

NUTRITION-RELATED TRAINING, KNOWLEDGE, ATTITUDES AND PRACTICES
OF SELECTED KANSAS ELEMENTARY TEACHERS

by

LU ANN LAURICE SOLIAH

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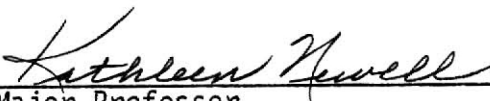
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Approved by:


Major Professor

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TABLE OF CONTENTS

	Page
INTRODUCTION	1
REVIEW OF LITERATURE	5
Present Status of Nutrition Education in Schools	5
Persons Responsible for Nutrition Education	5
Present Teacher Preparation in Nutrition	6
Placement and Time Allotment	8
Integration of Nutrition with Other Subjects	10
Integration of Nutrition Education in the School Foodservice Program	11
Nutrition Education Teaching Practices	12
Research Studies Among Teachers	15
Nutrition Knowledge	15
Nutrition Attitudes	17
Dietary Practices	19
Interrelationships Among Nutrition Knowledge, Training, and Attitudes	20
METHODOLOGY	22
Selection of the Sample	22
The Instrument	26
Distribution of Survey Instruments	29
Data Analysis	30
Analysis of Nutrition Knowledge Scores	31
Analysis of Attitudes, Practices, and Nutrition Education Practices Scores	31
RESULTS AND DISCUSSION	36
Description of Sample	36

General Information	36
Nutrition Training	36
Preferred Nutrition Training Approaches	41
Recommendations on Nutrition Education in the Elementary Curriculum	47
Nutrition Sources and Materials Utilized	47
Integration of Nutrition in the Curriculum	49
Suggestions of Teachers for the Kansas Nutrition Education Program	50
Nutrition Knowledge	51
Analysis of Variance of Nutrition Knowledge Test Scores	51
Responses on Nutrition Knowledge Items	55
Basic Vocabulary/Basic Concepts	58
Nutrition Practices	58
Food Selection	59
Food Preparation	59
Storage Procedures and Advertising Claims	59
Nutrition-Related Attitudes and Practices and Nutrition Education Practices	60
Analysis of Variance of Nutrition-Related Attitudes and Practices and Nutrition Education Practices	60
Responses on General Attitudes/Habits Items	60
Value of Proper Nutrition	60
Food Selection	69
Eating Patterns and Beverage Consumption	69
Advertising Claims	69
School Food	70

Responses on Occupational Attitudes/Habits Items	70
Coordination Between Teachers and Foodservice Personnel	70
Classroom and Cafeteria Practices	76
In-Service Needs	77
Coordination with Parents	77
Interrelationships Among the Variables	78
Nutrition Knowledge and Selected Characteristics of Teachers	78
Nutrition-Related Attitudes and Practices, Nutrition Education Practices and Selected Characteristics of Teachers	82
Correlations of Nutrition Knowledge, Attitudes, and Practices Scores	83
SUMMARY	89
REFERENCES	91
ACKNOWLEDGMENTS	94
APPENDIXES	95
A. Sampling Plan Information	96
B. Initial Correspondence to School Administrators	99
C. The Instrument	107
D. Teacher Response Sheet	119
E. Correspondence for Distribution of Instruments	124
F. Form for Recording Survey Distribution and Returns	131
G. Coding of Questionnaire Data	133
H. Scoring Key for Nutrition Knowledge Test	138
I. Memorandum and Evaluation Forms for Nutrition Trained Panel	140

J. Responses of Nutrition-Trained Panel (Tables 28-31)	148
K. Supplemental Table (Table 32)	156

LIST OF TABLES

Table	Page
1. Areas of measurement and corresponding items in knowledge attitudes, and habits domains of the Nutrition Education Assessment Series, Teacher Edition	28
2. Data from pilot study to evaluate reliability and validity of test instrument for elementary teachers and foodservice personnel	29
3. Priority score grid for evaluation of nutrition trained panel on importance of nutrition-related attitudes and practices and nutrition education practices items	34
4. Items comprising scales constructed from attitudes/habits domains (Teacher Edition)	35
5. Characteristics and grade level taught of Kansas elementary teachers	37
6. Number of students in Kansas elementary teachers classes	37
7. Years of teaching experience of Kansas elementary teachers	38
8. Educational background of Kansas elementary teachers	38
9. Reports of Kansas elementary teachers on type and recency of nutrition training	39
10. Reports of Kansas elementary teachers on preferred ways of obtaining additional nutrition training	44
11. Percentage of Kansas elementary teachers using various nutrition sources and materials	48
12. Percentage of teachers reporting integration of nutrition into other subjects	49
13. Analysis of variance of nutrition knowledge test variables for Kansas elementary teachers	52
14. Variance component estimates of scores of Kansas elementary teachers on the nutrition knowledge test	53
15. Means, standard deviations, and coefficients of variation of the scores of Kansas elementary teachers on the nutrition knowledge test	54

Table	Page
16. Comparison of nutrition knowledge test scores of Kansas and Florida elementary teachers	55
17. Responses of Kansas elementary teachers on items in knowledge domain by area of measurement	56
18. Analysis of variance of nutrition-related attitudes and practices and nutrition education practices test variables for Kansas elementary teachers	61
19. Variance component estimates of scores of Kansas elementary teachers on the nutrition-related attitudes and practices and nutrition education practices	62
20. Means, standard deviations, and coefficients of variation of the scores of Kansas elementary teachers on the nutrition-related attitudes and practices and nutrition education practices	62
21. General attitudes/habits of Kansas elementary teachers toward nutrition	63
22. Occupational attitudes/habits of Kansas elementary teachers	71
23. F ratios for analysis of effects of selected variables in nutrition knowledge scores of Kansas elementary teachers	79
24. Least square means and standard errors for nutrition knowledge scores of Kansas elementary teachers from analysis of selected variables	80
25. F ratios for analysis of effects of selected variables in nutrition-related attitudes and practices and nutrition education practices scores of Kansas elementary teachers	84
26. Least square means and standard errors for nutrition-related attitudes and practices and nutrition education practices scores of Kansas elementary teachers from analysis of effects of selected variables	85
27. Correlation coefficients of teachers' scores for nutrition knowledge, nutrition-related attitudes and practices, and nutrition education practices	87
28. Responses of nutrition trained panel members (N = 13) on evaluation of nutrition-related attitude items (Teacher and Food Service Personnel Editions)	149

Table	Page
29. Responses of nutrition trained panel members (N = 13) on the evaluation of nutrition-related practice items (Teacher and Food Service Personnel Editions)	151
30. Responses of nutrition trained panel members (N = 13) on evaluation of nutrition education practices (Teacher Edition)	153
31. Mean and standard deviation from importance ratings of nutrition trained panel for attitudes/habits items and priority scores assigned	154
32. Responses of Kansas elementary teachers to nutrition knowledge questions	157

LIST OF FIGURES

Figure	Page
1. Geographic location of Unified School Districts (USD) in the study sample by Board of Education District (BED)	25
2. Nutrition training of Kansas elementary teachers in each Board of Education District (BED)	43
3. Preferred ways of obtaining additional nutrition training in each Board of Education District (BED)	46

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INTRODUCTION

Nutrition education has been defined (1) as "the process by which beliefs, attitudes, environmental influences and understandings about food lead to practices that are scientifically sound, practical, and consistent with individual needs and available food resources." Nutrition education should be available to all individuals and efforts should focus on the establishment and protection of nutritional health rather than on crisis intervention. Nutrition education should be a continuing process throughout the life cycle, regardless of income, education level, location, or cultural, social and economic practices (1).

Cortes and Standel (2) stated that the development of children's food habits occurs at an early age and that children should learn about foods and the nutrients they provide early in life so that good nutrition becomes a part of their growing process. Knowledge of good nutrition is essential for the maintenance of health and achievement of one's genetic potential (3). Nutrition concepts introduced to children sequentially as a part of their basic education can provide them with a sound knowledge base and influence lifelong attitudes and habits (4).

The school can play an important role in the nutritional welfare of children. Nutrition education is most productive when there is a comprehensive, sequential, integrated program in the school, beginning in kindergarten and continuing through the twelfth grade (5). The school has the opportunity to influence the child's interest in nutrition and give continuous leadership throughout his school life. In order to meet the nutrition education challenge, it appears logical to enlist the assistance of the teachers who are already in the classroom.

The elementary teacher holds a distinct position of authority in the classroom. The student-teacher relationship can be utilized to enhance nutrition education and develop good food habits of children (2). The training and attitudes of the elementary classroom teacher will have an influence on the success of nutrition education. Teachers should have some knowledge of nutrition and how to incorporate it into their school lesson plans for their influence, to be beneficial (2, 6). According to Steinberg (7), few elementary teachers have any training in nutrition education as a part of their teacher preparation (7).

Recent nutrition education research has focused on the design and evaluation of individual nutrition programs. Learning objectives and teaching methods have been evaluated (8). Little research, however, has been conducted to determine nutrition training of teachers, measure their nutrition knowledge and attitudes, and assess their dietary behavior.

In 1966, the United States Congress passed the Child Nutrition Act which was designed to promote the health and well-being of children by providing federal assistance for a school breakfast program and for food-service equipment purchases (9). As a result of recommendations from the 1969 White House Conference on Food, Nutrition, and Health, the National School Lunch Act and the Child Nutrition Act of 1966, were amended by P.L. 91-248 (10). One of the objectives of this legislation was to strengthen child nutrition programs by providing nutrition training and education for workers, participants, and cooperators in the school lunch program (10). In 1977, the Child Nutrition and School Lunch Acts were amended (P.L. 95-166) to provide funds, based on 50¢ per child enrolled in schools or institutions, for nutrition education in each state (11). The goal of the program is to provide children with better learning

experiences in the classroom and school cafeteria so that they may develop good food and nutrition attitudes and practices fundamental to their health and well-being (12). The act authorized the United States Secretary of Agriculture to formulate and carry out a nutrition information and education program through a system of grants to state agencies to provide instruction to teachers and students, training of foodservice personnel, and development of classroom materials and curriculum (11). Upon receipt of funds authorized by this amendment, states were required to conduct a needs assessment, defined as a systematic process for evaluating the scope and success of nutrition education activity (11).

As a part of this legislation (P.L. 95-166), enacted by the United States Congress, funds were provided to the Kansas State Department of Education for a Nutrition Education and Training Program (NETP). Under a joint agreement, the Kansas State Department of Education contracted with Kansas State University, to conduct a needs assessment during the 1979-80 school year, which included a survey of nutrition knowledge, attitudes and dietary practices of teachers, school foodservice personnel and fifth grade students.

The objectives of one component of the Kansas Nutrition Education and Training Program Needs Assessment Project and the objectives of this research were:

- 1) to assess nutrition education experiences that are available to teachers,
- 2) to assess teachers' attitudes toward previous nutrition education experiences,
- 3) to measure teachers' level of basic knowledge achieved in foods and nutrition,

- 4) to assess teachers' dietary behavior,
- 5) to study relationships among nutrition-related attitudes, knowledge of food and nutrition and dietary behavior of teachers, and
- 6) to identify factors related to nutrition knowledge and attitudes of teachers.

REVIEW OF LITERATURE

Present Status of Nutrition Education in Schools

Nutrition education, particularly for elementary children, is one of the challenging responsibilities of the teacher (13). Research has shown that adequate preparation in nutrition for teachers is necessary for effective teaching of the subject (14).

Persons Responsible for Nutrition Education

In 1964, a national study (7) indicated that the classroom teacher was responsible for the major portion of nutrition education in elementary schools. In junior and senior high schools, teachers with physical and health education degrees taught most of the health classes. In small school districts, however, 30 per cent of the health classes were taught by teachers with no background in health or nutrition education (7).

In 1975, Johnson and Butler (15) assessed grades kindergarten-twelve nutrition education programs in the fifty states and the District of Columbia. They found that a variety of persons, including foodservice directors, health educators, physical education specialists, and school administrators were responsible for nutrition education in the responding states. In Kansas, a nutrition education training coordinator (11), who is supervised by two school foodservice specialists, coordinates the foods and nutrition education experiences for the state's elementary schools.

Silvey (16) found that 43 per cent of Tulsa, Oklahoma teachers thought nutrition education was part of their job, 41 per cent did not think it was their job, and 15 per cent were uncertain. All teachers with

previous nutrition training agreed that nutrition education was their job, those without training disagreed. Science, kindergarten, art, and self-contained teachers (those who taught numerous subjects), and teachers who had participated in a Dairy Council workshop had positive attitudes toward teaching nutrition. Homeroom platoon teachers, those who taught one subject all day, did not think that teaching nutrition was their responsibility (16). In a New York and New Jersey study (8), most elementary teachers recognized the importance of nutrition, but they did not identify themselves as the persons responsible for teaching it. In a 1971 interview survey of California elementary teachers (17), 95 per cent said their job included helping students learn proper food choices.

Present Teacher Preparation in Nutrition

Most state education departments do not require a unit in nutrition education for teacher certification (18). Peterson and Kies (19) reported data indicating that approximately 67 per cent of the 2,000,000 teachers in the United States graduated from junior, teachers, or liberal arts colleges, where nutrition courses were not offered. The remaining 33 per cent attended universities, but only a small number had included a nutrition course in their program of study.

Kansas State University requires twelve semester hours in the natural sciences, including a biological and a physical science course, one of which must have a laboratory unit, for certification of elementary teachers (20). A college level course in foods and nutrition is required for certification of home economics teachers. Presently, there are no state-wide requirements for nutrition training of other teachers (21). In Indiana, elementary education majors are required to take a course in

nutrition to meet certification requirements (22). Peterson and Kies (19) reported that nutrition is not required for elementary teacher accreditation in Nebraska.

In a survey of kindergarten through sixth grade (K-six) teachers in New York and New Jersey, less than 25 per cent had had a college nutrition course (8). Peterson and Kies (19) reported only 9 per cent of the Nebraska grades K-three teachers they surveyed had taken a college course in nutrition; 83 per cent indicated that their college preparation had not included methods of teaching nutrition. A Hawaiian study of elementary teachers showed that 39 per cent and 15 per cent, respectively, had taken either a health or nutrition course in college, but the exact per cent taking nutrition courses was not specified (2). Nutrition was a required course for 8.3 per cent, and an elective for 7.6 per cent of elementary teachers in Texas (6). In general, teachers surveyed in Texas had an understanding of the principles of nutrition but had little interest or opportunity to communicate this knowledge to their students (6). A Florida survey (23) of early elementary teachers indicated that 13 per cent had taken a nutrition course, 47 per cent had health or science courses with nutrition included, and 40 per cent had no nutrition training. Methods of teaching nutrition were not included in the program of study for 78 per cent of the teachers.

Teacher participation in nutrition education workshops is relatively infrequent. Cook et al. (8) reported that in their survey 1 per cent of the elementary teachers in New York City, 4 per cent in New Jersey, and 6 per cent in upstate New York had attended a workshop in foods and nutrition. Five per cent of the elementary teachers in a North Dakota school

district had participated in a nutrition conference, institute, or workshop (24).

In Oklahoma (13), elementary teachers who had participated in nutrition education workshops integrated more nutrition in their teaching. As a result of the workshops and their follow-ups, the eating habits and attitudes of 11,000 children were influenced positively. Several parents reported that their children were a good influence on the family's eating patterns because teachers were emphasizing nutrition.

In 1971, the California Dairy Council (25) trained 11,000 grades K-six teachers at nutrition education workshops. Teachers responded favorably to their training. School foodservice directors reported that children ate better in the lunchrooms and that fewer fruits and vegetables were thrown away in 1971, than in previous years.

Milk Board Workshops, sponsored by the Milk Marketing Board in Ontario, Canada (26) were conducted to train teachers to teach nutrition to their students. Seventy per cent of the 7,800 teachers who attended the workshops taught nutrition in their classroom. Children in those classes showed increased nutrition knowledge and improvement in eating behavior (26).

Placement and Time Allotment

Over three-fourths of the teachers surveyed in New York and New Jersey (8) believed the study of foods and nutrition was important and should be taught all year; 16 per cent indicated that it was important and that it should be taught within a period of a few weeks, and 5 per cent thought that it did not need to be taught or should be taught only if there was time. The majority of the teachers (72 per cent) thought

nutrition was taught most effectively in grades K-six, approximately 60 per cent of the K-three teachers thought it should be included in grades other than K-three, and 55 per cent of the four-six teachers thought it should be taught in grades other than four-six. Teachers who thought they should teach nutrition and that it should be taught all year long were more likely to include it in their lesson plans (8).

Silvey (16) found that 79 per cent of the Tulsa, Oklahoma teachers believed nutrition should be taught in all elementary grades, 11 per cent were uncertain, and 10 per cent disagreed that it should be taught at that level. Eighty-nine per cent of Florida teachers disagreed or strongly disagreed that nutrition is best taught in grades six and above because children are more likely to remember facts they have learned (23).

An investigation of the time spent teaching nutrition in elementary classrooms in New York and New Jersey (8) showed that 75 per cent of the grades K-six teachers taught nutrition for an average of 9.7 hours per year, 25 per cent did not teach it. A small number of teachers accounted for most of the nutrition education hours i.e. 20 per cent of the teachers taught 60 per cent of the total amount (8).

