom in the non-rural school had a sink, refrigerator and cooking equipment. The other classrooms used the sinks in the "community areas." The librarian/media specialist reported that several films and filmstrips on food and nutrition were in her media library but they were old and seldom used. All were put out by food companies and covered topics such as food production and the need to eat a balanced diet.

Additional Observations in the Sample Schools

Both schools had many (30-40) food and nutrition books in their libraries. Many of the books were children's cookbooks. Both libraries reported that "the cookbooks are always checked out by the children; they are very popular".

Teachers in both schools mentioned difficulty in getting materials, films and filmstrips, from the Intermediate School District (ISDs). They reported that materials came late or never arrived.

Another observation which was of interest was the principals' comments about nutrition education in their school. Both principals said that "you are welcome to interview teachers at this school but I do not think you will find much, if any, nutrition education in these classrooms." However, over half of all the sample teachers did teach nutrition, some of them quite extensively. The principals did not appear to be aware of the extent or the existence of a non-mandated subject, nutrition, in their schools. Several teachers alluded to the apparent lack of administration awareness and support in their nutrition education activities. Head (1974) reported that administration commitment to the importance of nutrition education in the school is necessary for a successful program.

SUMMARY AND CONCLUSIONS

General Summary

Interviews with 39 elementary school teachers were conducted in two Michigan public schools. All the teachers were asked about their teaching responsibilities, food and nutrition training, opinions on students' nutrition education needs and demographic characteristics. Current and past nutrition teachers were asked about nutrition topics covered in their classroom, reasons for including these topics, teaching techniques and resources used to teach nutrition. Non-nutrition teachers were asked why they had not taught nutrition. They were also asked for suggestions for assistance and resources to help them teach nutrition.

The teachers were asked what they felt students needed to know about nutrition. The Daily Food Guide or the Basic Four Food Groups and "junk" food versus "good" food were the most frequently mentioned topics. These responses reflect the currently available nutrition education curriculum materials and guidelines and the media emphasis on particular nutrition issues.

All of the teachers believed that they could have an impact on students eating habits. The major source of

impact reported was authority figure influence. Inclusion of nutrition information in the curriculum was also seen as a way of impacting students' eating habits.

About half (54%) of the 39 teachers were currently including nutrition topics in their curriculum. Another 30 percent had taught nutrition in the past. Lack of time, money, materials and teacher cooperation were frequently cited reasons why the past nutrition teachers no longer included nutrition. The teacher's age, sex, years teaching, college major or minor, highest degree earned and previous food or nutrition training made no significant difference in the teacher's decision to include nutrition topics.

Current and past nutrition teachers cited the Daily Food Guide as the nutrition topic most often included in their curriculum. Snacks and meal patterns were also frequently mentioned. Teacher concern or interest, student needs and the availability of materials were the reasons why the teachers decided to include nutrition in their classrooms.

Lecture/discussion, taste testing and films/filmstrips were the teaching methods most often used to present nutrition topics. Mothers/parents, another teacher and Dairy Council of Michigan staff were the resource people used by the teachers to help them teach nutrition. National Dairy Council and Dairy Council of Michigan materials were the most often used resource materials.

Current, past and non-nutrition teachers gave suggestions concerning what they might need to assist them in including nutrition in their classrooms. Accessible materials was the most frequently reported need.

All 39 teachers completed a 40 item Nutrition Knowledge Test. The mean score was 50.5 out of 100 possible points. Age, sex, years of teaching, school location and previous food and nutrition training made no significant difference in the teacher's test scores.

The teachers were personally most interested in and wanted more information on consumerism, weight control, drugs and nutrient interactions, safety of the food supply and nutrition and health related issues. Topics of greatest interest for teaching to students included the basic need for food, Daily Food Guide, meal patterns and snacks.

Conclusions and Implications

The research describes the status of nutrition education in two of Michigan's public schools. Each school in Michigan may be different. However, some general characteristics have been observed such as the importance of administration, school board and teacher support for any curriculum component.

It is important to convince the administration, school boards and teachers of the need for nutrition education. The administration includes such people as school principles, curriculum developers, and superintendents.

Administrators and school board members can be convinced by teachers, parents or a nutrition educator. Once the teachers realize that the administration and school board support nutrition education as an integral part of the curriculum and are willing to provide money, they will be encouraged to include nutrition in their classrooms. Nutrition educators who wish to implement a nutrition education program in a school need to recognize the unique characteristics prevalent at each school.

Materials for teacher use need to be complete and concise. Nutrition facts and classroom activities need to be included. Teachers do not want to spend time preparing for nutrition lessons. They do not want to have to develop their own curriculums or spend time researching, and gathering materials.

Inservice workshops during the required inservice days in the schools would be the most appropriate time to introduce teachers to nutrition education materials. The materials could initially be placed in school libraries. If funds are available, it would be desirable to provide each teacher with some nutrition education materials. The school library could also contain an accurate, introductory college level nutrition text book such as Understanding Nutrition by E. Whitney and M. Hamilton, West Publishing Co., N.Y., 1977, and a refereed nutrition education journal such as The Journal of Nutrition Education for the teachers' reference.