In 1975, Fine (27) reviewed health instruction practices among elementary teachers in New York. Approximately three-fourths of the teachers spent less than one hour per week teaching health, and nutrition was included in the health class. More time, however, was spent teaching health than nutrition.

In Texas, 12.8 per cent of the teachers surveyed indicated that nutrition received equal scheduling consideration and 14.4 per cent gave it equal time allotment compared to other school subjects. Some teachers

reported that they taught nutrition "when needed" or "in the spring" (6). They agreed that nutrition education is important but not as important as mathematics, reading, or social studies (6).

One hundred fifty-three elementary school teachers in North Dakota were asked about their nutrition teaching in 1973. Zero to five minutes per week was spent teaching nutrition by 51 per cent of the teachers, six to nineteen minutes by 41 per cent, and twenty minutes by 8 per cent (24).

In an Oklahoma study, Silvey (16) found that 63 per cent of the teachers did not think they had time to teach nutrition, 4 per cent were uncertain, and 23 per cent reported adequate time. In New York and New Jersey (8) the teacher's decision to teach nutrition and the time allotment were related to his or her previous enrollment in nutrition classes. Instructors with high school, college, or in-service nutrition courses taught 2.5, 2.4, and 3 hours more nutrition per year, respectively, than teachers without foods and nutrition training (8).

Integration of Nutrition with Other Subjects

Nutrition can be taught as a separate unit or incorporated into other subjects. Effective nutrition education programs can be developed in schools by applying the principles of learning, using effective educational techniques, creating an appreciation for the world of food and utilizing the school foodservice as a laboratory for classroom experiences (28).

Oklahoma elementary teachers interviewed in 1971 (13) indicated that nutrition was usually integrated into the health and physical education units, but not into other subjects. Ninety-eight per cent of the elementary teachers (grades one-six) in Kentucky agreed that nutrition

should be integrated in health education programs (14). In a Texas survey (6), McMurray found that nutrition was seldom taught as a separate course. If nutrition was a part of a teacher's instruction plan it was usually included in health or social studies; occasionally it was integrated in art, music, or geography, or was a part of the school lunch program. Similar findings (19) were reported in Nebraska; 63 per cent of the teachers thought nutrition should be taught as part of an integrated curriculum. In practice however only 53 per cent taught nutrition with other units, 33 per cent taught it as a separate unit, and 13 per cent did not teach it (19). Cooper and Go (29) reviewed twenty-two grades K-twelve nutrition curriculum guides and found that nutrition was included frequently in health or language arts and English. Occasionally it was integrated in science, and rarely in arts, crafts, or social science.

Integration of Nutrition Education in the School Foodservice Program

Todhunter (30) suggested integrating nutrition education in an already existing curriculum, the school foodservice program. This method would allow for first-hand experience with food which could be related to previous classroom learning. The United States Department of Agriculture (USDA) has promoted the integration of nutrition education in the school feeding program. Petersen and Kies (19) stated that more cooperation between school foodservice personnel and elementary teachers was needed. They found that 67 per cent of the teachers favored cooperative efforts, but over half of them did not utilize the school foodservice as a laboratory, tours of the kitchen or student participation in menu planning were not common practices. In Tulsa, Oklahoma 40 per cent of the

teachers (16) thought the school lunch program was an educational as well as a feeding program, 25 per cent were uncertain of the role of the program, and 35 per cent disagreed that it had an educational function. Seventy-five per cent of the teachers agreed that the school lunch program makes an important contribution to students' health and over half (63 per cent) thought that school lunches were nutritionally adequate (16).

Perkins et al. (31) reported that teachers in Manhattan, Kansas had a favorable attitude toward the school lunch program and agreed that it provided a nutritionally adequate diet for students. Teachers also agreed that cooperation with school foodservice employees was important for effective nutrition education and that school lunch personnel were qualified for their jobs. Approximately 20 per cent of the Texas teachers (6) used the school lunch program to teach nutrition. In Kentucky (14), teachers had a positive attitude toward the school feeding program, but only 6 per cent reported that they integrated nutrition instruction into the school lunch program.

Nutrition Education Teaching Practices

In 1974, Spollen (22) reviewed teaching methods and sources of nutrition information used by New York elementary teachers. Discussion, food preparation, and class projects were the teaching methods used most frequently. McMurray (6) found that a considerable amount of indecision existed among Texas teachers as to the best way to teach nutrition to their students. Teaching the four food groups was the technique used most frequently; the nutrient approach was used least.

Nutrition teaching activities were studied in elementary schools in North Dakota in 1973 (24). The basic four food groups and the importance

of eating breakfast were discussed in the classroom by 80 per cent or more of the teachers. Films, slides, charts, posters, and bulletin boards were the nutrition education instruction materials used in most elementary schools. The four resource persons used most frequently by elementary teachers were home economists, extension agents, dietitians, other teachers, or nurses (24). Nearly all of the elementary teachers in New York and New Jersey (8) used films or filmstrips to teach foods and nutrition. Classroom food projects, posters, and booklets were used by approximately 50 per cent of the teachers. School nurses, textbooks, magazines, and Dairy Council materials were the resources utilized most by New Jersey, upstate New York, and New York City teachers (8).

Cortes and Standal (2) found that teaching activities requiring long preparation time, such as gardening, mobiles, and transparencies, were not used very often, even if they were rated as "very important" teaching aids. The majority (83 per cent) of Hawaiian grades K-three teachers believed educational television was very important but only 4 per cent used it. Resource professionals, such as dietitians or nutritionists, were rated as being "very important" by 85 per cent of the teachers, but only 2 per cent consulted them.

Most elementary teachers in Kentucky relied on health textbooks for nutrition information (14). In 1974, elementary teachers in New York (22) reported that television, radio, and school nurses were the main sources of nutrition information. Forty-two per cent of the teachers used home economics extension bulletins and 20.6 per cent used women's magazines. None of the teachers in the survey listed a reliable nutrition textbook as their source of information, and approximately 8 per cent were using questionable nutrition texts (22).

In Texas elementary schools, McMurray (6) found that National Dairy Council materials were used most often, but none of the teachers used nutrition bulletins published by USDA. Dairy Council materials were used in over 50 per cent of the nutrition units taught in Tulsa, Oklahoma in 1976-77 (16).

Forty-two per cent of the North Dakota (24) teachers reported that they needed more nutrition education materials and some teachers expressed a need for a nutrition consultant. Several teachers indicated that they were unaware of materials available for nutrition education. Six per cent subscribed to magazines in which nutrition articles were published occasionally, none of the teachers subscribed to the Journal of Nutrition Education (24).

Science and kindergarten teachers in an Oklahoma survey responded favorably toward the availability of nutrition teaching materials. Other teachers however indicated that they did not have adequate supplies or they were uncertain about the effectiveness of their present teaching materials (16). Over half of the teachers in Kentucky (14) agreed that nutrition education materials were not readily available. Oklahoma elementary teachers (13), indicated that they were interested in new and creative nutrition education teaching methods and that they wanted to motivate students to select food wisely.

Approximately 65 per cent of the teachers surveyed in New York stated that provision of nutrition education training materials for their own use would be helpful (22). The teachers showed some interest in nutrition workshops but summer school courses in nutrition were not well-accepted (22). According to Cortes and Standal (2), teachers in Hawaii, reported limited availability of nutrition education resources and they

indicated a need for the development of attractive and interesting materials for elementary children. They encouraged communication between teachers and nutrition professionals through workshops, in-service training sessions, summer courses, and Parent Teacher Association meetings (2).

In North Carolina (32) all teachers thought it was important to reinforce nutrition education with parent education, however, Parent Teacher Association meetings with nutrition programs were poorly attended. There was interest in classroom experiences and project activities as indicated by comments from parents and other family members.

A research study in Indiana (33) included a parent education program concerning nutrition and school lunch with a plan to increase vegetable consumption of third graders. A series of six letters were sent to parents and invitations were extended to eat lunch at school and visit the school kitchen. As a result of the program, tendencies were seen toward increased vegetable consumption and school lunch participation among third graders. Parents expressed appreciation for the information about nutrition and school lunches and responded favorably toward nutrition education programs for students (33).

Research Studies Among Teachers

Nutrition Knowledge

Nutrition knowledge is an awareness or understanding of facts related to nutrition concepts (23). Teachers need adequate nutrition training to develop a good understanding of the subject and the importance of teaching it.

A mail survey was conducted to test nutrition knowledge of early elementary teachers in Nebraska (19). Overall nutrition knowledge scores of the teachers were low. The highest possible score was 140, the mean was 58.3, with a range of 1 to 119. Teachers scored higher on general nutrition questions than they did on food composition items. The importance of eating a good breakfast was recognized, but few teachers knew the composition of an adequate breakfast. They generally were familiar with the basic four food groups, but approximately 23 per cent did not understand the importance of eating a variety of foods.

The mean nutrition score for 1,278 Kentucky teachers (grades one-six) was 68.05 per cent (14). Teachers usually knew nutrition facts more often than they understood nutritional applications. Misconceptions existed concerning food sources of nutrients, for example 12 per cent thought apples were a good source of vitamin C. The data indicated that there was a need for more training in the principles of nutrition for teachers (14).

In a study in New York state (22), mean nutrition knowledge scores of the teachers were low also. The highest possible score was 36; the mean was 18.4 with a range of 8 to 32. Seventy-eight per cent of the teachers did not know that vitamin C is needed daily or that fat soluble vitamins are stored in the body. Thirty-four per cent of Tulsa, Oklahoma teachers (16) responding to a nutrition questionnaire did not know and 15 per cent were uncertain of the composition of a Type A school lunch. Science, kindergarten, and platoon teachers were more informed concerning the Type A school lunch than other elementary teachers (16).

Byrd (23) tested nutrition knowledge of early elementary classroom teachers in Florida. The scores for a fifty-item test ranged from 18 to

44 with a mean of 29.21. Misconceptions concerning functions, classifications, and sources of nutrients were common. Seventy-eight per cent of the teachers could not select a good source of vitamin A, 33 per cent thought calcium was needed for body energy, and 41 per cent thought vitamin C converted sunshine to ascorbic acid.

In 1979, a Nutrition Education Needs Assessment Project (34) was conducted in Florida to measure nutrition knowledge, attitudes, and habits of preschool, elementary, and secondary teachers, foodservice managers, and pre-kindergarten through senior high students. The elementary teachers' mean nutrition knowledge score was 38.11 with a standard deviation of 5.75, the highest possible score was 55. In general, teachers scored higher on food preparation items than on other areas assessed; performance was lower on test items regarding energy, iron, absorption, sugar intake, and food storage practices (34).

Nutrition Attitudes

Attitudes have been defined as organized and consistent measures of thinking, feeling, and reacting (35). A link between attitudes and behavior is possible; some psychologists believe attitudes predispose to behavior (36). Most researchers, however, think attitudes are one of several variables that influence our behavior, but they are not the sole determinant (37).

According to Foley et al. (38) attitudes are a vital link between nutrition knowledge and application. Attitudes explain food preferences and food behaviors in different cultures. Also, knowledge of a community's food attitudes can increase the likelihood for nutrition education success and communicating nutrition information to the entire family (38).

In Nebraska (19), teachers indicated that behavioral change is more dependent upon attitudes than on knowledge. Seventy-three per cent said that knowing the basic four food groups does not guarantee the selection of an adequate diet. To achieve desirable eating habits, good nutrition attitudes were rated by 91 per cent of the teachers as more important than teaching foods and nutrition facts. Peterson and Kies (19) concluded that nutrition attitudes were important factors in determining food consumption patterns and that present nutrition instruction methods should be revised. Wesley (14) agreed that changes in food habits involves more than learning nutrition facts.

Ninety-four per cent of the teachers in a Florida (23) survey thought nutrition could not be taught without the use of scientific terminology in early elementary grades and 90 per cent thought creating favorable food attitudes and good food habits was more important than teaching facts about nutrition. Most of the Florida grades K-three teachers (89 per cent) thought children were more likely to develop good food habits if they were exposed to a wide variety of foods and 81 per cent agreed or strongly agreed that changes in food habits were easier to achieve if learning activities related specifically to children's interests (23).

Results from a five-month nutrition education program in North Carolina (32) showed that when teachers wanted to teach nutrition, they were more successful in improving food attitudes than when they felt forced into teaching it. Also, the program was more effective when school administrators and foodservice supervisors recognized the importance of nutrition education (32).

Baker (39) conducted a nutrition education program for approximately 200 children in Iowa. She reported that teachers and peers can influence children's food attitudes either positively or negatively. In one experimental classroom a boy expressed his liking for squash and the ratings for that vegetable increased in his class. While in another class, the teacher made negative comments about squash and the ratings by the students fell.

In the Florida Needs Assessment Project (34), pre-kindergarten to senior high teachers agreed that nutrition was a part of good health. Most teachers (96 per cent) indicated that they were concerned about eating a balanced diet and over 80 per cent reported that they enjoyed the social aspect of eating.

In 1978, a mail survey of elementary schools was conducted in Manhattan, Kansas (31) to determine the influence of teachers' attitudes toward the school lunch program on student participation. Teachers neither agreed nor disagreed that developing favorable attitudes toward food is more important than teaching facts about nutrition. In general, teachers thought that children developed better eating habits if they were offered a wide variety of foods, and that the eating habits of younger children could be influenced more than those of older students. Also, a significant relationship was found between teachers' perceived view of food quality and student participation in the school lunch program (31).

Dietary Practices

Few studies have been conducted to determine dietary practices of elementary teachers. In 1970, over 300 California (17) teachers were

interviewed about their eating habits. More than 80 per cent thought their diet was adequate. Seventy-five per cent reported that they ate breakfast every day because they thought breakfast was needed for proper body functioning. Nearly all of the teachers said a well-balanced diet could be obtained from a grocery store. Over 10 per cent however said that specialty food stores sold more of the "right foods." Approximately 80 per cent of the teachers could list the four food groups, 17 per cent could describe three of the four, and the remainder could not identify the food groups.

Dietary practice information was obtained from pre-kindergarten to senior high teachers in the Florida Needs Assessment Project (34). Over half of the teachers considered their own diets nutritious. Most (80 per cent) of the teachers always or usually ate breakfast. Snacks usually consisted of fruits, rather than "sweets," vegetables or high-fat/high-salt foods. The majority of the teachers drank fruit juices, daily, rather than soft drinks. Ninety-four per cent of the Florida teachers disagreed or strongly disagreed that crash dieting was a good way to lose weight.

Interrelationships Among Nutrition Knowledge, Training, and Attitudes

A common assumption is that inclusion of nutrition education courses in undergraduate programs of study for elementary teachers will result in greater knowledge of nutrition. The data of Petersen and Kies (19) from the Nebraska study did not support that assumption. They suggested that limited retention of facts from formal nutrition courses, nutrition knowledge acquired from other sources, or lack of precision of their test instrument were possible explanations for their results (19).

Kentucky teachers who had completed a nutrition course received higher scores on a nutrition knowledge test than those without nutrition training (14). Nutrition knowledge scores increased with increasing number of credit hours in nutrition up to six hours (14). Carver and Lewis (40) reported similar results when they compared nutrition knowledge test scores of nutritionists and pre-service and in-service elementary school teachers. Correlation coefficients tended to increase (mean test scores vs. level of training in nutrition) as the number of formal nutrition courses increased (40).

In New York (22), home economics majors and those who had taken nutrition courses in college had significantly higher nutrition knowledge scores than teachers with elementary education degrees. There were no significant differences in mean scores attributable to age, sex, education level, previous enrollment in biology or short-term nutrition courses, or whether or not a teacher was teaching nutrition at the present time (22). Teachers' age, sex, ethnic background, years of teaching experience, grade level taught, nutrition training, or the school's nutrition education program did not affect nutrition knowledge scores of Florida teachers (23).

The relationship between nutrition knowledge and attitudes has not been clearly established. Spollen (22) reported a slight positive correlation between teachers' knowledge of nutrition and their attitudes toward nutrition education. Neither Petersen and Kies (19) nor Byrd (23) found a correlation between nutrition knowledge of elementary teachers and their attitudes toward teaching nutrition.

METHODOLOGY

The research proposal for the Kansas Nutrition Education and Training Program Needs Assessment Project and appropriate forms were submitted to and approved by the Kansas State University Committee on Research Involving Human Subjects.

Selection of the Sample

Stratified random sampling was used for the Needs Assessment Project. To obtain a sample representative of elementary schools throughout the state of Kansas, Unified School Districts (USD) were selected to be used in this study from each Board of Education District (BED); and then individual schools, or the sampling units, were selected randomly from the USD's. The number of schools ($N = 103$) selected in this study from each BED was proportional to the number of schools in each district, which was an approximate 10 per cent sample of elementary schools in the state. In selecting schools, simple random sampling within a BED was used with the following exceptions:

- 1) One or more schools from the largest USD were selected so the largest USD in each BED would be represented.
- 2) Minor adjustments were made to include some schools with breakfast programs.
- 3) The one school district in the state not participating in the National School Lunch Program was added.

The initial sample was reviewed by School Food Service Specialists on the staff of the Kansas State Department of Education. Based on their suggestions the list was modified slightly. General information regarding the

Kansas Education Districts and the Nutrition Training Program Needs Assessment original sampling plan is given in Appendix A.

Fifteen schools in the original sample were replaced; eight were replaced because they did not include fifth graders. One school had been closed at the end of the 1978-79 school year and six schools refused to participate. One large urban school district which had four schools in the original sample refused and was not replaced because a comparable replacement district was not available. Also, one school in another district which had a special health project was not replaced for the same reason. The other school not replaced refused after data collection had begun. The proportionality of the resultant sample (N = 97 schools) is indicated on the Kansas map of the USD's and BED's (Figure 1).

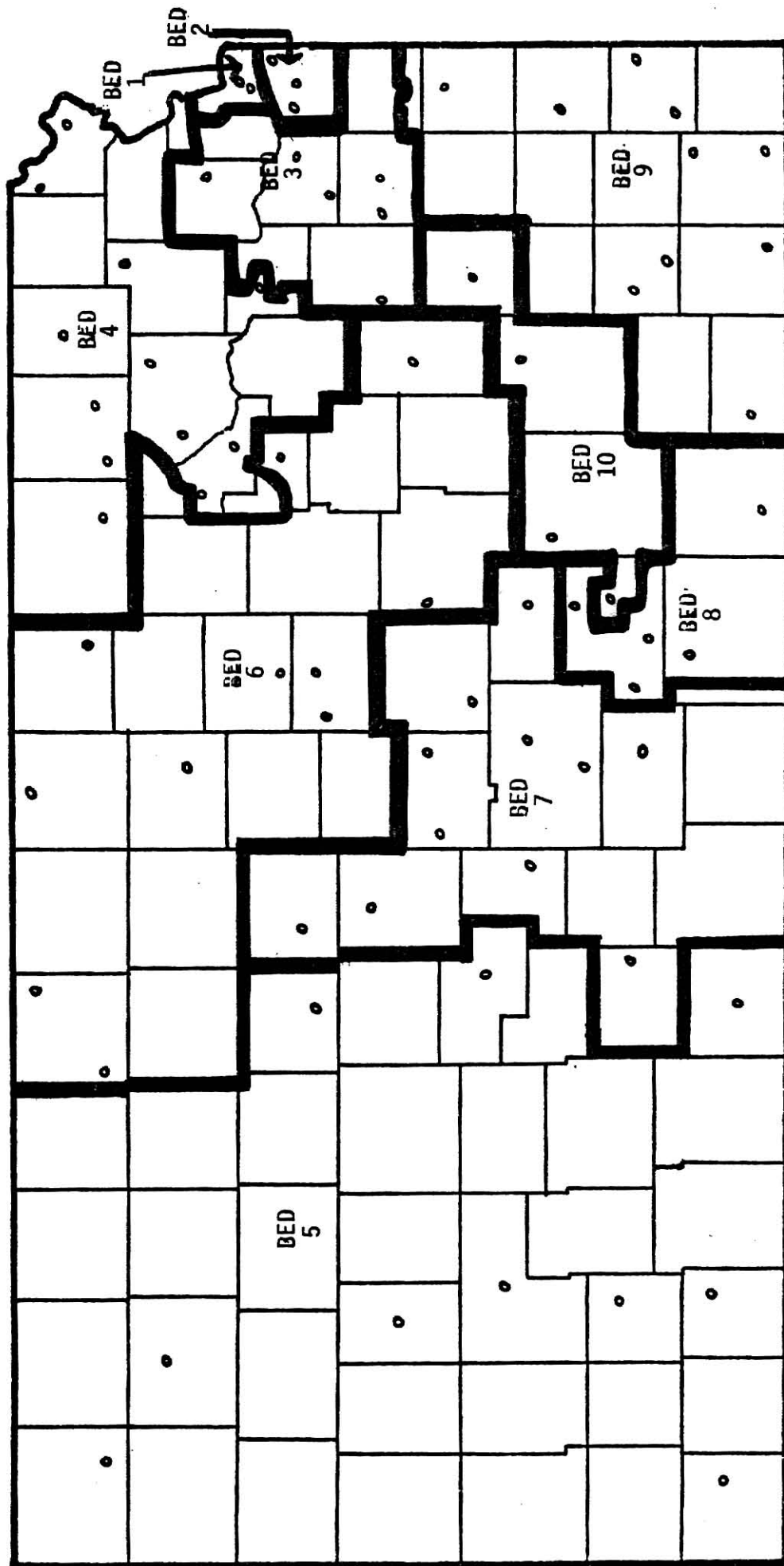
USD superintendents were contacted by mail and asked to grant approval for the participation of school(s) in their district (Appendix B). If permission was not granted for a particular school to participate in the Needs Assessment Project, the school was replaced at random with a different school from the same USD if possible or from a randomly selected USD.

The three target groups for the Needs Assessment Project were:

- 1) All elementary school teachers, grades K-6, in the selected schools.
- 2) All foodservice personnel involved in food preparation for the selected schools including managers and other employees, but excluding district level foodservice personnel.
- 3) All fifth grade students attending selected schools.

This thesis includes a description of the data collection and analysis for the elementary school teachers, grades K-6. Homeroom

FIG. 1. Geographic location of Unified School Districts (USD) in the study sample by Board of Education Districts (BED)



self-contained, platoon or departmentalized, and team teachers were selected to participate in the study. Full-time special education, learning disability, physical education, and music teachers were not included.

USD superintendents granting approval for participation of the school(s) in their district, supplied the name(s) of principal(s) at the selected school(s). Principal(s) at each school in the sample were contacted by mail and asked to supply the names and addresses of all K-6 elementary teachers (Appendix B).

The Instrument

Factors considered in the selection of the instrument to assess nutrition training, knowledge, attitudes, and dietary behavior of elementary teachers were objectivity, reliability, and validity. Twelve objective type instruments from a variety of studies or surveys of teachers were reviewed.

The teacher edition of the Nutrition Education Assessment Series (NEAS), developed by Planning, Development, and Evaluation (PDE) Associates, Inc. was selected (Appendix C). The PDE instrument was selected for several reasons: (a) the instrument was designed specifically for the NET Program (41); (b) several of the PDE series had been selected for use in the National Evaluation of NETP;¹ (c) the data from the Florida study indicated that the test was reliable for use with group data (42). The instrument contained 115 items designed to measure nutrition knowledge, attitudes and dietary and nutrition education practices. Fifty-five

¹Conversation with Dr. Thomas Ferb, Director, NETP. Evaluation Study, ABT Associated Inc., Cambridge, Mass.

multiple choice items were used to assess knowledge in the following domains: basic nutrition vocabulary and concepts, nutrition practices, food selection, food preparation, storage procedures, and advertising claims (Table 1). To measure nutrition-related attitudes and practices and nutrition education practices, teachers were asked to respond to sixty items on Likert-type scales in the following areas: the value of proper nutrition, food selection, eating patterns, beverage consumption, advertising claims, and school food. Teachers' occupational attitudes and habits were assessed by their responses to in-service needs, classroom, and cafeteria practices, and coordination of nutrition education learning activities among teachers, parents, and foodservice personnel. A form (Appendix D) was developed for teachers to record responses and to collect general information (demographic data and educational background). Also a number of items were developed on nutrition education practices in the classroom. These items were designed to secure information on aspects of nutrition education not included in the PDE instrument.

Information on the reliability and content validity of the instrument was supplied by PDE Associates. Two reliability estimates were provided by the test developers. The Kuder-Richardson reliability coefficient (KR-20) is based on the proportion of persons passing each item and the standard deviation of the total scores (43). The KR-20 for the teacher edition was +0.883 (41). The odd/even estimate, a measure of internal consistency, indicates the degree to which the two halves of the test are equivalent (43). The odd/even estimate was 0.78.¹

¹Telephone conversation with Dr. Tom Freijo, President, PDE Associates, Inc.

Table 1: Areas of measurement and corresponding items in knowledge, attitudes, and habits domains of the Nutrition Education Assessment Series, Teacher Edition¹

area of measurement	number of items	item numbers
<u>Knowledge Domain:</u>		
basic vocabulary/basic concepts	14	1-14
nutrition practices	12	15-26
food selection	14	27-40
food preparation	7	41-47
storage procedures	3	48-50
advertising claims	5	51-55
Total Knowledge	55	1-55
<u>General Attitudes/Habits Domain:</u>		
value of proper nutrition	5	56-59, 72
food selection	9	60-62, 73-78
eating patterns	5	63, 79-82
beverage consumption	5	64, 83-86
advertising claims	7	65-69, 87, 88
school food	4	70, 71, 89, 90
Total General Attitudes/Habits	35	56-90
<u>Occupational Attitudes/Habits:</u>		
coordination between teachers and foodservice personnel	4	105, 108, 109, 111
classroom practices	13	92-101, 106, 107, 114
cafeteria practices	1	102
in-service needs	5	91, 110, 112, 113, 115
coordination with parents	2	103, 104
Total Occupational Attitudes/Habits	25	91-115

¹PDE Associates, Inc., 1979.

Construct validity is the ability of a test to measure an individual's achievement based on their previous nutrition training (44) and it is assessed by testing groups, with and without nutrition training. A higher nutrition knowledge score for persons with nutrition training indicates content and construct validity of the test. The test was given to two classes of Principles of Nutrition students (N = 45) and two classes of Organizational Behavior Business Management students (N = 69). Because of difficulties in processing the mark-sense cards, the last five items of the fifty-five item test were not analyzed. The reliability estimates, mean scores, standard deviations, ranges, and the t-value are summarized in Table 2.

Table 2: Data from pilot study to evaluate reliability and validity of test instrument for elementary teachers and foodservice personnel

student group	highest possible score	mean score and standard deviation	range	reliability estimate KR-20
nutrition (N = 45)	50	40.58 \pm 4.23	29-48	0.70
business (N = 69)	50	30.26 \pm 5.86	19-44	0.74

t-value = 10.90 ($P \leq 0.001$)

Distribution of Survey Instruments

Packets including letters to the teachers describing the study and instruction for completing the questionnaire, PDE instruments, the teacher response sheets, and return envelopes were assembled and mailed to principals in each school with directions for distribution to the teachers in the sample (Appendix E). Questionnaires were mailed to 109

kindergarten and 980 other elementary teachers (grades one to six) in the ninety-seven schools which represented approximately 11.6 per cent and 7.6 per cent of all Kansas teachers for each of the two groups, respectively. The names of the teachers did not appear on the forms used to collect data. Identification code numbers were employed for maintaining confidentiality of information, identifying the location of the teacher, and for facilitating follow-up mailings. Following completion of the questionnaires by the teachers, they were returned to the investigator. A follow-up letter (Appendix E) was sent to teachers who did not complete the entire response sheet. Approximately three weeks after the date of the initial mailing, a follow-up mailing was sent to nonrespondents (Appendix E). A checklist (Appendix F) was developed to record the school's name, address, USD number, the teacher's name, identification number, and grade level taught. The date each survey form was sent, returned, and date of follow-up mailings, when necessary, were recorded on the checklist during the distribution phase. The return rate ($N = 819$) from kindergarten teachers was 76.1 per cent and 75.1 per cent from other elementary teachers (grades one to six).

Data Analysis

Data from the NEAS instrument were reviewed and keypunched directly from the response sheets. The general information section of the teacher response sheet was hand-coded by the investigator (Appendix G). Frequency distributions and percentages were compiled for each response category for all items on the NEAS instrument and general information section.

Analysis of Nutrition Knowledge Scores

The general linear models (45) analysis of variance was used to analyze teacher test scores. Independent variables included in the initial analysis were the following: Board of Education District, Unified School District, and sampled schools. Means, standard deviations, and coefficients of variation were computed for total, per cent, and nutrition knowledge domain scores devised by PDE (Table 1). The knowledge section of the test was scored according to the answer key provided by the test developers (Appendix H).

Analysis of variance also was used to study relationships between selected demographic variables and nutrition knowledge scores. The demographic variables considered were grade level taught, whether college/continuing education nutrition course(s) had been completed and whether or not the teachers were teaching nutrition to their students.

Analysis of Attitudes, Practices, and Nutrition Education Practices Scores

A group of thirteen faculty members and graduate students trained in nutrition were asked to evaluate items 56-110 on the teacher edition of the NEAS (Appendix I) to assist in developing scales from the items. Three scales were developed from the fifty-five items: nutrition-related attitudes scale, nutrition-related practices scale and nutrition education practices scale. Responses of the panel were used to determine items to include on each scale and to devise relative weighting of item responses in constructing scales. This approach for developing attitudes/practices scales was suggested by the test developer, since the clusters

of items in Table 1 were for purposes of categorization and discussion and were not intended for computation of scores.¹

Each nutrition trained person read the attitude statements (items 56-71) and indicated on a response sheet whether they believed agreement or disagreement represented a positive attitude related to nutrition among teachers. Uncertainty was indicated with a question mark. They also indicated the degree of importance they attached to each of the items in terms of its value to positive nutrition attitudes, using the following scale:

- 1 = extremely important
- 2 = important
- 3 = somewhat important
- 4 = not very important
- 5 = definitely not important
- 6 = uncertain

Nutrition-related practices (items 72-90) were evaluated as desirable, undesirable, or neither desirable nor undesirable. Each nutrition-related practice also was reviewed for its importance using the scale listed above and rated accordingly. Nutrition education classroom practices (items 71-110) were evaluated for their importance for teachers in elementary grades using the same scale.

Frequency distributions from the nutrition trained panel were compiled on each item (Tables 28-31, Appendix J). A review panel (project co-directors, project coordinator, and the investigator) analyzed each statement and decided whether agreement or disagreement represented a positive attitude, based on responses from the nutrition trained group.

¹Telephone conversation with Dr. Tom Freijo, President, PDE Associates, Inc.

Six items (70, 77, 80, 81, 84, and 101) were excluded because of lack of agreement by the nutrition trained panel (Appendix J).

When fewer than eight of the thirteen nutrition trained panel members (61.5 per cent) agreed that an item represented a positive or negative attitude or practice the question was excluded (Tables 28-31, Appendix J) with one exception (item 81). Although 61.5 per cent of the nutrition trained panel was uncertain that item 81 represented a positive attitude, the decision of the review panel was to include the item because it was postulated to receive a lower weighted score. Item 101 in the nutrition education practice section was excluded because of lack of agreement among the nutrition trained panel members as to the importance of the practice.

The means and standard deviations of the importance responses of the nutrition trained panel were computed and arranged in ascending order. Responses were scored according to the rating scale presented above. Then a priority score grid was developed for categorizing panel responses that provided a method for considering both means and standard deviations simultaneously (Table 3). The review panel assigned weighted values, one to five, with five representing a high degree of importance of the attitude or practice with low variance among the nutrition trained panel members. Conversely low importance ratings of an attitude or a practice with low, medium, or high variance was assigned a value of one. Intermediate values (4, 3, and 2) were assigned to categories with importance ratings in the mid-range between the two extremes and with high, medium, or low variance. Table 31 (Appendix J) is a listing of the means and standard deviations computed from importance ratings of the nutrition trained panel and the resultant priority scores assigned to each item.

Table 3: Priority score grid for evaluation of nutrition trained panel responses on importance of nutrition-related attitudes and practices and nutrition education practices items

mean scores	standard deviations		
	0 - 0.77	0.77 - 1.34	1.34 - 1.99
1.00 - 1.85	5	4	3
1.85 - 2.34	3	2	2
2.34 - 3.92	1	1	1

Scale: 1 = extremely important, 2 = important, 3 = somewhat important, 4 = not very important, 5 = definitely not important, and 6 = uncertain.

The four response categories in the nutrition-related attitudes and practices and nutrition education practices sections of the test were assigned numerical values from four to one. A score of four represented the most positive attitude or practice and one the least positive. The direction of scoring was reversed on items for which disagreement on the attitude items or infrequent on the practices items represented the most positive response. In Table 4 items comprising each of the three scales are tabulated.

Scores for attitudes and practices and nutrition education practices for each teacher were computed by multiplying the priority scores by responses to items included in each scale. Weighted scores in each section (nutrition-related attitudes and practices and nutrition education practices) were added. The minimum score for each of the three scales was computed by multiplying the lowest possible score, or one, by the priority score for each item on the scale. The maximum score was

Table 4: Items comprising scales constructed from attitudes/habits domains (Teacher Edition)

scale ¹	response categories ²	positive items ³	negative items
nutrition-related attitudes	strongly agree agree disagree strongly disagree	56, 57 59, 63 64, 66, 68 69, 71	58, 60, 61, 62 65, 67
nutrition-related practices	always usually seldom never	72, 74, 75 76, 79, 84 87, 88, 89	73, 78, 82, 83 86, 90
nutrition education practices	frequently sometimes rarely never	91-100 102-110	

¹Items 70, 77, 80, 81, 85, and 101 were excluded because of lack of agreement among the nutrition trained panel members.

²Responses were scored 4 to 1 for positive items, as listed, and 1 to 4 for negative items.