Finally, it is important that teachers be made aware of what nutrition education is and what it can be. If they understand the diversity of acceptable nutrition topics that can be part of a nutrition education curriculum the teachers may be encouraged to include them. Ideally, all teachers will teach nutrition topics in their classrooms. Nutrition education experiences may range from exposing children to food in the classroom or lunchroom through displays, posters or demonstrations to conducting detailed experiments on the effects of nutrients on rats. The amount of nutrition education occurring in a classroom can be expected to vary from teacher to teacher. The author feels that a small amount of nutrition education would be better than none, if accurate information is presented.

APPENDICES

APPENDIX A

RESEARCH INSTRUMENTS

C_____

Interview Schedule

Name _____ School _____

Address _____ Phone _____

1. What grade(s) do you teach? _____

2. What subjects or topics in your students standard curriculum do you teach personally?

Communication Skills_____ (reading, writing, speaking, listening)	Science_____	Health_____
Social Studies_____	Spelling_____	Art_____
Arithmetic_____	Music_____	Physical Education_____
Other_____	Other_____	

3. What subjects or topics are included in your students standard curriculum but which another teacher is responsible for?

Communication Skills_____ (reading, writing, speaking, listening)	Science_____	Health_____
Social Studies_____	Spelling_____	Art_____
Arithmetic_____	Music_____	Physical Education_____
Other_____	Other_____	

4. a) What subjects, topics, or activities do you teach in your classroom that other teachers don't?

Don't know what other teachers include _____ _____ _____ _____ _____ _____

b) How did you decide to teach this (these)? _____

_____

_____

_____

5. Most of my questions are about nutrition education. What do you think students need to know about nutrition?_____

_____

_____

BM/CJL
FSHN/MSU
2/80

C_____

6. Have you had any food or nutrition training? yes_____ no_____ don't know_____

   High School course_____ 4-H_____

   Health_____Nutrition_____ Girl Scouts_____

   Home Economics_____ Inservice Type_____

   Other_____ _____

   College courses_____

   Health_____Nutrition_____ Workshop Type_____

   Home Economics_____ _____

   Other_____

7. a) Do you think you, as a teacher, can have an impact on students eating habits?

   yes_____ no_____ don't know_____

   How much? A little _____ a lot _____ medium_____

   b) How? _____

   _____

8. Where do you think youth learn about nutrition?

   a) Inside school? yes_____ no_____ don't know _____

   From whom?_____

   Subject in curriculum?_____

   Or where?_____

   b) Outside school? yes_____ no_____ don't know _____

   From whom?_____

   Or where?_____

9. Do you currently include any topics or activities that you would consider nutrition education in your classroom? yes_____ no_____ don't know_____
   (If yes, go to page 3)

10. Have you ever taught nutrition topics in your classroom? yes_____ no_____ don't know_____
    (If yes, go to page 5)
    (If no to both questions, number 9 and 10, go to page 7)

C_____

TEACHERS WHO CURRENTLY TEACH NUTRITION

11. a) What specific topics do you cover?_____

_____

_____

b) How did you decide to include these topics?_____

_____

_____

12. What types of teaching methods do you use when you present the above topics?

lecture/discussion_____ films_____

demonstrations_____ filmstrips_____

experiments_____ self-paced materials_____

taste testing_____ other_____

13. a) Have you ever used any resource people to help you teach any of these topics?

yes_____ no_____ don't know_____ If yes, whom?

Home Ec. teacher_____ Another teacher_____

Dietitian_____ Coop. Ext. Home Economist_____

Food service personnel_____ Dairy Council of Mich. staff_____

Other_____ Mother_____

b) How were the above mentioned people used?_____

_____

_____

_____

C_____

14. a) Have you ever used any written resource materials to help you teach any nutrition topics? yes_____ no_____ don't know_____

Dairy Council_____ Cooperative Extension, USDA bulletins_____

Health Department_____ books (specify)_____

magazines (specify)_____ Food Industry Materials_____

Other_____

b) How were the above mentioned materials used?_____

_____

15. How much time do you set aside for these nutrition related topics each school year?

good estimate_____ poor estimate_____

no idea_____

16. How much preparation time do you use to teach these topics (including time for lesson plans, inservice, preservice)?

good estimate_____ poor estimate_____

no idea_____

17. If another topic was introduced that you were required to add to your curriculum, would you have to eliminate a topic you are teaching now?

yes_____ no_____ don't know_____

If not, why not_____

If yes, how would you decide which topic to eliminate, or how would you set priorities?_____

_____

18. You include nutrition topics in your classroom but some other teachers don't. What do you think it would take to get other teachers to include nutrition education in their classrooms? don't know_____

Administrative directive_____ Monitoring_____

Inservice_____ Motivation_____

Accessible materials_____ Other_____

19. Can you suggest methods or resources which would help you teach nutrition more easily in your classroom? yes_____ no_____ don't know_____

movies_____ pamphlets_____visuals_____money_____other_____

_____

BM/CJL
FSHN/MSU
2/80

C_____

TEACHERS WHO HAVE TAUGHT NUTRITION IN THE PAST

20. Why do you no longer include nutrition topics in your classroom?_____

_____

_____

21. a) What specific topics did you cover when you taught nutrition?