³Item number refers to test question number in Nutrition Education Assessment Series, Teacher edition, PDE Associates, Inc., 1979.

computed by multiplying the highest possible score, or four, by the priority score for each item on each of the respective scales. Scores were then standardized on a base of 100. The general linear models (45) analysis of variance also was used to analyze teachers' attitudes/practices scores using the same variables used in the analysis of knowledge test scores. Demographic variables used for analyzing practices scores were the same as those used previously. Correlation coefficients were computed to analyze relationships between knowledge, attitudes, and practices scores.

RESULTS AND DISCUSSION

Description of Sample

General Information

The majority of the respondents were females between the ages of twenty-one and forty years of age (Table 5). Class size ranged from fifteen to twenty-four students (Table 6). Departmentalized, team teachers, and kindergarten teachers with morning and afternoon sections taught the larger classes (thirty or more students). The smaller classes (two to fourteen students) were in rural and small town schools. The years of teaching experience of the teachers ranged from one to forty-six years (Table 7). Approximately two-thirds of the teachers held Bachelor of Science degrees (Table 8), and about one-third held Master of Science degrees. The area of specialization for over 85 per cent of the teachers was elementary education. Other areas of specialization included secondary and adult education, mathematics, science, social studies, and home economics. The results were similar to those in a study in New York (22) where over 69 per cent and 28 per cent of the teachers held Bachelor of Science and Master's degrees, respectively, and over 57 per cent specialized in elementary education.

Nutrition Training

The data indicated that 55.8 per cent of the teachers had no training in nutrition, and 44.2 per cent had some training. About 20 per cent of the teachers reported they had completed a college or continuing education nutrition course (Table 9). Approximately half of the teachers had completed the course between 1970-79, the other half prior to 1970, and most were one to three semester hour courses. About 20 per cent of

Table 5: Characteristics and grade level taught of Kansas elementary teachers

characteristic	response categories	N ¹	per cent
age	21-30	233	29.1
	31-40	222	27.7
	41-50	166	20.7
	51-60	127	15.9
	over 60	53	6.6
sex	female	727	89.0
	male	90	11.0
grade level taught	kindergarten	83	10.2
	first	109	13.4
	second	111	13.6
	third	105	12.9
	fourth	110	13.5
	fifth	148	18.1
	sixth	84	10.3
	combination of grades	65	8.0

¹N varies because of nonresponses.

Table 6: Number of students in Kansas elementary teachers classes

number of students	N	per cent
2-14	63	7.9
15-19	146	18.2
20-24	335	41.9
25-29	172	21.5
30 or more	84	10.5

Table 7: Years of teaching experience of Kansas elementary teachers

Teaching experience years	N	per cent
less than 5	151	19.0
5-9	217	27.2
10-14	166	20.8
15-19	91	11.4
20-29	117	14.7
30 or more	55	6.9

Table 8: Educational background of Kansas elementary teachers

response categories		N ¹	per cent
educational background	B.S. degree	92	11.7
	B.S. degree plus additional hours	439	55.9
	M.S. degree	84	10.7
	M.S. degree plus additional hours	165	21.0
	Ed.D. or Ph.D.	1	0.1
	other	5	0.6
area of specialization	elementary education	613	87.4
	special education	16	2.3
	other	72	10.3

¹N varies because of nonresponses.

Table 9: Reports of Kansas elementary teachers on type and recency of nutrition training

educational activity	N ¹	per cent
completed high school nutrition course		
yes	155	19.2
no	653	80.8
completed college nutrition course or continuing education course		
yes	173	21.4
no	635	78.6
time of completing college or continuing education course		
1975-1979	30	3.7
1970-1974	27	3.3
1960-1969	24	3.0
prior to 1960	50	6.2
semester hours of college or continuing education course		
1-3	87	10.8
4-6	28	3.5
7-10	4	0.5
over 10	14	1.7
attended nutrition workshop		
yes	163	20.2
no	644	79.8
time of completing nutrition workshop		
1975-1979	114	14.1
1970-1974	19	2.4
1960-1969	4	0.5
prior to 1960	3	0.4

¹N varies because of nonresponses.

Table 9: (cont.)

educational activity	N	per cent
completed correspondence course		
yes	7	0.9
no	800	99.1
topics included in nutrition courses or workshops		
nutrition concepts	304	37.6
methods for teaching nutrition	149	18.5
selection and/or development of nutrition education materials for teacher use	99	12.3
selection and/or development of nutrition education materials for use with children	133	16.5

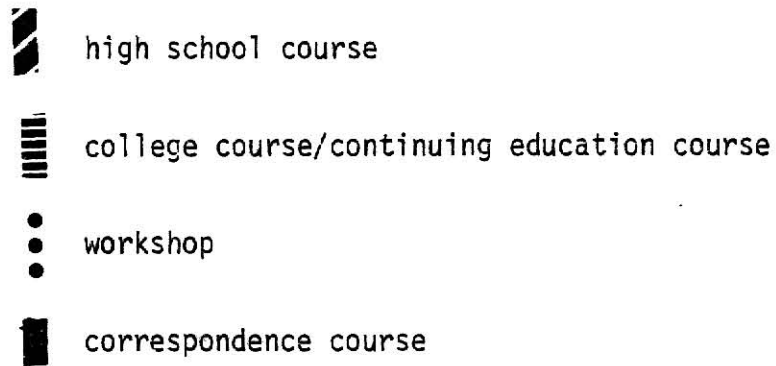
the teachers had attended nutrition workshops, most of them within the last five years. Less than one per cent of the teachers had completed a correspondence course. Studies in Florida (23), Oklahoma (16), Nebraska (19), and New York (22) showed that approximately two-thirds of the teachers had had nutrition training.

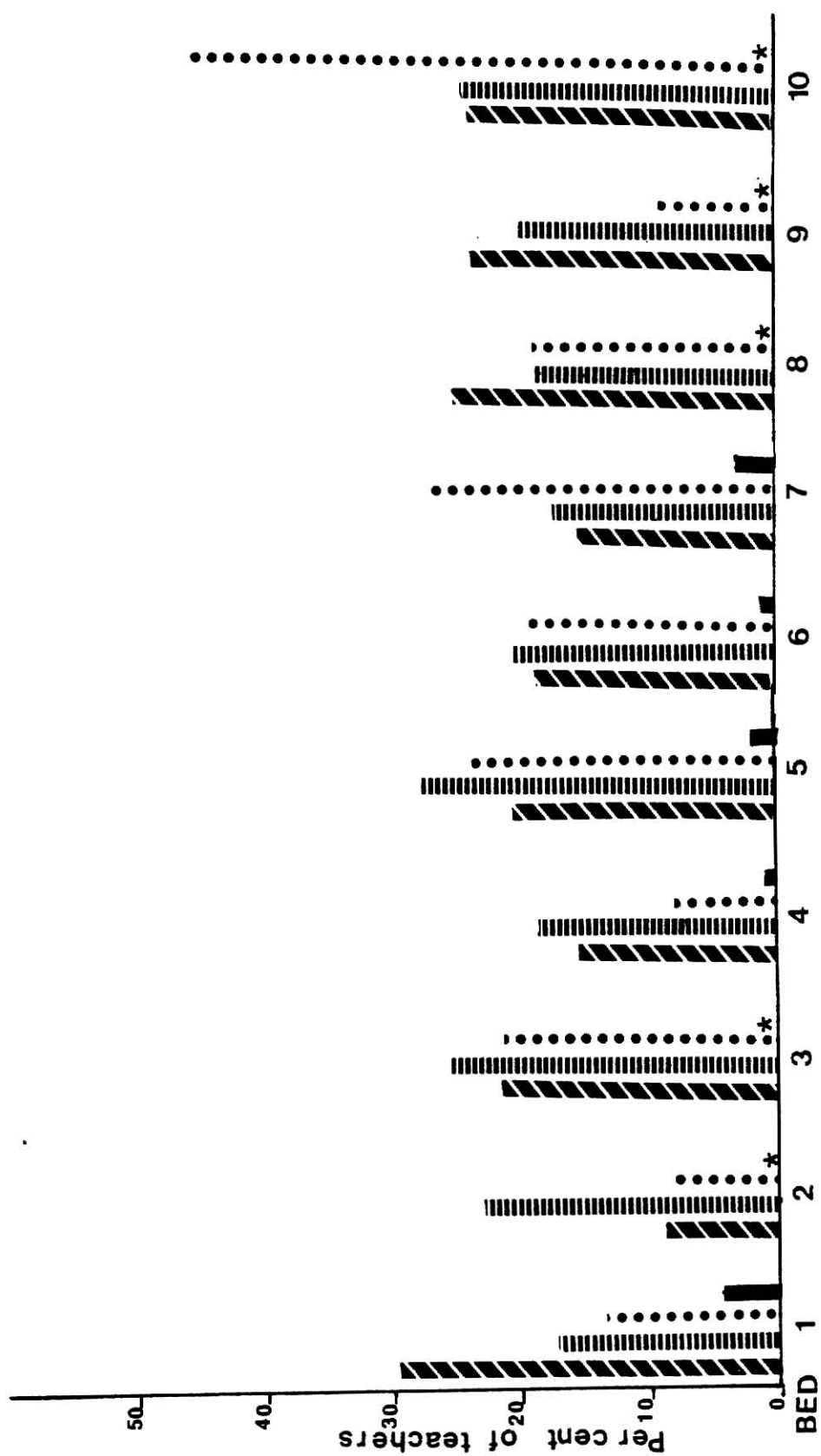
With the exception of BED 2, teachers in all BED's had had about the same amount of nutrition training in high school (Figure 2). Approximately the same proportion of teachers in each BED had completed college nutrition courses. In BED 10, southeastern and south central Kansas, more teachers reported attending nutrition workshops than teachers in other BED's (Figure 2).

The nutrition education courses or workshops had included a variety of topics (Table 9). Nutrition concepts were taught in over one-third of the classes, but less than 20 per cent included methods for teaching nutrition or selection and/or development of nutrition education materials for teachers and children. Methods of teaching nutrition were not included in college courses taken by 78 per cent of Florida (23) and 83 per cent of Nebraska teachers (19).

Preferred Nutrition Training Approaches. Provision of nutrition education materials (65.4 per cent) and attending nutrition education workshops during the school year (49.9 per cent) were listed as preferred ways of obtaining additional nutrition training by Kansas elementary teachers (Table 10). Over 80 per cent of the teachers indicated that they did not want summer school courses in nutrition. Similar information on preferred ways of obtaining additional nutrition training was found when the data were analyzed according to BED's (Figure 3). In Hawaii (2), North Dakota (23), and New York (22) teachers requested

FIG. 2. Nutrition training of Kansas elementary teachers in each Board of Education District (BED).









* = 0 per cent

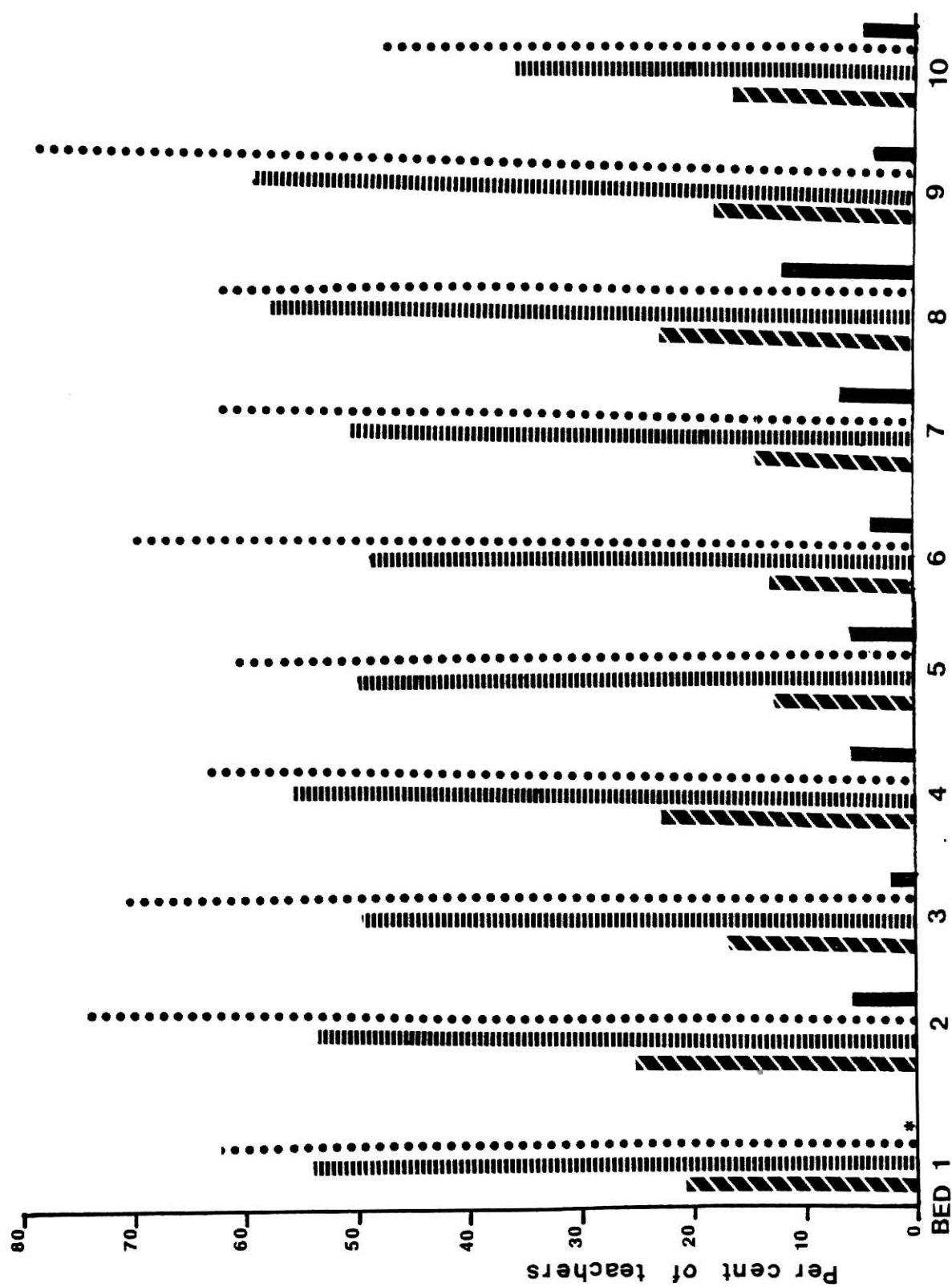
Table 10: Reports of Kansas elementary teachers on preferred ways of obtaining additional nutrition training

type of nutrition training	N ¹	per cent
summer school courses in nutrition		
yes	137	17.0
no	670	83.0
nutrition workshops during the school year		
yes	403	49.9
no	405	50.1
provision of nutrition education materials		
yes	529	65.4
no	280	34.6
other		
yes	41	5.0
no	766	95.0

¹N varies because of nonresponses.

FIG. 3. Preferred ways of obtaining additional nutrition training in each Board of Education District (BED).

-  summer school courses in nutrition education
-  nutrition workshops during the school year
-  provision of nutrition education materials
-  other



nutrition education materials for children and teacher use. Eighty-nine per cent of the Kentucky teachers (14) agreed that attending nutrition courses or workshops would be beneficial for teaching nutrition to their students. In New York and New Jersey, however, Cook et al. (8) reported that only 6 per cent of the teachers requested foods and nutrition workshops.

Recommendations on Nutrition Education in the Elementary Curriculum.

Almost all of the teachers (89.7 per cent) indicated that nutrition should be taught in all grades or in a combination of grades. Over half (54.4 per cent) reported that they were teaching nutrition to their students at the present time. Sixty-five per cent of the Tulsa, Oklahoma teachers (16) agreed that nutrition should be taught in all elementary grades. Spollen (22) found that in New York 51 per cent of the teachers were teaching nutrition to their students. In contrast, 88 per cent of the Florida teachers (23), 86 per cent of the Nebraska (19), and 75 per cent of the New York and New Jersey teachers (8) taught nutrition either as a separate unit or integrated in other subjects. Wesley (14) reported that 93 per cent of the Kentucky teachers included nutrition in their regular classroom instruction. Similar results were found in Texas (6) and North Dakota (24).

Nutrition Sources and Materials Utilized.

Nutrition sources and materials used by Kansas elementary teachers are summarized in Table 11. Science, health, and nutrition books were listed frequently as sources of nutrition information. Films and filmstrips were used by approximately 75 per cent of the teachers, over half used posters, and about one-third used pamphlets. Other nutrition sources and materials included journals

Table 11: Percentage of Kansas elementary teachers using various nutrition sources and materials

nutrition source	per cent ¹	nutrition materials	per cent ¹
school nurse	16.3	science book	21.9
physician	2.8	health book	37.4
home economist	4.2	other books	4.3
home economics teacher	3.3	pamphlets	31.7
school foodservice personnel	12.4	films	30.4
television, radio	7.7	filmstrips	42.4
extension bulletins	15.5	posters	50.9
books	30.4	curriculum guides	8.2
magazines	11.0	other	16.8
professional journals	4.1		
other	23.8		

¹N varies from 801 to 809.

such as School Food Service Journal, Food Management, Learning, and Instructor and magazines; for example, Reader's Digest and Newsweek.

Dairy Council materials were used by a number of the respondents.

In Oklahoma, one-third of the classes viewed a nutrition film during the academic year (16) and the school cafeteria was used as a resource about once per year. School nurses, textbooks, magazines, and Dairy Council materials were consulted frequently for nutrition information in New York, New Jersey (8) and Texas (6). About three-fourths of the teachers in North Dakota (24) used films/slides, charts/posters, and bulletin boards.

Integration of Nutrition in the Curriculum. Nutrition was integrated most frequently in health, science, and social studies classes (Table 12), and occasionally in art, mathematics, and spelling, and rarely in music or English. Some teachers included nutrition in other subjects such as physical education, home economics, reading, and penmanship. Hanson (24) reported that North Dakota teachers usually integrated nutrition in health or science, and occasionally in reading, physical education, social studies, art, mathematics, English, geography, or history. In Texas (6) nutrition was included frequently in health and social studies.

Table 12: Percentage of teachers reporting integration of nutrition into other subjects

subject	per cent ¹
art	20.4
music	4.2
health	63.1
science	55.9
spelling	10.9
social studies	29.7
English	6.9
math	12.4
other	4.8

¹N varies from 807 to 809.

Teachers were asked if they observed any improvement in food habits of children as a result of their nutrition instruction. Food habit

improvement was reported by 48.8 per cent of the teachers, no improvement by 30.7 per cent and 20.5 per cent indicated the question was not applicable because they did not teach nutrition to their students. Slightly better results were reported by Silvey (16); 63 per cent of the Oklahoma teachers surveyed indicated that they motivated students to improve their eating habits.

Suggestions of Teachers for the Kansas Nutrition Education Program.

All elementary teachers were asked to make suggestions for the Kansas Nutrition Education Training Program. They reported that the Dairy Council was their most valuable nutrition information source. Other helpful sources included the elementary education nutrition program developed by USD 501, Nutrition is Fun Too (NIFT), and the television series, Mulligan's Stew.

Teachers indicated needs for more nutrition education materials including curriculum guides, workbooks, worksheets, quizzes, films, posters, charts, materials for bulletin boards, food models, games, and puzzles for all grade levels. They suggested that more nutrition education materials should be developed on the following topics: nutritious breakfasts, healthful snacks, the importance of drinking milk, dental health, proper food handling, and food additives. Some teachers requested information on the dangers of eating a high sugar, low fiber, and high calorie diet.

Some teachers included additional comments on their attitude toward nutrition education in elementary schools. Reasons for not teaching nutrition included not enough time, insufficient training, and lack of support from administrators. A few teachers stated that the subject was

too advanced for elementary children. Some thought nutrition education was the responsibility of parents. Sixty-three per cent of the teachers in Tulsa, Oklahoma (16) thought they did not have sufficient time to teach nutrition. In North Dakota, 78 per cent of the teachers (24) thought that the home was the most influential factor determining a child's eating habits.

Nutrition Knowledge

Analysis of Variance of Nutrition Knowledge Test Scores

Results of the analysis of variance of the nutrition knowledge test scores are presented in Table 13. The variance component estimates of scores on the nutrition knowledge test are listed in Table 14. The nutrition knowledge test scores of the teachers in the BED's, USD's, and schools did not differ significantly. Individual differences among the teachers accounted for 93.8-95.8 per cent of the variance.

The means, standard deviations, and coefficients of variation for the nutrition knowledge test are listed in Table 15. The total score was based on fifty-five test items and the scores ranged from 13 to 51, with a mean of 38.58. Per cent scores for the nutrition knowledge test ranged from 23.6 to 92.7, with a mean of 70.15. The mean score of Florida elementary teachers (34) taking the same test was 38.11 with a per cent score of 69.29. The mean scores on the nutrition knowledge domains of the two groups of teachers were almost identical (Table 16).

The mean per cent score of Kentucky teachers (14) on a nutrition knowledge test was 68.05. Byrd (23) reported a mean per cent score of 58.44 for teachers in her study. Lower scores (41.6 and 51.5 per cent)

Table 13: Analysis of variance of nutrition knowledge test variables for Kansas elementary teachers

d.f.	source of variation				error ¹
	BED	USD/BED	school/USD/BED		
expected mean squares	$\sigma^2 + 10.55\sigma_S^2 + 19.19\sigma_{USD}^2 + 78.73\sigma_{BED}^2$	$\sigma^2 + 7.76\sigma_S^2 + 9.37\sigma_{USD}^2$	$\sigma^2 + 8.35\sigma_S^2$		σ^2
mean squares					
total score	44.94	38.45	34.29		28.05
per cent score	148.57	127.11	113.35		92.72
basic vocabulary/ basic concepts	5.53	3.57	2.22		3.00
nutrition practices	2.56	3.97	4.90		3.15
food selection	3.66	4.72	3.06		3.29
food preparation	1.72	1.20	1.71		1.17
storage procedures	0.57	0.75	5.97		0.66
advertising claims	2.99	2.02	5.66		1.46

¹Between individual teachers.

Table 14: Variance component estimates of scores of Kansas elementary teachers on the nutrition knowledge test

	variance component			
	σ^2_{BED}	$\sigma^2_{\text{USD/BED}}$	$\sigma^2_{\text{school/USD/BED}}$	$\sigma^2_{\text{error}}^1$
total score				
variance component	0.00	0.49	0.75	28.05
per cent	0.0	1.7	2.5	95.8
per cent score				
variance component	0.00	1.62	2.47	92.72
per cent	0.0	1.7	2.5	95.8
basic vocabulary/ basic concepts				
variance component	0.01	0.14	0.00	3.00
per cent	0.3	4.4	0.0	95.3
nutrition practices				
variance component	0.00	0.00	0.21	3.15
per cent	0.0	0.0	6.2	93.8
food selection				
variance component	0.00	0.18	0.00	3.29
per cent	0.0	5.1	0.0	94.9
food preparation				
variance component	0.01	0.00	0.07	1.17
per cent	0.9	0.0	5.2	93.9
storage procedures				
variance component	0.00	0.04	0.00	0.60
per cent	0.0	6.0	0.0	94.0
advertising claims				
variance component	0.00	0.09	0.00	1.46
per cent	0.2	5.6	0.0	94.2

¹Between individual teachers.

Table 15: Means, standard deviations, and coefficients of variation of the scores of Kansas elementary teachers on the nutrition knowledge test

scores	highest possible score	mean	standard deviation	coefficient of variation
				%
total score	55	38.58	5.30	14
per cent score	100	70.15	9.63	14
basic vocabulary/ basic concepts	14	10.74	1.73	16
nutrition practices	12	6.83	1.77	26
food selection	14	10.38	1.81	17
food preparation	7	5.91	1.08	18
storage procedures	3	1.50	0.78	52
advertising claims	5	3.21	1.21	38

Table 16: Comparison of nutrition knowledge test scores of Kansas and Florida elementary teachers

scores	Kansas teachers	Florida teachers ¹
	———— mean score and s.d. ————	
total	38.58 ± 5.30	38.11 ± 5.75
basic vocabulary/basic concepts	10.74 ± 1.73	10.52 ± 1.93
nutrition practices	6.83 ± 1.77	6.29 ± 1.82
food selection	10.38 ± 1.81	10.33 ± 1.67
food preparation	5.91 ± 1.08	5.87 ± 1.11
storage procedures	1.50 ± 0.78	1.40 ± 0.79
advertising claims	3.21 ± 1.21	3.06 ± 1.30

¹Source: (34).

on nutrition knowledge tests were reported for teachers in Nebraska (19) and New York (22), respectively. All of these studies used different knowledge tests than the one used in this study; therefore, results are not directly comparable.

Responses on Nutrition Knowledge Items

The responses of Kansas elementary teachers on each of the four alternatives to the nutrition knowledge questions are listed in Table 32 (Appendix K). Correct and incorrect responses on items in the knowledge domain by area of measurement are in Table 17. Selected test items from Table 17 on which the teachers scored high (≥ 90 per cent correct) or low (≤ 50 per cent correct) are discussed below.

Table 17: Responses of Kansas elementary teachers¹ on items in knowledge domain by area of measurement

item number by area of measurement ²	correct responses	incorrect responses ³
	%	%
basic vocabulary/basic concepts		
1	96.7	3.3
2	98.7	1.3
3	66.8	33.2
4	86.2	13.8
5	51.8	48.2
6	96.5	3.5
7	78.3	21.7
8	82.4	17.6
9	86.8	13.2
10	36.9	63.1
11	95.0	5.0
12	55.6	44.4
13	67.8	32.2
14	73.3	26.7
nutrition practices		
15	30.3	69.7
16	23.0	77.0
17	65.4	34.6
18	46.2	53.8
19	81.3	18.7
20	53.0	47.0
21	19.8	80.2
22	92.4	7.6
23	92.2	7.8
24	41.3	58.7
25	78.8	21.2
26	57.6	42.4

¹N = 819.

²Item number refers to test question number in Nutrition Education Assessment Series, Teacher edition, PDE Associates, Inc., 1979.

³Includes incorrect and nonresponses.

Table 17: (cont.)

item number by area of measurement	correct responses	incorrect responses
	%	%
food selection		
27	90.0	10.0
28	76.2	23.8
29	44.8	55.2
30	51.6	48.4
31	95.1	4.9
32	73.5	26.5
33	89.0	11.0
34	96.7	3.3
35	55.2	44.8
36	74.0	26.0
37	87.9	12.1
38	34.1	65.9
39	89.9	10.1
40	77.7	22.3
food preparation		
41	53.1	46.9
42	87.7	12.3
43	78.5	21.5
44	88.3	11.7
45	89.1	10.9
46	95.0	5.0
47	98.3	1.7
storage procedure		
48	80.5	19.5
49	49.2	50.8
50	19.9	80.1
advertising claims		
51	67.9	32.1
52	72.0	28.0
53	58.9	41.1
54	49.1	50.9
55	72.3	27.7

Basic Vocabulary/Basic Concepts. Over 96 per cent of the Kansas teachers selected the correct definition of a calorie (item 1) and knew that table salt was sodium chloride (item 2). Over 94 per cent identified the two major types of carbohydrate (item 6) and knew that fibers were not absorbed by the body, but aid in regularity (item 11). Almost all the teachers in the Florida Needs Assessment Project could define a calorie, and identify sodium chloride, carbohydrate types, and the function of fiber. Byrd (23) reported that 66 per cent of the teachers knew the definition of a calorie and 76 per cent could identify the two major types of carbohydrates. About one-third of the teachers in the Kansas Needs Assessment Project and less than half in the Florida project (34) knew that the body absorbs about 10 per cent of the iron present in food (item 10).

Nutrition Practices. Over 92 per cent of the Kansas teachers were aware of the harmful effects of cholesterol on the blood vessels (item 23) and knew that bread is the major source of carbohydrate in many diets (item 22). Approximately 80 per cent of the teachers underestimated the amount of sugar the average American consumes per year (item 21). About half of the teachers did not know that nutrient needs increase during pregnancy (item 18) nor that excessive consumption of vitamin A could lead to toxicity (item 24). Approximately one-fourth of the teachers knew that a deficit of 3,500 calories (item 15) or exercising vigorously for eight hours is required to lose one pound of body fat (item 16). Similar results were found in the Florida Needs Assessment (34); about one-fourth of the Florida teachers knew the average amount of sugar consumed per year by Americans and responded correctly to energy intake/expenditure and body weight items. Nearly all of the teachers could

identify bread as a carbohydrate source and knew the relationship between cholesterol and vascular disease. Byrd (23) reported that about 25 per cent of the teachers in her survey thought weight control was accomplished by omitting fats and carbohydrates from the diet. Approximately 80 per cent of the teachers in the Nebraska survey (19) thought concentrated sweets were essential for body energy needs.

Food Selection. Almost all (90.4 per cent) of the Kansas teachers could identify a good source of high quality protein (item 27) or a good protein substitute for meat (item 31). Similar results were reported in the Florida Needs Assessment Project (34). Teachers in Kansas were less certain of good food sources of iron; for example, approximately 40 per cent of the teachers thought carrots and green peas were good sources (item 29). Twelve per cent of the teachers in a Kentucky study (14) thought milk was a good source of iron. In both Kansas and Florida Needs Assessment Projects, only one-third of the teachers could classify a product in a food group (item 38) when nutrition information was supplied in the form of a nutritional label.

Food Preparation. Nearly all of the Kansas teachers (95 per cent) knew the reason why turkey should not be stuffed until immediately before baking (item 46). Over 98 per cent understood why fresh pork needs to be heated to an internal temperature of 170 degrees F. (item 47).

Storage Procedures and Advertising Claims. About 80 per cent of the teachers in Kansas thought meat should never be refrozen, even if there were ice crystals still in it (item 50). Over 40 per cent thought honey was considerably more nutritious than white sugar (item 54).

Nutrition-Related Attitudes and Practices and Nutrition Education Practices

Analysis of Variance of Nutrition-Related Attitudes and Practices and Nutrition Education Practices

The analysis of variance of the nutrition-related attitudes and practices and nutrition education practice variables is presented in Tables 18-20. The variance component estimates of the scores are listed in Table 19. Individual differences among the teachers accounted for 86.8 to 95.6 per cent of the variance. Compared to the variance for nutrition knowledge or attitudes and practice scores, more of the variance for nutrition education practices was attributable to differences among USD's. The means, standard deviations, and coefficients of variation for the nutrition-related attitudes and practices and nutrition education practice items are listed in Table 20. The highest possible score was 100. The relative attitude score was 25.0 per cent higher than the nutrition-related practices scores and 65.9 per cent higher than the nutrition education practices.

Responses on General Attitudes/Habits Items

The responses to the nutrition attitude questions of Kansas elementary teachers are listed in Table 21. Selected attitudes of the teachers are discussed below according to the categories devised by PDE (Table 1).

Value of Proper Nutrition. In general, Kansas elementary teachers have a favorable attitude toward nutrition. Ninety-nine per cent of the teachers strongly agreed or agreed that good eating habits are important to good health (item 56) and 95 per cent indicated that they were interested in the nutritional value of the food they ate (item 59). Over 80 per cent thought their current diet was well-balanced nutritionally

Table 18: Analysis of variance of nutrition-related attitudes and practices and nutrition education practices test variables for Kansas elementary teachers

	source of variation			
	BED	USD/BED	school/USD/BED	error ¹
d.f.	9	65	23	697
expected mean squares	$\sigma^2 + 10.47\sigma_S^2 + 19.08\sigma_{USD}^2 + 78.06\sigma_{BED}^2$	$\sigma^2 + 7.68\sigma_S^2 + 9.28\sigma_{USD}^2$	$\sigma^2 + 8.30\sigma_S^2$	σ^2
mean squares				
nutrition-related attitudes	159.98	70.58	84.69	67.39
nutrition-related practices	109.71	141.08	144.94	105.14
nutrition education practice	1027.20	581.60	373.73	0.26

¹ Between individual teachers.

Table 19: Variance component estimates of scores of Kansas elementary teachers on the nutrition-related attitudes and practices and nutrition education practices

	variance component			
	σ^2_{BED}	$\sigma^2_{USD/BED}$	$\sigma^2_{school/USD/BED}$	$\sigma^2_{error}^1$
nutrition-related attitudes				
variance component	1.24	0.00	2.08	67.39
per cent	1.8	0.0	2.9	95.3
nutrition-related practices				
variance component	0.00	0.00	4.80	105.14
per cent	0.0	0.0	4.4	95.6
nutrition education practices				
variance component	2.29	23.30	13.74	0.26
per cent	0.8	7.8	4.6	86.8

¹ Between individual teachers.

Table 20: Means, standard deviations, and coefficients of variation of the scores of Kansas elementary teachers on the nutrition-related attitudes and practices and nutrition education practices

scores	highest possible score	mean	standard deviation	coefficient of variation
				%
nutrition-related attitudes	100	74.42	8.21	11
nutrition-related practices	100	59.54	10.25	17
nutrition education practices	100	44.87	14.72	33

Table 21: General attitudes/habits of Kansas elementary teachers toward nutrition¹

item number by area of ² measurement	item	strongly agree	%	agree	%	disagree	%	strongly disagree	%
value of proper nutrition									
56	Good eating habits are important to good health.	84.8		14.2		0.5		0.5	
57	My current diet is a well-balanced nutritious one.	19.5		64.0		15.5		1.0	
58	Crash dieting is a good way to lose weight.	1.2		2.8		36.5		59.5	
59	I am interested in the nutritional value of what I eat.	36.9		58.0		4.6		0.5	
		always		usually		seldom		never	
72	I combine good eating habits and exercise to maintain proper body weight.	7.5		58.9		31.5		2.1	

¹N varies from 799 to 813.

²Item number refers to test question number in Nutrition Education Assessment Series, Teacher edition, PDE Associates, Inc., 1979.