_____

_____

_____

b) How did you decide to include these topics? _____

_____

_____

_____

22. What types of teaching methods did you use when you presented the above topics?

lecture/discussion_____ films_____

demonstrations_____ filmstrips_____

experiments_____ self-paced materials_____

taste testing_____ other_____

23. a) Did you ever use any resource people to help you teach any of these topics? yes_____ no_____ don't know_____ If yes, whom?

Home Ec. teacher_____ Another teacher_____

Dietitian_____ Coop. Ext. Home Economist_____

Food service personnel_____ Dairy Council of Mi. staff_____

Other_____ Mother_____

b) How were the above mentioned people used?_____

_____

_____

C_____

24. a) Did you ever use any written resource materials to help you teach any of these topics? yes_____ no_____ don't know_____

Dairy Council_____ Cooperative Extension, USDA bulletins_____

Health Department_____ books (specify)_____

magazines (specify)_____ Food Industry Materials_____

Other_____

b) How were the above mentioned materials used?_____

_____

25. How much time did you set aside for these nutrition related topics each school year?

good estimate_____ poor estimate_____

no idea_____

26. How much preparation time did you use to teach these topics in your class? (including time for lesson plans, inservice, preservice, etc.)

good estimate_____ poor estimate_____

no idea_____

27. You included nutrition topics in your classroom but some other teachers don't. What do you think it would take to get other teachers to include nutrition in their classroom? don't know_____

administrative directive_____ monitoring_____

inservice_____ motivation_____

accessible materials_____ other_____

28. Can you suggest methods or resources which would have helped you teach these topics more easily or would have improved student learning?

yes_____ no_____ don't know_____

movies_____ pamphlets_____ visuals_____ money_____

other_____

C_____

TEACHERS WHO DO NOT INCLUDE NUTRITION

29. Have you ever considered including nutrition topics in your classroom?

yes_____ no_____ don't know_____

If yes, what is the main reason why you haven't as yet?_____

_____

If no, under what circumstances would you consider including nutrition topics?

_____

30. If you decided to include a nutrition topic, what would you like or need in order to do it? (such as assistance, aides, materials) don't know_____

_____

_____

C_____

Comments:

How do you feel about nutrition education?
Basic philosophies, etc.

Demographics

Age_____ Sex: M F

School districts population density rural_____ urban_____

Does your school participate in school breakfast? yes_____ no_____

school lunch? yes_____ no_____

How many years have you been teaching? _____

What was your college degree major? _____ minor? _____

What is the highest degree you have completed? BA BS MA MS Ed.D. Ph.D.

BA+ BS+ MA+ MS+ _____

C_____

Some food and nutrition topics are listed below. Please indicate your personal interest in each topic by checking the appropriate column.	Interested and would like more information	Interested but do not want more information	Not interested enough to seek more information
Basic need for food (energy, growth, repair)			
Nutrients and their function in the body			
Food composition (amount of nutrients in food)			
Daily food guide (food groups, Recommended Dietary Allowances)			
Meal patterns (breakfast, lunch, dinner, etc)			
Snacks			
Consumerism (labeling, advertising, buying)			
Food from farm to table (growing, processing, marketing)			
Safety of the food supply (additives, sanitation)			
Legislation related to food, nutrition and health			
International food habits and issues			
Nutrition and health related issues			
Weight control/obesity			
Dental health			
Athletics and nutrition			
Drug and nutrient interactions			
Other			

From the above topics, choose the five that you would teach to students if you included nutrition education in the classroom.

First choice_____

Second_____

Third_____

Fourth_____

Fifth_____

BM/CJL
FSHN/MSU
2/80

OBSERVATION SHEET (CLASSROOM)

Room description

Texts

People

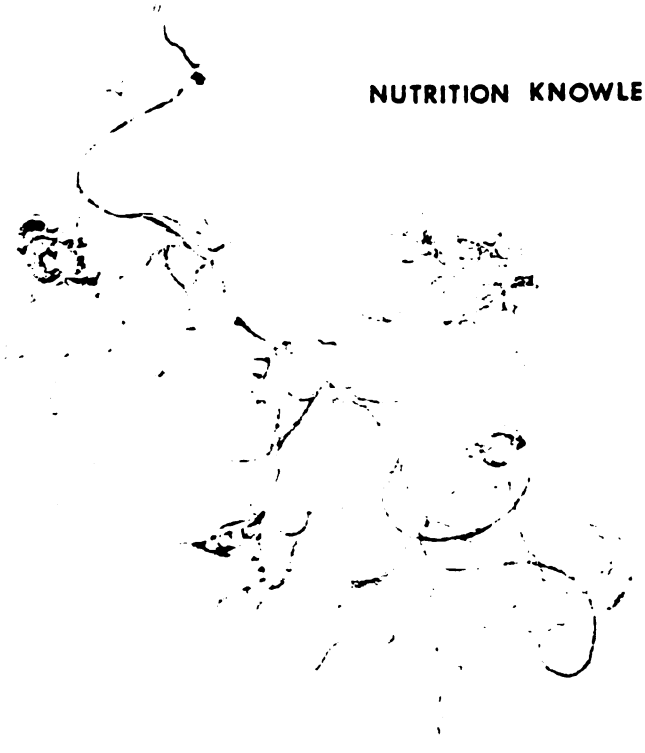
OBSERVATION SHEET (ENTIRE SCHOOL)