Table 21: (cont.)

item number by area of measurement	item	strongly agree		agree		disagree		strongly disagree	
		%		%		%		%	
food selection									
60	Foods higher in nutrient content are less tasty than other foods.	2.4		6.5		60.5		30.6	
61	If people simply eat what they like, they will have a nutritious diet.	1.1		3.3		48.8		46.8	
62	The best way to lose weight is to eliminate foods containing fat from the diet.	4.9		22.0		62.1		11.0	
		always		usually		seldom		never	
73	I eat sweets for snacks.	1.6		34.9		58.2		5.3	
74	I eat fruit for snacks.	2.2		51.9		43.8		2.1	
75	I eat vegetables for snacks.	1.0		28.3		61.0		9.7	
76	I select foods to make up a balanced diet.	13.0		76.6		9.0		1.4	
77	I use a vitamin supplement.	16.5		24.2		29.5		29.8	
78	I eat foods like potato chips, corn chips, or cheese curls for snacks.	1.5		18.0		62.6		17.9	

Table 21: (cont.)

item number by area of measurement	item	strongly agree	%	agree	%	disagree	%	strongly disagree
eating patterns								
63	Part of the pleasure of eating is sitting and talking with people I like.	23.0		62.4		12.4		2.2
		always		usually		seldom		never
79	I eat breakfast.	55.2		24.2		14.6		6.0
80	I eat a snack before going to bed.	2.2		20.4		60.9		16.5
81	I eat a snack between lunch and supper.	4.0		33.9		50.4		11.7
82	After I finish a meal I feel "stuffed."	1.7		24.7		71.0		2.6
beverage consumption								
		strongly agree		agree		disagree		strongly disagree
64	It is a good nutritional habit to drink several glasses of water daily.	63.8		33.0		2.1		1.1

Table 21: (cont.)

item number by area of measurement	item	always		usually		seldom		never	
		%		%		%		%	
83	Between meals I drink "soft drinks."	3.7		19.9		53.7		22.7	
84	I drink fruit or vegetable juices every day.	26.1		35.8		33.6		4.5	
85	I drink more than one cup of coffee in a day.	29.5		23.3		13.7		33.5	
86	I drink two or more ounces of alcohol in a day.	0.6		3.3		33.2		62.9	
advertising claims									
65	Foods which supply more nutrients cost more than foods with fewer nutrients.	strongly agree		agree		disagree		strongly disagree	
		2.1		8.9		63.3		25.7	
66	In general, highly processed foods have fewer nutrients than less highly processed foods.	19.0		58.8		19.2		3.0	
67	In America today, it is nearly impossible to get all the nutrients one needs unless one takes a vitamin supplement.	3.0		15.0		61.1		20.9	
68	Foods grown with natural fertilizers are more nutritious than foods grown with synthetic fertilizers.	6.2		27.2		57.1		9.5	

Table 21: (cont.)

item number by area of measurement	item	strongly agree	%	agree	%	disagree	strongly disagree
		%		%		%	
69	The labels on packaged food help the wise consumer to decide how nutritious a food is.	24.0		65.3		9.6	1.1
		always		usually		seldom	never
87	I read the ingredients label on a package of processed food before I buy it.	7.1		35.7		47.9	9.3
88	I read the nutritional label on the foods I buy.	4.7		36.3		48.3	10.7
		strongly agree		agree		disagree	strongly disagree
school food							
70	The lunches served in school are tasty.	10.3		63.5		17.5	8.7
71	The lunches served in school are good for me.	6.9		49.8		34.4	8.9

Table 21: (cont.)

item number by area of measurement	item				
		always	usually	seldom	never
		%	%	%	%
89	I eat the lunches served at school.	14.5	25.3	38.3	21.9
90	I buy soft drinks or "sweets" at school for snacks.	2.0	11.4	39.5	47.1

(item 57). The majority of the teachers in the Florida Needs Assessment Project agreed good eating habits were important to good health and over half considered their own diets nutritious. Over 89 per cent of the teachers interviewed in a California study thought their own diet was adequate (17).

Food Selection. Nearly 90 per cent of the teachers in the present study reported that they selected food to obtain a balanced diet (item 76). Sweets were always or usually selected for snacks by over 35 per cent (item 83). Most of the Florida (34) teachers were concerned about eating a balanced diet.

Eating Patterns and Beverage Consumption. Most of the Kansas teachers (87.4 per cent) seldom or never snacked before going to bed, and 62.1 per cent did not snack between lunch and supper (items 80 and 81). Over half did not drink soft drinks between meals (item 83). Nearly all of the teachers agreed that it was a good nutritional habit to drink several glasses of water daily (item 64) and about 80 per cent always or usually ate breakfast (item 79). Most of the respondents in the Florida Needs Assessment (34) ate breakfast and also did not eat snacks at bedtime or between meals. Breakfast was consumed daily by 75 per cent of the teachers interviewed in a California study (17).

Advertising Claims. Ninety per cent of the Kansas teachers thought the nutrient labels on packaged foods help consumers determine the value of food (item 69). Less than half of the teachers, however, usually or always read ingredients or nutritional labels on the foods they purchase (items 87 and 88). Similar results were found in Florida (34); the

majority of the teachers thought that package labels help consumers determine nutrient values.

School Food. In this survey, teacher participation in school lunch programs was low. Only 40 per cent indicated that they always or usually ate lunches served at school (item 89). About three-fourths of the teachers agreed that the lunches served in school were tasty (item 70), but fewer (56.7 per cent) agreed that the lunches served were good for them (item 71). Although over half of the Florida teachers (34) considered school lunch tasty and good for them, they did not eat the school lunches. Studies in Kansas (31) and Kentucky (14) indicated that teachers had positive attitudes toward the school lunch program. Most teachers in the Kansas (31) study believed the food served at school was of good quality. They indicated that school lunches were too expensive, too starchy, too high calorie, and that they would like larger servings of vegetables and salads. Fifty-five per cent of the teachers in an Oklahoma (16) study agreed that school lunches were nutritionally adequate. Petersen and Kies (19) reported that 84 per cent of the teachers in their study thought school lunches were nutritional.

Responses on Occupational Attitudes/Habits Items

The responses to the occupational attitude and habit items of Kansas elementary teachers are listed in Table 22. Selected attitudes of the teachers are discussed below.

Coordination Between Teachers and Foodservice Personnel. Disagreement existed concerning the competence of foodservice personnel to provide nutrition instruction to students. About half of the Kansas teachers thought they were competent (item 111) and the other half

Table 22: Occupational attitudes/habits of Kansas elementary teachers

item number by area of measurement ¹	item	N ²	fre- quently %	some- times %	rarely %	never %
coordination between teacher and foodservice personnel						
105	I coordinate my nutrition instruction with the lunchroom meals in my school.	804	3.5	22.8	28.8	44.9
108	I use the school cafeteria personnel as resource people in my classroom.	804	3.1	13.3	19.5	64.1
109	I use the school cafeteria as a laboratory for instruction.	805	1.9	10.2	21.5	66.4
<div>strongly agree</div> <div>agree</div> <div>disagree</div> <div>strongly disagree</div>						
111	Most school foodservice personnel are competent to provide nutrition instruction to my students.	791	9.6	48.0	35.9	6.4

¹Item number refers to test question number in Nutrition Education Assessment Series, Teacher edition, PDE Associates, Inc., 1979.

²N varies because of nonresponses.

Table 22: (cont.)

item number by area of measurement	item	N	fre- quently %	some- times %	rarely %	never %
classroom practices						
92	I discuss with my students the food habits of other world cultures.	812	7.5	48.4	32.0	12.1
93	I teach vocabulary associated with food and nutrition	811	19.4	52.2	22.4	6.0
94	I give instruction related to safe practices in food storage.	810	4.2	27.7	40.2	27.9
95	I have food and/or nutrition-related displays in my classroom.	811	8.0	54.4	26.3	11.3
96	I give instruction related to selecting a nutritionally adequate diet.	811	19.4	54.5	19.0	7.1
97	I give instruction related to food production.	811	6.0	52.9	30.2	10.9
98	I give instruction related to food preparation.	811	2.8	34.2	45.0	18.0
99	I teach functions of various food additives.	807	1.6	13.4	40.0	45.0
100	I discuss with my students the importance of selecting nourishing snacks.	810	25.4	51.6	16.8	6.2

Table 22: (cont.)

item number by area of measurement	item	N	fre- quently %	some- times %	rarely %	never %
101	I give special nutrition guidance to the overweight and underweight students in my class.	812	1.5	14.7	36.4	47.4
106	I utilize activities that introduce my students to new foods.	811	3.9	31.6	36.1	28.4
107	I involve my students in planning school lunch menus.	804	0.6	12.0	21.0	66.4
			strongly agree	agree	disagree	strongly disagree
114	I have sufficient materials to provide nutrition instruction to my students.	806	5.8	37.7	43.3	13.2
			fre- quently	some- times	rarely	never
cafeteria practices						
102	I observe the school eating habits of all my students.	811	23.5	31.2	26.4	18.9

Table 22: (cont.)

item number by area of measurement	item	N	fre- quently %	some- times %	rarely %	never %
in-service needs						
91	I participate in staff development activities related to teaching nutrition.	800	8.9	29.1	27.2	34.8
110	I read books and articles related to nutrition.	810	18.9	46.2	27.4	7.5
			strongly agree	agree	disagree	strongly disagree
112	Most school foodservice personnel are in need of nutrition in-service training.	763	9.6	47.4	38.9	4.1
113	I feel adequately trained to teach nutrition-related topics to my students.	802	7.2	46.9	38.9	7.0
115	I feel nutrition education related in-service training needs of teachers are being met adequately in my school.	796	4.1	29.8	52.1	14.0

Table 22: (cont.)

item number by area of measurement	item	N	fre- quently %	some- times %	rarely %	never %
coordination with parents						
103	I talk with parents about the nutritional needs of their children.	809	1.6	22.8	39.1	36.5
104	I talk with parents about the eating habits of their children.	811	2.5	27.7	38.6	31.2

disagreed. Over 83 per cent of the teachers rarely or never used school foodservice personnel as resource people in the classroom (item 108) or used the school cafeteria as a laboratory for instruction (item 109). Similar results were found in the Florida Needs Assessment Project (34); most Florida teachers also did not use school cafeteria personnel as resource people in the classroom or use the cafeteria for nutrition instruction. The majority of the Florida teachers thought that most school foodservice personnel were capable of teaching nutrition, but they also thought that foodservice personnel needed in-service training.

In contrast, the Kansas teachers in Perkins' (31) study believed that school lunch personnel were qualified for their jobs and that cooperation with school foodservice employees was important for effective nutrition education. They also indicated that foodservice workers had favorable attitudes toward the school lunch program. Spollen (22) reported that 90 per cent of the New York teachers she surveyed used their school lunch program as a nutrition teaching resource. Silvey (16) reported that 61 per cent of the Oklahoma teachers in her study had not considered the school cafeteria as a teaching resource.

Classroom and Cafeteria Practices. Only 43.5 per cent of the teachers in the Kansas Needs Assessment Project thought that they had sufficient materials to provide nutrition instruction to their students (item 114). In general, teachers either frequently or sometimes taught vocabulary associated with food and nutrition (item 93) and discussed food habits of other world cultures with their students (item 92). Over 70 per cent of the teachers frequently or sometimes discussed the importance of selecting nourishing snacks (item 100) and nutritionally adequate diets with their students (item 96). However, 68.1 per cent of

the teachers rarely or never taught safe food storage practices (item 94) or involved their students in planning school lunch menus (item 107). About half of the teachers observed the school eating habits of their students and the other half indicated that they rarely or never observed them (item 102).

In the Florida Needs Assessment Project (34) the majority of the teachers reported that they taught food and nutrition vocabulary, food selection, food preparation, and food habits of other cultures. Perkins et al. (31) reported that the Kansas teachers in their study encouraged student participation in menu planning and thought it would reduce plate waste. Over half of the teachers surveyed in Nebraska (19) expressed doubt concerning the usefulness of classroom menu planning and tours of school kitchens.

In-Service Needs. About half of the teachers in this study thought that they were adequately trained to teach nutrition-related topics to their students (item 113). Similar findings were reported in studies conducted in Kentucky (14), Hawaii (2), Oklahoma (16), and New York (22). About two-thirds of the teachers in the Kansas and Florida (34) Needs Assessment Projects believed that nutrition education-related in-service training was inadequate.

Coordination with Parents. Approximately two-thirds of the teachers in Kansas and Florida (34) rarely or never talked with parents about the nutritional needs or eating habits of their children (items 103 and 104). Elementary teachers surveyed in Kansas (31) were supportive of parental involvement in the school lunch program because they thought parents could improve their children's school lunch attitudes.

Interrelationships Among the Variables

Nutrition Knowledge and Selected Characteristics of Teachers

Analysis of variance indicated that there were differences in nutrition knowledge scores of Kansas elementary teachers attributable to grade level taught, whether teachers had completed college/continuing education course(s) on nutrition, and whether or not they were teaching nutrition at the present time (Tables 23, 24). Two scores differed among teachers by grade level, food preparation and advertising claims (Table 24); the range of scores was 4.75 ± 0.43 to 6.20 ± 0.29 (of 7 points possible) and 2.17 ± 0.50 to 3.78 ± 0.26 (of 5 points possible, respectively).

Total and per cent scores, and scores on basic vocabulary, nutrition practices, and food selection of teachers who had had college or continuing education course(s) in nutrition were higher ($P \leq 0.001$) than those without nutrition courses. On advertising claims items, nutrition trained teachers also scored higher ($P \leq 0.01$) than non-nutrition trained teachers.

Teachers who were teaching nutrition to their students at the time of the study achieved higher total, per cent, food selection, and nutrition practice scores ($P \leq 0.001$) than those who were not teaching nutrition. They scored higher also on basic vocabulary ($P \leq 0.01$) and food preparation ($P \leq 0.05$) items than non-nutrition teaching instructors.

In contrast, Spollen (22) found no significant differences among teachers who taught nutrition and those who did not teach the subject. Age, sex, college degree (B.S. or M.S.) had no significant effect on mean nutrition scores of New York teachers. Home economics majors had higher

Table 23: F ratios for analysis of effects of selected variables in nutrition knowledge scores of Kansas elementary teachers¹

scores	mean square error ²	F values for effects of:		
		grade level ³	college/con- tinuing education course ⁴	presently teaching nutrition ⁵
total score	26.14	0.92	22.75***	22.58***
per cent score	86.41	0.92	22.75***	22.58***
basic vocabulary	2.93	0.66	11.60***	10.38**
nutrition practices	3.19	0.69	12.33***	11.20***
food selection	3.09	1.11	13.07***	17.65***
food preparation	1.09	2.81**	1.19	5.28*
food storage	0.60	1.07	3.74	2.82
advertising claims	1.51	2.29*	7.15**	1.93

¹N = 764.

²Degrees of freedom = 754.

³Eight groups: kindergarten, grades 1-6, other (combination of grades).

⁴Two groups: those completing a college or continuing education nutrition course.

⁵Two groups: those presently teaching nutrition to elementary students and those not teaching nutrition.

* $P \leq 0.05$ ** $P \leq 0.01$ *** $P \leq 0.001$

Table 24: Least square means and standard errors for nutrition knowledge scores of Kansas elementary teachers from analysis of effects of selected variables¹

score	variable	least square means and standard errors
total score	college/continuing education course	
	yes	39.24 ± 0.69
	no	37.05 ± 0.57
	teaching nutrition	
per cent score	yes	39.04 ± 0.62
	no	37.25 ± 0.62
	college/continuing education course	
	yes	71.34 ± 1.26
basic vocabulary	no	67.36 ± 1.03
	teaching nutrition	
	yes	70.98 ± 1.13
	no	67.73 ± 1.13
nutrition practices	college/continuing education course	
	yes	11.14 ± 0.23
	no	10.62 ± 0.19
	teaching nutrition	
food selection	yes	11.08 ± 0.21
	no	10.68 ± 0.21
	college/continuing education course	
	yes	7.02 ± 0.24
	no	6.46 ± 0.20
	teaching nutrition	
	yes	6.96 ± 0.22
	no	6.52 ± 0.22
	college/continuing education course	
	yes	10.68 ± 0.24
	no	10.11 ± 0.20

¹Data presented only for significant findings.

Table 24: (cont.)

score	variable	least square means and standard errors
food selection	teaching nutrition	
	yes	10.66 ± 0.21
	no	10.12 ± 0.21
food preparation	grade level	
	K	5.98 ± 0.22
	1	4.87 ± 0.35
	2	5.65 ± 0.47
	3	6.20 ± 0.29
	4	5.79 ± 0.30
	5	4.75 ± 0.43
	6	5.75 ± 0.33
	other	5.97 ± 0.05
	teaching nutrition	
	yes	5.71 ± 0.13
	no	5.53 ± 0.13
advertising claims	grade level	
	K	3.78 ± 0.26
	1	3.26 ± 0.41
	2	3.10 ± 0.55
	3	3.05 ± 0.34
	4	2.46 ± 0.36
	5	2.17 ± 0.50
	6	2.90 ± 0.39
	other	3.30 ± 0.06
	college/continuing education	
	course	
	yes	3.15 ± 0.17
	no	2.86 ± 0.14

mean scores ($P \leq 0.001$) than elementary education majors. Teachers who had taken a college nutrition course(s) scored higher ($P \leq 0.05$) than those without training in nutrition. There were no significant differences among teachers with some nutrition training (high school, adult education, extension), and those without training.

Byrd (23) computed an analysis of variance to determine whether or not significant differences at or beyond the 0.05 level existed between nutrition knowledge scores and teachers' personal characteristics. There were no significant differences in the nutrition knowledge scores in relation to age, sex, ethnic background, grade level taught, number of years of teaching experience, home economics background, college nutrition course including methods, or the type of nutrition education program in the school.

In a Kentucky study (14) teachers who had completed a college nutrition course(s), achieved a higher per cent score on a nutrition knowledge test, than those without college preparation in nutrition. Nutrition knowledge scores increased as credit hours in nutrition increased, up to six hours, but did not increase significantly with additional hours. Petersen and Kies (19) found that inclusion of nutrition courses in the undergraduate curriculum of elementary teachers did not result in higher scores on a nutrition knowledge test.

Nutrition-Related Attitudes and Practices, Nutrition Education Practices and Selected Characteristics of Teachers

Analysis of variance indicated that there were differences in nutrition attitudes and practices and nutrition education practice scores of Kansas elementary teachers attributable to grade level taught, whether a teacher had completed a college/continuing education course(s) on

nutrition, and whether or not they were teaching nutrition at the present time (Tables 25, 26). Significant differences among teachers by grade level were found on the two scores computed to assess practices (Table 26). The ranges of scores for nutrition practices and nutrition education practices for grade level taught were 53.71 ± 3.38 to 69.90 ± 4.52 and 32.07 ± 4.67 to 51.51 ± 6.60 , respectively (Table 26).

Nutrition-related attitude and practice scores of teachers who had completed a college or continuing education course(s) in nutrition were higher ($P \leq 0.05$) than for those without nutrition courses; nutrition-trained teachers scored higher ($P \leq 0.01$) than those without nutrition training on the nutrition education practices scores. Scores also were higher for nutrition-related attitude ($P \leq 0.01$) and practice ($P \leq 0.001$) scores of teachers who were teaching nutrition to their students at the time of the study than those who were not teaching nutrition. Nutrition education practice scores of teachers who were teaching nutrition also were higher ($P \leq 0.001$) than those who were not teaching the subject. McMurray (6) found no significant differences between nutrition education attitudes and college training in nutrition.

Correlations of Nutrition Knowledge, Attitudes, and Practices Scores

Correlations among scores for nutrition knowledge, attitudes, practice, and nutrition education practices are listed in Table 27. Nutrition knowledge scores were correlated positively ($P \leq 0.001$) with scores for nutrition-related attitudes. Nutrition-related practices scores and nutrition knowledge scores also were correlated positively ($P \leq 0.001$ or $P \leq 0.01$) except for knowledge of proper nutrition practices, which was not correlated with nutrition-related practices. Nutrition education

Table 25: F ratios for analysis of effects of selected variables in nutrition-related attitudes and practices and nutrition education practices scores of Kansas elementary teachers¹

scores	mean square error ²	F values for effects of:		
		grade level ³	college/con- tinuing education course ⁴	presently teaching nutrition ⁵
nutrition-related attitudes	67.34	0.88	3.92*	8.67**
nutrition-related practices	101.60	2.13*	5.48*	25.19***
nutrition education practices	216.85	2.37*	9.10**	224.99***

¹N varies from 757 to 760.

²Degrees of freedom varies from 747 to 750.

³Eight groups: kindergarten, grades 1-6, other (combination of grades).

⁴Two groups: those completing a college or continuing education nutrition course.

⁵Two groups: those presently teaching nutrition to elementary students and those not teaching nutrition.

* $P \leq 0.05$ ** $P \leq 0.01$ *** $P \leq 0.001$

Table 26: Least square means and standard errors for nutrition-related attitudes and practices and nutrition education practices scores of Kansas elementary teachers from analysis of effects of selected variables¹

score	variable	least square means and standard errors
nutrition-related attitudes	college/continuing education course	
	yes	74.13 ± 1.12
	no	72.66 ± 0.92
	teaching nutrition	
	yes	74.29 ± 1.00
	no	72.50 ± 1.00
nutrition-related practices	grade level	
	K	62.63 ± 2.10
	1	53.71 ± 3.38
	2	69.90 ± 4.52
	3	60.22 ± 2.82
	4	59.22 ± 2.93
	5	58.44 ± 4.14
	6	66.83 ± 3.20
	other	59.85 ± 0.46
	college/continuing education course	
	yes	62.41 ± 1.37
	no	60.29 ± 1.12
	teaching nutrition	
	yes	63.21 ± 1.22
	no	59.48 ± 1.22
nutrition education practices	grade level	
	K	46.00 ± 3.08
	1	33.96 ± 4.94
	2	51.51 ± 6.60
	3	46.53 ± 4.12
	4	41.92 ± 4.29
	5	39.72 ± 6.05
	6	32.07 ± 4.67
	other	45.81 ± 0.67

¹Data presented only for significant findings.

Table 26: (cont.)

score	variable	least square means and standard errors
nutrition education practices	college/continuing education course	
	yes	44.19 \pm 2.00
	no	40.19 \pm 1.64
	teaching nutrition	
	yes	50.33 \pm 1.79
	no	34.05 \pm 1.79

Table 27: Correlation coefficients of teachers' scores for nutrition knowledge, nutrition-related attitudes and practices, and nutrition education practices

score	T-score	basic voc	nutr pract	food sel	food prep	stor proc	adv claims	nutr attit	nutr pract
total score									
basic vocabulary	0.72 ¹								
nutrition practices	0.69	0.33							
food selection	0.71	0.37	0.31						
food preparation	0.60	0.30	0.31	0.35					
storage procedures	0.43	0.25	0.23	0.15	0.20				
advertising claims	0.62	0.33	0.34	0.32	0.29	0.21			
nutrition-related attitudes	0.26	0.17	0.15	0.20	0.13	0.12	0.17		
nutrition-related practices	0.20	0.16	0.05n.s.	0.18	0.11**	0.16	0.12	0.33	
nutrition education practices	0.10*	0.07*	0.01n.s.	0.10**	0.07*	0.04n.s.	0.06n.s.	0.16	0.29

¹ Unlabeled coefficients are significant at $P \leq 0.001$.

* $P \leq 0.05$ ** $P \leq 0.01$ n.s. = non-significant

practice scores, however, were correlated positively ($P \leq 0.05$, $P \leq 0.01$, and $P \leq 0.001$) with nutrition knowledge scores with the exception of nutrition practices, storage procedures, and advertising claims.

Spollen (22) found a slight positive correlation between nutrition knowledge and attitudes of elementary teachers, however Byrd (23) and Petersen and Kies (19) found no correlation between the two.

SUMMARY

Elementary teachers have an important role in the nutritional welfare of children, and their training and attitudes can influence the success of nutrition education. However, few elementary teachers have adequate training in nutrition education during their teacher preparation.

As a part of the Kansas Nutrition Education and Training Program Needs Assessment Project, a mail survey was conducted to assess nutrition-related training, knowledge, attitudes, and dietary practices of elementary teachers in ninety-seven randomly selected schools. Completed instruments were obtained from 817 teachers; the return rate was approximately 75 per cent.

The majority of the teachers were females, between twenty-one and forty years of age. Over half held Bachelor of Science (B.S.) degrees with specialization in elementary education and had completed additional credit hours beyond the B.S. degree.

Kansas elementary teachers had a favorable attitude toward nutrition. Almost all of the teachers agreed good eating habits were important to good health, and that they were interested in the nutritional value of the food they ate. Approximately 81 per cent of the respondents thought their current diet was well-balanced nutritionally.

Almost all of the teachers indicated that nutrition should be taught in all elementary grades or in a combination of grades. Over half reported that they were teaching nutrition to their students at the time of the study.

Nutrition was integrated most frequently in health, science, and social studies, occasionally in art, mathematics, or spelling, and rarely

in music or English. Science, health, and nutrition books were listed frequently as nutrition information sources. Films and filmstrips were used by approximately 75 per cent of the teachers, over half used posters, and about one-third used pamphlets. Over 83 per cent of the teachers rarely or never used school foodservice personnel as resource people in the classroom or the school cafeteria as a laboratory for instruction.

The nutrition knowledge test scores of the teachers throughout the state or among the districts and schools did not differ significantly. Per cent scores for the nutrition knowledge test ranged from 23.6 to 92.7 per cent with a mean of 70.15.

Teachers who had had a college or continuing education nutrition course or who were teaching nutrition presently had higher nutrition knowledge, attitudes, and practice scores, but lower nutrition education practice scores than teachers without nutrition training or who were not teaching the subject. In general, nutrition knowledge scores were correlated positively with scores for nutrition-related attitudes and practices. Nutrition education practice scores were correlated negatively with nutrition knowledge scores for the majority of the items.

Only half of the Kansas elementary teachers considered themselves adequately trained to teach nutrition to their students, and fewer than half thought they had sufficient materials for nutrition instruction. Nutrition workshops during the school year and increasing the availability of nutrition education materials were listed as the preferred ways to receive additional nutrition training.

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APPENDIXES

APPENDIX A
Sampling Plan Information

KANSAS NUTRITION EDUCATION AND TRAINING PROGRAM
NEEDS ASSESSMENT PROJECT
Kansas State University
in cooperation with the Kansas State
Department of Education

Sampling Plan

	Kansas Board of Education Districts (BED)									
	1	2	3	4	5	6	7	8	9	10
Kansas Education District Data										
Number of USD's ² in each BED	4	6	23	42	70	48	41	20	37	16
Number of elementary schools in each BED	54	75	74	147	154	143	126	59	115	111
Per cent of total Kansas elementary schools	5.1	7.1	7.0	13.9	14.6	13.5	11.9	5.6	10.9	10.5
Total number of elementary students in each BED	17,534	26,845	17,546	32,571	25,856	25,252	21,623	14,800	23,383	32,484
Total number of 5th graders in each BED	2,922	4,474	2,924	5,428	4,309	4,208	3,603	2,466	3,897	5,414
Per cent of total 5th graders in Kansas	7.4	11.3	7.4	13.7	10.9	10.6	9.1	6.2	9.8	13.7
NETP Needs Assessment Sampling Data										
Total number of schools sampled in each BED	5	7	7	14	15	14	12	6	11	10
Total number of USD's sampled	2	3	6	11	11	11	10	5	10	4
Total number of 5th graders sampled in each BED	353	506	280	615	563	580	678	246	245	764
5th graders sampled in BED Total 5th graders in BED = %	12.0	11.3	9.6	11.3	13.1	13.8	18.8	10.0	13.9	14.1
5th graders sampled in BED Total 5th graders in state = %	6.9	9.9	5.5	11.9	10.9	11.3	13.2	4.7	10.6	14.9

¹Based on information extracted from the Kansas Educational Directory, 1978-79.

²Unified School District.

Sampling Plan (cont.)

	Kansas Board of Education Districts (BED)									
	1	2	3	4	5	6	7	8	9	10
Kansas Education District Data										
Total number of kindergarten teachers in each BED	58	80	26	56	32	47	37	17	26	101
Total number of elementary teachers in each BED	767	1,777	310	658	445	659	412	257	349	1,477
NETP Needs Assessment Sampling Data										
Number kindergarten teachers in sampled schools	5	10	6	17	16	17	10	6	10	18
Number elementary teachers in sample in each BED	102	148	89	186	230	208	131	93	174	271
Number kindergarten teachers sampled in BED										
Total number kindergarten teachers in BED = %	8.6	12.5	23.0	30.4	50.0	36.2	27.0	35.3	38.5	17.8
Number elementary teachers sampled in BED										
Total number elementary teachers in BED = %	13.3	8.3	28.7	28.3	51.7	31.6	31.8	36.2	49.9	18.4

¹Based on information extracted from the Kansas Educational Directory, 1978-1979.

APPENDIX B

Initial Correspondence to School Administrators

(Kansas State Department of Education Letterhead)

(Initial Letter to Superintendent in Selected Schools)

October 16, 1979

Dear

The Child Nutrition Amendment, P.L. 95-166, enacted by the United States Congress in 1977, provided funds to the Kansas State Department of Education for a Nutrition Education and Training Program. As a part of this legislation, a continuing needs assessment is required. Kansas State University in cooperation with the Kansas State Department of Education will conduct a needs assessment during the 1979-80 school year. The purposes of the needs assessment are to measure dietary behavior and nutrition attitudes and knowledge of children, elementary teachers, and foodservice personnel.

An approximate 10 per cent representative sample of elementary schools throughout the state will be asked to participate in the needs assessment project. The following school(s) in your district is among the 103 Kansas elementary schools randomly selected to be included in the project:

We are requesting your approval for data collection in the school(s) identified above, which would involve fifth grade children, teachers, and school foodservice personnel.

According to the data collection plan, all fifth graders at selected schools would be interviewed to determine their dietary intake using a dietary recall method. Each interview would require only about 15 minutes. Also, each child's height, weight, and skinfold thickness would be measured. Questionnaires concerning nutrition attitudes and knowledge would be administered to each class of fifth graders. Signed consents from parents and children would be obtained prior to data collection. Data would be collected during an on-site visit on a preconfirmed date to each school by a team of two to five trained interviewers from Kansas State University. On-site visits would be conducted between January 14 and April 18, 1980. The date and schedule would be planned in cooperation with the principal at each school, with as little disruption of school operations as possible.

Data from teachers would be obtained by questionnaires which would be mailed in mid-January to all elementary teachers in each school. Questionnaires also would be used to collect information from foodservice personnel at each school. If food is not prepared at the selected school, foodservice personnel at the school from where the food is transported also would be asked to complete the questionnaire. The teachers and foodservice personnel questionnaires would measure nutrition knowledge and attitudes and dietary behavior. We would need to have lists of elementary teachers and foodservice personnel provided from your office or by the principal in selected schools.

If you agree to participate in the needs assessment project, we would keep you fully informed concerning data collection procedures and you would be provided with a summary of the findings. As superintendent, your cooperation is vital to the success of this project. Results of this needs assessment will provide baseline data for planning the Nutrition Education and Training Program for the State of Kansas.

Please indicate your willingness for the schools and personnel in your district to be included in this project on the enclosed form. An envelope is provided for returning the form. We need your reply within one week to continue planning for the project. If you have any questions, please direct them to any member of the project staff at Kansas State University (913-532-5521) or to the School Food Service Section of the Kansas State Department of Education (913-296-2276).

Thank you for your cooperation. We look forward to the potential of working with you on this project.

Sincerely,

Cynthia S. Foley
Coordinator
Needs Assessment Project

Approved by:

Rita A. Hamman, Director
School Food Service Section

Allene G. Vaden, Ph.D., R.D.
Project Co-Director and
Associate Professor of Dietetics,
Restaurant and Institutional
Management

Percy Sillin, Ph.D.
Assistant Commissioner, Agency
Services
Kansas State Department of
Education

G. Kathleen Newell, Ph.D., R.D.
Project Co-Director and
Associate Professor of Foods and
Nutrition
Kansas State University

CSF:ns

Reply Form for Needs Assessment Project

_____ Approval is granted for the school or schools selected from the district to participate in the Nutrition Education Training Program Needs Assessment Project.

_____ Approval not granted.

Signed: _____
(Superintendent/s Name--Typed)
Superintendent, U.S.D. _____

If you agree to participate, please list the names of principals at the selected schools below.

School	Principal
--------	-----------

(Letterhead)

(Initial Letter to Principal of Selected Schools)

The Child Nutrition Amendment, P.L. 95-166, enacted by the United States Congress in 1977, provided funds to the Kansas State Department of Education for a Nutrition Education and Training Program. As a part of this legislation, a continuing needs assessment is required. Kansas State University in cooperation with the Kansas State Department of Education will conduct a needs assessment during the 1979-80 school year. The purposes of the needs assessment are to measure dietary behavior and nutrition attitudes and knowledge of children, elementary teachers, and foodservice personnel.

The superintendent of your school district has granted permission for your school to be one of 103 Kansas elementary schools randomly selected for this project. Approximately 10 per cent of the Kansas elementary schools have been asked to participate in the needs assessment.

According to the data collection plan, all fifth graders at selected schools will be interviewed to determine their dietary intake using a dietary recall method. Each interview will require only about 15 minutes. Also, each child's height, weight, and skinfold thickness will be measured. Questionnaires concerning nutrition attitudes and knowledge will be administered to each class of fifth graders as a group. Completion of the questionnaire will require about 20 to 30 minutes.

Signed consents from parents and children will be obtained prior to data collection. Data will be collected during an on-site visit on a preconfirmed date to each school by a team of two to five trained interviewers from Kansas State University. On-site visits will be conducted between January 14 and April 18, 1980.

You will be contacted soon regarding the tentative date of the on-site visit and other details. We will plan the visit in cooperation with both you and the fifth grade teachers so interference with school operations will be minimal.

Data from teachers will be obtained by questionnaires which will be mailed in mid-January to all elementary teachers in each school. Questionnaires also will be used to collect information from foodservice personnel at each school. If food is not prepared at the selected school, foodservice personnel at the school from where the food is transported also will be asked to complete the questionnaire. The teachers and foodservice personnel questionnaires will measure nutrition knowledge and attitudes and dietary behavior.