Lunchroom

Library

Halls

NKT



NUTRITION KNOWLEDGE TEST

Directions

This Booklet consists of True-False and Multiple Choice items. With a No. 2 pencil, blacken the circle immediately to the left of the response you choose. DO NOT USE ink, ballpoint or felt tip pens.

Items 1 - 12 are either true or false. If a statement is true, fill in the circle immediately to the left of "TRUE." If the statement is false, fill in the circle immediately to the left of "FALSE."

Items 13 - 40 are multiple choice. Choose the best answer from the alternatives provided. Fill in the circle immediately to the left of the answer you have selected.

IT IS IMPORTANT THAT YOU ANSWER ALL QUESTIONS EVEN IF YOU ARE NOT SURE OF YOUR ANSWERS.

Fill in circles completely and erase totally any answer you wish to change.

AGAIN, USE A NO. 2 LEAD PENCIL TO BLACKEN THE CIRCLE IMMEDIATELY TO THE LEFT OF THE RESPONSE YOU CHOOSE. DO NOT USE INK, BALLPOINT OR FELT-TIP PENS.

True-False

Answer the following questions by filling in the circle to the **left** of either "true" or "false."

1. All nutrients are chemicals.
   ○ True ○ False
2. Vitamin E eaten or taken as a supplement beyond the body's requirements is stored in the body.
   ○ True ○ False
3. An ounce of carbohydrate has more calories than an ounce of protein.
   ○ True ○ False
4. Minerals provide the body with small amounts of calories.
   ○ True ○ False
5. Some foods by themselves have all the nutrients in the amounts needed for adequate growth and health.
   ○ True ○ False
6. The teenage habit of snacking can provide valuable nutrients.
   ○ True ○ False
7. Pesticides and other pollutants are incidental food additives.
   ○ True ○ False
8. Vitamin A is toxic when consumed in large quantities.
   ○ True ○ False
9. As a person ages, generally, energy needs are reduced while nutrient needs remain the same.
   ○ True ○ False
10. If a child refuses milk, an acceptable food to provide similar nutrients would be eggs.
    ○ True ○ False
11. Nutrition labels are required on all canned goods.
    ○ True ○ False
12. There are no known dietary cures for diseases such as diabetes and heart disease.
    ○ True ○ False

Multiple Choice

Answer the following questions by filling in the circle to the **left** of the four answers.

13. Decreasing caloric intake by 500 calories per day would mean a loss of about one pound of body fat in
    ○ 3 days ○ 10 days
    ○ 7 days ○ 14 days
14. Which of the following is a vitamin?
    ○ fluoride ○ fructose
    ○ folacin ○ iron
15. The RDA's (Recommended Dietary Allowances) are nutrient levels
    ○ used as guidelines for diet planning
    ○ which insure good health for all individuals
    ○ which represent minimum daily needs
    ○ all of the above

SHEET NUMBER

16. Weight gain results, if at all, when calorie intake
- ○ is from high fat foods
- ○ is from high sugar content foods
- ○ is more than calorie expenditure
- ○ all of the above

17. Of the following, the best food source of both vitamin A and vitamin C is
- ○ apple
- ○ apricot
- ○ broccoli
- ○ carrot

18. Which of the following is the best food source of calcium?
- ○ butter
- ○ kelp
- ○ tomato juice
- ○ yogurt

19. The most concentrated source of calories is
- ○ fat
- ○ protein
- ○ starch
- ○ sugar

20. One of the first symptoms of vitamin A deficiency is
- ○ anemia
- ○ jaundice
- ○ night blindness
- ○ scurvy

21. The fat soluble vitamins include
- ○ A, B_1, B_2 and D
- ○ A, C, D, and E
- ○ A, D, E and K
- ○ B_1, B_5, B_{12}, and C

22. Vitamins are
- ○ a source of energy
- ○ indestructable
- ○ inorganic compounds
- ○ organic compounds

23. Which vitamin can be made in the body when sun rays contact the skin?
- ○ A
- ○ B_{12}
- ○ C
- ○ D

24. The chief function of carbohydrate we eat is to
- ○ maintain body fat
- ○ provide energy
- ○ provide essential amino acids
- ○ transport vitamin A

25. Sodium found in table salt and in food
- ○ can be deactivated by chloride
- ○ helps maintain water balance
- ○ helps prevent scurvy
- ○ is a non-essential nutrient

26. Enriched foods have nutrients
- ○ added that were not originally present or not present in the quantity added
- ○ replaced that were removed during processing
- ○ that are chemically inferior to the natural ones present in the food
- ○ that are chemically superior to the natural ones present in the food

27. If the cream is skimmed from milk, which nutrient will be reduced unless it is added back after processing?
- ○ calcium
- ○ vitamin A
- ○ vitamin B_{12}
- ○ vitamin C

SHEET NUMBER

28. According to the Daily Food Guide it is recommended that children and adults have how many servings of fruit and/or vegetables per day?
- ○ 1
- ○ 2
- ○ 3
- ○ 4

29. People with hypertension may need to reduce their intake of
- ○ alcohol
- ○ sodium
- ○ potassium
- ○ sugar

30. Peanut butter belongs to which of the Daily Food Guide groups?
- ○ breads and cereals
- ○ meat
- ○ fruits and vegetables
- ○ milk and dairy products

31. Eggs belong to which of the Daily Food Guide groups?
- ○ breads and cereals
- ○ meat
- ○ fruits and vegetables
- ○ milk and dairy products

32. A child's lunch should supply how much of his nutritional needs for a day?
- ○ 25%
- ○ 45%
- ○ 33%
- ○ 50%

33. According to the Daily Food Guide, it is recommended that teenagers have how many servings from the milk group per day?
- ○ 2
- ○ 4
- ○ 3
- ○ 5

34. According to the Daily Food Guide it is recommended that children and adults have how many servings of meat or protein per day?
- ○ 1
- ○ 3
- ○ 2
- ○ 4

35. During pregnancy, most women (age 23 and above) should
- ○ increase their food intake by 300 calories per day
- ○ limit their weight gain to 15-20 pounds
- ○ restrict their sodium intake
- ○ take mega vitamin supplements

36. Which of the following food combinations would provide a complete protein?
- ○ beans and lentils
- ○ rice and beans
- ○ corn and wheat
- ○ rice and broccoli

37. Vegetarians who eat no animal products or fortified products may need to supplement their diets with
- ○ iron
- ○ vitamin A
- ○ magnesium
- ○ vitamin B_{12}

38. Labeling laws require that food product ingredients be listed on the container in descending order of their
- ○ calories
- ○ nutrients
- ○ cost
- ○ weight

39. Vitamin C found in an orange is chemically
- ○ identical but more nutritious than vitamin C made in a lab
- ○ identical to vitamin C made in a lab
- ○ inferior to vitamin C made in a lab
- ○ superior to vitamin C made in a lab

40. If a food additive is found to cause cancer in a laboratory rat, the FDA must, under the Delaney Clause of The Additive Amendment of 1958,
- ○ ban the use of that additive
- ○ establish an allowable level for food additives
- ○ order investigative hearings
- ○ order lab testing in humans

THANK YOU FOR COMPLETING THE NUTRITION KNOWLEDGE TEST

Nutrition Education and Training
Food Science and Human Nutrition
1979

Michigan State University Printing

APPENDIX B

FORMS AND LETTERS

Dialog for NET Coordinators (Name_____)

My name is Barbara Mutch. I'm a graduate student at Michigan State University working on the NET project, with Dr. Lackey. We are interested in obtaining some information from elementary school teachers in Michigan concerning their inclusion of nutrition in their curriculum, techniques they use and their nutrition knowledge. We are looking for several K-5 or K-6 non-Title I public schools in which we could interview the teachers. We need a total sample size of 50 with approximately half of the teachers from rural schools and half from urban schools. We want to interview every teacher within a particular school, therefore, we need at least two schools, one urban, one rural with an average of 25 teachers in each. We are looking for schools in which we can get administrator approval and support.

Do you know of any possible schools in your area?

Administrators name_____

School_____ Address_____

Phone:

Rural_____ Urban_____

Teachers_____

Dialog for administrator, principal or curriculum developer—

My name is Barbara Mutch. I'm from Michigan State University. You were recommended to me by (NET Coordinators name ____) as possibly being interested in allowing me to discuss nutrition with your teachers. It would involve interviewing each teacher in your school for approximately 30 minutes at your and their convenience, and the completion of a nutrition knowledge test at their convenience.

- Would you be willing to participate?
- Can I send you a copy of the interview schedule?

Administrators name _____

School _____ Address_____

(directions)

Phone_____ rural _____ urban_____

teachers_____

grades _____

MICHIGAN STATE UNIVERSITY

DEPARTMENT OF FOOD SCIENCE AND HUMAN NUTRITION
HUMAN ECOLOGY BUILDING

EAST LANSING · MICHIGAN · 48824

Dear

I am a student at Michigan State University; Dr. Louise Sause is on my graduate advisory committee. I am in the process of collecting data for my Master's thesis on nutrition education in the elementary school curriculum. Dr. Sause recommended you as possibly being interested in allowing me to discuss curriculum topics with the teachers in one of the elementary schools in your district. I am specifically interested in how or if nutrition is currently incorporated into the curriculum, and teachers' nutrition knowledge.

I would like to interview all of the teachers in one public, non-Title I, K-5 or 6 elementary school. The interview will take approximately 20 minutes (but no more than 30 minutes) and will be conducted at your and the teachers' convenience. Part of the interview includes a short nutrition knowledge test.

I would appreciate your willingness to participate in this study. If you have any questions, or would like to see my interview schedule, please let me know. If you are interested, I would like to collect the data in February or March, if possible.

Thank you for your time and consideration of this project.

Sincerely,

Barbara Mutch

1. I have freely consented to take part in a scientific study being conducted by: Barbara Mutch

   under the supervision of: Dr. Carolyn Lackey

   Academic Title: Assistant Professor-Food Science and Human Nutrition

2. The study has been explained to me and I understand the explanation that has been given and what my participation will involve.

3. I understand that I am free to discontinue my participation in the study at any time without penalty.

4. I understand that the results of the study will be treated in strict confidence and that I will remain anonymous. Within these restrictions, results of the study will be made available to me at my request.

5. I understand that my participation in the study does not guarantee any beneficial results to me.

6. I understand that, at my request, I can receive additional explanation of the study after my participation is completed.

Signed_____

Date_____

BM/CJL
FSHN/MSU
2/80

MICHIGAN STATE UNIVERSITY

DEPARTMENT OF FOOD SCIENCE AND HUMAN NUTRITION
HUMAN ECOLOGY BUILDING

EAST LANSING · MICHIGAN · 48824

January 17, 1979

TO WHOM IT MAY CONCERN:

Mrs. Barbara Mutch is a graduate student in the Department of Food Science and Human Nutrition at Michigan State University. Mrs. Mutch is conducting a research on Nutrition Education in the School System. Her work has been approved by the University Committee on Research Involving Human Subjects. Mrs. Mutch will be interviewing teachers in Michigan schools to get their view on nutrition education in the classroom.

If you have any questions about Mrs. Mutch or her research, please feel free to contact me, her major advisor, at Michigan State University.

Sincerely,

Carolyn J Lackey

Carolyn J. Lackey, Ph.D., R.D.
Assistant Professor
Food Science and Human Nutrition
Office Phone: 353-8658

mew

APPENDIX C

PROBE CARDS

Subjects	Degree
. Communication Skills (reading, writing, speaking, listening)	BA
. Social Studies	BA plus additional hours
. Arithmetic	BS
. Science	BS plus additional hours
. Spelling	MA
. Health	MA plus additional hours
. Art	MS
. Music	MS plus additional hours
. Physical Education	EdD
. Other	PhD

Resource People

- Food Service Personnel
- Dairy Council of Michigan Staff
- Cooperative Extension Home Economist
- Student's Parent
- Home Economics Teacher
- Another Teacher
- Dietitian

Written Resources

- Dairy Council materials
- Cooperative Extension Service bulletins
- USDA bulletins
- Health Department pamphlets
- Food Industry educational materials
- Magazines (specify)
- Books (specify)

Age

A. 21-25
B. 26-30
C. 31-35
D. 36-40
E. 41-45
F. 45-50
G. 50-60
H. 60 plus

Teaching Methods

. Lecture/discussion
. Demonstrations
. Experiments
. Taste testing
. Films
. Filmstrips
. Self-paced units
. Others

Food or Nutrition Training

High school course (s)

College course (s)

4-H Club

Girl Scouts

Teacher Inservice Day (s)

Workshop (specify)

Other (specify)

APPENDIX D

NUTRITION KNOWLEDGE TEST RESULTS

A-1. NKT item response data for teachers interviewed at two schools (K-6th) in Michigan.

STANDARD FORM — 40 ITEMS — PERCENTAGES — UPPER 27% — MIDDLE 46% — LOWER 27% — 39 STUDENTS

STUDENTS PER GROUP — 10 — 19 — 10

ITEM	KEY	1			2			3			4			5			OMIT			ERROR			DIFF	DISC
		U	M	L	U	M	L	U	M	L	U	M	L	U	M	L	U	M	L	U	M	L		
1	1	50	16	20	40	79	80	0	0	0	0	0	0	0	0	0	10	5	0	0	0	0	74	30
2	1	30	32	70	60	68	30	0	0	0	0	0	0	0	0	0	10	0	0	0	0	0	59	-40
3	2	60	37	80	40	63	20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	54	20
4	2	50	26	80	50	74	20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	46	30
5	2	10	5	50	90	95	50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	18	40
6	1	80	68	70	20	32	30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	28	10
7	1	90	53	80	10	42	20	0	0	0	0	0	0	0	0	0	0	5	0	0	0	0	31	10
8	1	100	63	50	0	37	50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	31	50
9	1	90	79	40	10	21	60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	28	50
10	2	20	21	50	80	74	50	0	0	0	0	0	0	0	0	0	0	5	0	0	0	0	31	30
11	2	30	58	100	70	42	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	62	70
12	1	70	53	20	30	47	80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	51	50
13	2	0	11	30	70	68	70	10	16	0	10	5	0	0	0	0	10	0	0	0	0	0	31	0
14	2	0	0	0	90	58	10	0	11	0	10	32	90	0	0	0	0	0	0	0	0	0	46	80
15	1	40	0	0	0	5	0	10	32	30	50	58	70	0	0	0	0	5	0	0	0	0	90	40
16	3	0	0	0	0	0	0	70	58	30	20	42	70	0	0	0	10	0	0	0	0	0	46	40
17	3	10	11	60	10	32	10	60	37	10	20	21	20	0	0	0	0	0	0	0	0	0	64	50
18	4	0	11	10	30	16	0	0	11	20	70	58	70	0	0	0	0	5	0	0	0	0	36	0
19	1	60	37	30	0	11	10	30	21	30	30	32	30	0	0	0	0	0	0	0	0	0	59	30
20	3	0	16	10	0	11	10	100	68	40	0	5	40	0	0	0	0	0	0	0	0	0	31	60
21	3	20	42	60	20	11	30	40	26	0	10	21	10	0	0	0	10	0	0	0	0	0	77	40
22	4	0	16	50	0	0	0	10	26	20	90	58	30	0	0	0	0	0	0	0	0	0	41	60
23	4	0	16	0	0	5	20	0	32	40	100	47	40	0	0	0	0	0	0	0	0	0	41	60
24	2	10	11	20	90	74	50	0	11	30	0	5	0	0	0	0	0	0	0	0	0	0	28	40
25	2	0	11	0	90	74	50	0	0	10	10	16	40	0	0	0	0	0	0	0	0	0	28	40
26	2	80	47	70	20	32	30	0	5	0	0	16	0	0	0	0	0	0	0	0	0	0	72	-10
27	2	20	37	70	50	26	10	30	32	20	0	5	0	0	0	0	0	0	0	0	0	0	72	40
28	4	10	0	30	30	16	40	30	42	10	30	42	20	0	0	0	0	0	0	0	0	0	67	10
29	3	0	0	0	0	0	0	50	89	40	50	11	60	0	0	0	0	0	0	0	0	0	33	10
30	3	0	0	0	10	11	20	90	84	70	0	5	10	0	0	0	0	0	0	0	0	0	18	20
31	3	0	0	0	0	0	0	100	42	10	0	58	90	0	0	0	0	0	0	0	0	0	51	90
32	2	10	0	0	70	74	60	20	26	0	0	0	40	0	0	0	0	0	0	0	0	0	31	10
33	3	10	5	10	20	47	80	70	42	10	0	5	0	0	0	0	0	0	0	0	0	0	59	60
34	2	10	11	40	70	26	30	20	53	30	0	11	0	0	0	0	0	0	0	0	0	0	62	40
35	1	20	0	10	40	53	40	20	37	10	20	5	40	0	0	0	0	5	0	0	0	0	92	10
36	3	60	63	10	10	0	10	30	37	40	0	0	40	0	0	0	0	0	0	0	0	0	64	-10
37	4	50	42	50	20	5	0	0	11	30	30	42	20	0	0	0	0	0	0	0	0	0	67	10
38	4	0	0	10	0	5	0	30	47	60	70	47	30	0	0	0	0	0	0	0	0	0	51	40
39	2	20	16	30	80	42	20	0	5	10	0	37	40	0	0	0	0	0	0	0	0	0	54	60
40	1	50	37	10	10	37	50	40	21	40	0	5	0	0	0	0	0	0	0	0	0	0	67	40

LIST OF REFERENCES

REFERENCES

Acock, A.C. and W.J. Scott. A model for predicting behavior: the effect of attitude and social class on high and low visibility political participation. Social Psychology Quarterly 43 (1): 59-72, 1980.

Baker, M.J. Influence of nutrition education on fourth and fifth graders. Journal of Nutrition Education 4:55-58, 1972.

Bell, C. and M. Lamb. Nutrition education and dietary behavior of fifth graders. Journal of Nutrition Education 5:196, 1973.

Bowman, E. Developing a state plan: three state coordinators share their experiences. Food and Nutrition 9 (6):12, 1979.

Callahan, D.L. Inservice teacher workshops. Journal of Nutrition Education 5:233-234, 1973.

Carver, L.R. and K.J. Lewis. A nutrition knowledge test for elementary school teachers. Journal of Nutrition Education 11:68-71, 1979.

Cook, C.B., D.A. Eiler and E.C. Kaminaka. How much nutrition education in grades K-6? Journal of Nutrition Education 9:131-135, 1977.

Crane, J.G. and M.V. Angrosino. Field Projects in Antropology: A Student Handbook. Morristown, N.J.: General Learning Press, 1974.

Earl, R.D. and D.R. Winklejohn. Attitudes of elementary teachers toward science and sciene teaching. Science Education 61(1): 41-45, 1977.

Ebel, R. Essentials of Educational Measurement. Third Ed. Englewood Cliffs: Prentice-Hall, Inc., 1979.

Egan, M.C., M. Goodwin and A. Maretzki. Pregnant women, children and adolescents. Journal of Nutrition Education 12 (Supplement 1): 121-128, 1980.

Fishbein, M. and I. Ajzen. Belief, Attitude, Intention and Behavior: An Introduction to Theory and Research. Reading, Mass: Addison-Wesley, 1971.

Grogan, J. Teacher inservice for nutrition education--an interdisciplinary approach in the school system. Journal of Nutrition Education 10:119-120, 1978.

Guthrie, H.A. What should be taught in nutrition education. Thresholds in Education 4:23-24, 1978.

Head, M.K. A nutrition education program at three grade levels. Journal of Nutrition Education 6:56-59, 1974.

Hicks, B.M. Perspectives in teaching nutrition--utilizing school food service--part IV. Food and Nutrition News 49(3):3, 1978.

Hoffmann-LaRoche Inc. Current Nutrition Beliefs and Practices Among Health Educators, Students, Parents. Final Report. Nutley, N.J.: Hoffmann-La Roche Inc., 1978.

Johnson, M.J. and J.L. Butler. Where is nutrition education in U.S. public schools. Journal of Nutrition Education 7:20-21, 1975.

Knudtson, H.K. Nutrition Concepts Held by Fifth and Sixth Grade Teachers in Iowa. Unpublished Master's Thesis. Ames: Iowa State University, 1972.

Kolasa, K. and C. Lackey. Michigan School Breakfast Survey. Final Report. Unpublished, Michigan State University, 1979.

Lackey, C. and K. Kolasa. Nutrition Education and Training Activities. Final Report. Unpublished, Michigan State University, 1979.

Lackey, C., K. Kolasa, K. Penner, and B. Mutch. Development of a nutrition knowledge test. Final Report. Unpublished, Michigan State University, 1979.

Michigan Department of Education. Minimal Health Performance Objectives for Health Education in Michigan. Lansing: Michigan Department of Education, 1974.

Michigan Department of Public Health. Basic nutrition facts of Michigan. Working Draft. Lansing: Michigan Department of Public Health, 1980.

Miller, D.C. Handbook of Research Design and Social Measurement. New York: David McKay Company, Inc., 1977.

Nie, N.H., C.H. Hull, J.G. Jenkins, K. Steinbrenner and D.H. Bent. Statistical Package for the Social Sciences Second Ed. New York: McGraw-Hill, 1975.

Niedermeyer, F.C. and M.H. Moncrief. Primary graders study nutrition. The Elementary School Journal (Feb):305-310, 1975.

O'Farrell, M. and J.L. Kendrick. Educators' attitudes toward nutrition education in Florida. Journal of Nutrition Education 4:15-16, 1972.

Perkins, K.L., F.R. Roach and A.G. Vaden. Influence of teachers' attitudes toward the school lunch program on student participation. Journal of Nutrition Education 12:55-60, 1980.

Petersen, M.E. and C. Kies. Nutrition knowledge and attitudes of early elementary teachers. Journal of Nutrition Education 4:11-15, 1972.

Pourchot, L.L. and J.R. Ellis. Nutrition education preparation for educators. Thresholds in Education 4:17-19, 1978.

Public Law 95-166. National School Lunch Act and Child Nutrition Amendments of 1977.

Robinson, C.H. Nutrition education--what comes next? Journal of the American Dietetic Association 69:126-132, 1976.

Sodowsky, J.D. Inservice nutrition education for elementary teachers. Journal of Nutrition Education 5: 139-142, 1973.

Spitze, H.T. Innovation techniques for teaching nutrition. Journal of Nutrition Education. 3:156-159, 1971.

Stackhouse, M. Nutrition education and training. Food and Nutrition 9(6):10-11, 1979.

Standard Research Inc., RPX user's manual. Revision 20. East Lansing: Standard Research Inc., 1980.

Tinkleman, S.N. Planning the objective test. In Educational Measurement. R.L. Thorndike, ed. Washington, D.C.: American Council on Education, 1971, pp. 46-80.

Webster's Third New International Dictionary. 17th ed. s.v. "Education". Springfield: G and C Merriam Company, 1976.

White House Conference on Food, Nutrition and Health. Final Report. Washington, D.C.: U.S. Government Printing Office, 1969.

Wicker, A.W. An examination of the "other variables" explanation of attitude-behavior inconsistency. Journal of Personality and Social Psychology 19:18-30, 1971.

Wodarski, L.A., C.L. Adelson, M.T. Todd and J.S. Wodarski. Teaching nutrition by teams-games-tournaments. Journal of Nutrition Education 12:61-65, 1980.