We will keep you fully informed concerning data collection procedures and both you and your superintendent will be provided with a summary of findings. Results of this needs assessment will provide baseline data for planning the Nutrition Education and Training Program for the State of Kansas.

Please complete the enclosed form and return to us by the end of the week. If you have not already done so, we would like you to provide names and home addresses of elementary teachers and foodservice personnel, which can be included on, or attached to, the form. An envelope is provided for returning the form and attached lists.

Thank you for your cooperation. We look forward to meeting and working with you on this project.

Sincerely,

Cynthia S. Foley
Coordinator
Needs Assessment Project

Approved:

Rita A. Hamman, Director
School Food Service Section

Allene G. Vaden, Ph.D., R.D.
Project Co-Director and
Associate Professor of Dietetics,
Restaurant and Institutional
Management

Percy Sillin, Ph.D.
Assistant Commissioner, Agency
Services
Kansas State Department of
Education

G. Kathleen Newell, Ph.D., R.D.
Project Co-Director and
Associate Professor of Foods and
Nutrition
Kansas State University

ns

105

Please list names, grade level, and home address of all teachers at this school, grades K-6. If this school is a middle school, list all teachers assigned to levels up to grade 6.

Names of Elementary Teachers	Grade Level Taught	Home Address

Please return in attached envelope to: Dr. Allene G. Vaden, Kansas State University.

APPENDIX C
The Instrument

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Planning, Development & Evaluation, Associates, Inc. on June 16, 1980.

NUTRITION EDUCATION ASSESSMENT SERIES

Teacher Edition

PUBLISHED BY:

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DIRECTIONS: For items 1-55, select the best answer. Mark only one answer for each item.

1. A Calorie is best defined as:
 - a. a unit of measure for vitamins
 - b. a unit of measure for energy
 - c. a substitute for meat
 - d. the name for a balanced meal
2. Sodium chloride is another name for:
 - a. table salt
 - b. white sugar
 - c. brown sugar
 - d. vitamin C
3. An essential nutrient is one which:
 - a. the body produces without food
 - b. the body needs but cannot produce enough of
 - c. the body produces when it eats food
 - d. is inexpensive and healthy
4. Dextrose is a kind of:
 - a. vitamin
 - b. carbohydrate
 - c. mineral
 - d. protein
5. Which of the following supplies the body with the most Calories?
 - a. an ounce of protein
 - b. an ounce of fat
 - c. an ounce of carbohydrate
 - d. an ounce of water
6. The two major types of carbohydrate are:
 - a. minerals and vitamins
 - b. sugars and starches
 - c. fat and oil
 - d. protein and minerals
7. Which of the following is an essential nutrient?
 - a. glucose
 - b. iron
 - c. fish
 - d. eggs
8. Protein is made up of:
 - a. amino acids
 - b. ascorbic acids
 - c. meats
 - d. lipids
9. Which of the following nutrients is a source of energy?
 - a. carbohydrate
 - b. vitamin C
 - c. niacin
 - d. calcium
10. The body absorbs approximately what part of the iron present in the food we consume?
 - a. 10%
 - b. 40%
 - c. 70%
 - d. 100%
11. Which of the following is not absorbed by the body, but aids in regularity?
 - a. fibers
 - b. niacin
 - c. phosphorus
 - d. vitamin K
12. Absorption takes place in the:
 - a. stomach
 - b. large intestine
 - c. small intestine
 - d. mouth
13. Which of the following nutrients do not have to be digested to be used by the body?
 - a. proteins
 - b. carbohydrates
 - c. vitamins
 - d. fats
14. Your body cannot store up extra energy from:
 - a. protein
 - b. carbohydrate
 - c. vitamin C
 - d. fat

15. Approximately how many Calories must a person burn to lose one pound of weight?
- 500
 - 1,500
 - 2,500
 - 3,500
16. To lose a pound of fat, an average person needs approximately how many hours of vigorous exercise?
- $\frac{1}{2}$ hour
 - 3 hours
 - 5 hours
 - 8 hours
17. Each list below contains foods that an average adult might eat in a day. Which list would avoid consuming too little or too much protein?
- 3 eggs, 2 cups of milk, $\frac{1}{4}$ lb. of hamburger, 4 oz. of Cheddar cheese, a 12 oz. Porterhouse steak
 - $\frac{1}{2}$ cup of oatmeal, 1 slice of whole wheat toast, 1 cup of milk, $\frac{1}{4}$ lb. of hamburger, 1 medium chicken thigh
 - 2 eggs, 1 cup of milk, 3 medium slices of turkey, 1 cup of cottage cheese, 1 medium chicken breast
 - $\frac{1}{2}$ cup of oatmeal, 3 eggs, $\frac{1}{4}$ lb. of hamburger, 1 cup of cottage cheese, a 12 oz. Porterhouse steak
18. Which of the following would be the best nutritional advice for pregnant women?
- Reduce intake of all nutrients.
 - Maintain customary intake of all nutrients.
 - Increase intake of protein, but reduce intake of vitamins and minerals.
 - Increase intake of all nutrients.
19. During the first 3-5 months after birth, an infant's nutritional needs can best be met by feeding:
- formula
 - breast milk
 - skim milk
 - whole milk
20. Which of the following groups is least likely to suffer from iron deficiency?
- small children
 - teenaged boys
 - teenaged girls
 - middle-aged men
21. The average American consumes approximately how many pounds of sugar in a year?
- between 5 and 25 pounds
 - between 26 and 50 pounds
 - between 51 and 75 pounds
 - between 76 and 100 pounds
22. In many diets, the major source of carbohydrate is:
- bread
 - fish
 - spinach
 - milk
23. Many medical experts believe that consuming too much cholesterol contributes to disease of the:
- liver
 - kidneys
 - blood vessels
 - digestive system
24. Excessive consumption of which of the following could be toxic?
- vitamin A
 - niacin
 - vitamin B₂
 - vitamin C
25. Which of the following is among the most serious deficiencies in America?
- phosphorus deficiency
 - copper deficiency
 - iodine deficiency
 - iron deficiency

26. Alcoholics frequently become undernourished. Which of the following is a proper explanation for this condition?
- Too much alcohol causes the body to reject other nutrients.
 - Excessive alcohol consumption causes a loss of appetite.
 - Alcohol supplies the body with no nutrients.
 - Alcohol causes the body to need more nutrients than it normally requires.
27. Of the following, which is the best source of high quality protein?
- milk
 - lettuce
 - bread
 - coffee
28. Which of the following is a good source of riboflavin (vitamin B₂)?
- applesauce
 - orange juice
 - bacon
 - whole wheat bread
29. Which of the following are good sources of iron?
- cottage cheese and peaches
 - carrots and green peas
 - applesauce and celery
 - hamburger and baked beans
30. Which of the following has the highest fat content?
- a serving of lean beef
 - a raw potato
 - two slices of white bread
 - a dried fruit
31. Which of the following would be a good protein substitute for meat in a meal?
- eggs
 - pancakes
 - spinach
 - squash
32. Which pair of foods below contains the best protein balance?
- dried beans and rice
 - carrots and peas
 - rice and onions
 - lettuce and tomatoes
33. A new food has just been developed. It has lots of vitamin A and vitamin C. It also has a sweet taste. Which of the following groups will this food probably belong in?
- breads and cereals
 - meats and meat substitutes
 - vegetables and fruits
 - milk and milk products
34. One of the best sources of calcium is:
- whole wheat bread
 - lettuce
 - milk
 - orange juice
35. For those people who are allergic to milk, which of the following foods is a good nutritional substitute?
- spinach
 - yogurt
 - black-eyed peas
 - orange juice
36. Which of the following foods is highest in cholesterol content?
- 1 egg
 - 2 ounces of Cheddar cheese
 - 1 cup of whole milk
 - 1 cup of ice cream
37. Which of the following has the lowest percentage of fat?
- whole milk
 - skim milk
 - 2% fat milk
 - chocolate milk

38. The following nutritional label describes the nutrient content of a common food. Which food group does this food probably belong in?

Nutrition Information			
Per 1 Cup Serving			
Calories....110	Carbohydrate....19 grams		
Protein...6 grams	Fat.....1 gram		
Percentage of U.S. Recommended Daily Allowance (U.S. RDA)			
Protein.....10	Thiamin.....8	Calcium..2	
Vitamin A.....15	Riboflavin...4	Iron...10	
Vitamin C.....35	Niacin.....4		

- a. meats and meat substitutes
b. fruits and vegetables
c. vitamins and minerals
d. breads and cereals
39. Which of the following meals contains the best balance of nutrients?
- a. lean beef, eggs, cottage cheese, milk
b. celery, apples, whole wheat bread, unsweetened iced tea
c. baked potato, dinner roll, hard boiled eggs, unsweetened iced tea
d. turkey, baked potato, green peas, orange juice
40. Which of the following breakfasts contains the best balance of nutrients?
- a. pancakes, bacon, coffee, orange juice
b. eggs, milk, orange juice, pancakes
c. pancakes, toast, orange juice, milk
d. milk, orange juice, grapefruit, coffee
41. The most prevalent food additive in terms of quantity is:
- a. BHT
b. sugar
c. vitamin C
d. monosodium glutamate (MSG)
42. Salt is added to canned foods mainly:
- a. for coloring
b. for bulk
c. as a preservative
d. as a nutritional supplement
43. Which of the following foods can safely be eaten raw?
- a. eggs
b. broccoli
c. hamburger
d. cookie dough
44. The best way to preserve the B vitamins and ascorbic acid when cooking fresh vegetables is to:
- a. soak the vegetables before cooking
b. boil the vegetables until tender
c. cook the vegetables whole and unpared
d. add butter to the vegetables before serving
45. It is a good idea to thoroughly clean a counter after cutting up raw chicken because:
- a. other foods prepared on the counter will pick up the chicken flavor if the counter is not cleaned
b. the acid on the chicken skin will damage the counter
c. raw chicken sometimes carries salmonella poisoning
d. raw chicken can cause other foods to lose their nutrients
46. A turkey should not be stuffed until immediately before baking because:
- a. the dressing will become soggy if left in the turkey cavity overnight
b. the dressing will lose its nutritional value if left in the turkey overnight
c. all the tenderizing juices of the turkey will be neutralized by the dressing
d. the warm dressing will allow microorganisms to grow and may cause food poisoning

47. Fresh pork should be heated to an internal temperature of 170° F because:
- at that temperature pork becomes tender enough to eat
 - at that temperature a chemical reaction occurs that increases the nutritional value of pork
 - at that temperature pork loses its strong odor
 - at that temperature the parasite trichinae, if present, is killed
48. Which of the following statements is true concerning what to do with a turkey served for lunch?
- It may safely be left out for 4-6 hours before refrigerating.
 - If sliced and covered with foil, it may safely be left out for 2-4 hours before refrigerating.
 - It should be refrigerated immediately after lunch.
 - If not stuffed, it may safely be left out for up to 24 hours before refrigerating.
49. Which of the following least needs to be refrigerated?
- milk
 - eggs
 - white bread
 - whole wheat bread
50. A good rule of thumb regarding meat removed from a freezer is:
- never refreeze meat
 - you may refreeze meat if ice crystals are still in it
 - you may refreeze meat if it is washed after thawing
 - you may safely refreeze any thawed meat
51. The label "enriched" on a loaf of bread may only be used if which of the following nutrients have been added?
- vitamin A, vitamin C, and vitamin D
 - thiamin, riboflavin, niacin, and iron
 - calcium, vitamin D, wheat germ, and dried yeast
 - all essential amino acids
52. A food that has been fortified is one that has had:
- certain original nutrients replaced after processing
 - extra taste preservatives added
 - nutrients added that did not originally exist in the food
 - mineral water added
53. Which of the following advertising claims is based on established fact?
- Eating gelatin promotes strong, healthy nails.
 - Vitamin E creams remove skin blemishes.
 - Large doses of vitamin C will cure a common cold.
 - Synthetic vitamins are as nutritious as natural vitamins.
54. Which of the following claims is based on established fact?
- Very large amounts of vitamin A may be toxic.
 - Honey is considerably more nutritious than white sugar.
 - A vitamin supplement is necessary to be healthy.
 - The protein in meat is of better quality than that in eggs.
55. When you buy a piece of beef marked "USDA Choice", you can be sure that the meat will:
- be more tender than the same cut at a lower grade
 - be fresher than the same cut at a lower grade
 - be more nutritious than the same cut at a lower grade
 - weigh more than the same cut at a lower grade

DIRECTIONS: For items 56-71, there are no right or wrong answers. Simply choose the option which describes how you feel about the statement.

56. Good eating habits are important for good health.
a. Strongly agree c. Disagree
b. Agree d. Strongly disagree
57. My current diet is a well-balanced, nutritious one.
a. Strongly agree c. Disagree
b. Agree d. Strongly disagree
58. Crash dieting is a good way to lose weight.
a. Strongly agree c. Disagree
b. Agree d. Strongly disagree
59. I am interested in the nutritional value of what I eat.
a. Strongly agree c. Disagree
b. Agree d. Strongly disagree
60. Foods higher in nutrient content are less tasty than other foods.
a. Strongly agree c. Disagree
b. Agree d. Strongly disagree
61. If people simply eat what they like, they will have a nutritious diet.
a. Strongly agree c. Disagree
b. Agree d. Strongly disagree
62. The best way to lose weight is to eliminate foods containing fat from the diet.
a. Strongly agree c. Disagree
b. Agree d. Strongly disagree
63. Part of the pleasure of eating is sitting and talking with people I like.
a. Strongly agree c. Disagree
b. Agree d. Strongly disagree
64. It is a good nutritional habit to drink several glasses of water daily.
a. Strongly agree c. Disagree
b. Agree d. Strongly disagree
65. Foods which supply more nutrients cost more than foods with fewer nutrients.
a. Strongly agree c. Disagree
b. Agree d. Strongly disagree
66. In general, highly processed foods have fewer nutrients than less highly processed foods.
a. Strongly agree c. Disagree
b. Agree d. Strongly disagree
67. In America today, it is nearly impossible to get all the nutrients one needs unless one takes a vitamin supplement.
a. Strongly agree c. Disagree
b. Agree d. Strongly disagree
68. Foods grown with natural fertilizers are more nutritious than foods grown with synthetic fertilizers.
a. Strongly agree c. Disagree
b. Agree d. Strongly disagree
69. The labels on packaged food help the wise consumer to decide how nutritious a food is.
a. Strongly agree c. Disagree
b. Agree d. Strongly disagree
70. The lunches served in school are tasty.
a. Strongly agree c. Disagree
b. Agree d. Strongly disagree
71. The lunches served in school are good for me.
a. Strongly agree c. Disagree
b. Agree d. Strongly disagree



GO ON

DIRECTIONS: For items 72-90, there are no right or wrong answers. Simply choose the option which describes how often you do the thing mentioned in the item.

72. I combine good eating habits and exercise to maintain proper body weight.
a. Always c. Seldom
b. Usually d. Never
73. I eat "sweets" for snacks.
a. Always c. Seldom
b. Usually d. Never
74. I eat fruits for snacks.
a. Always c. Seldom
b. Usually d. Never
75. I eat vegetables for snacks.
a. Always c. Seldom
b. Usually d. Never
76. I select foods to make up a balanced diet.
a. Always c. Seldom
b. Usually d. Never
77. I use a vitamin supplement.
a. Always c. Seldom
b. Usually d. Never
78. I eat foods like potato chips, corn chips or cheese curls for snacks.
a. Always c. Seldom
b. Usually d. Never
79. I eat breakfast.
a. Always c. Seldom
b. Usually d. Never
80. I eat a snack before going to bed.
a. Always c. Seldom
b. Usually d. Never
81. I eat a snack between lunch and supper.
a. Always c. Seldom
b. Usually d. Never
82. After I finish a meal I feel "stuffed".
a. Always c. Seldom
b. Usually d. Never
83. Between meals I drink "soft drinks".
a. Always c. Seldom
b. Usually d. Never
84. I drink fruit or vegetable juices every day.
a. Always c. Seldom
b. Usually d. Never
85. I drink more than one cup of coffee a day.
a. Always c. Seldom
b. Usually d. Never
86. I drink two or more ounces of alcohol in a day.
a. Always c. Seldom
b. Usually d. Never
87. I read the ingredients label on a package of processed food before I buy it.
a. Always c. Seldom
b. Usually d. Never
88. I read the nutritional label on the food I buy.
a. Always c. Seldom
b. Usually d. Never
89. I eat the lunches served at school.
a. Always c. Seldom
b. Usually d. Never
90. I buy soft drinks or "sweets" at school for snacks.
a. Always c. Seldom
b. Usually d. Never

DIRECTIONS: For items 91-110, choose the option which best represents how often you do the thing mentioned in the item.

91. I participate in staff development activities related to teaching nutrition.
a. Frequently c. Rarely
b. Sometimes d. Never
92. I discuss with my students the food habits of other world cultures.
a. Frequently c. Rarely
b. Sometimes d. Never
93. I teach vocabulary associated with food and nutrition.
a. Frequently c. Rarely
b. Sometimes d. Never
94. I give instruction related to safe practices in food storage.
a. Frequently c. Rarely
b. Sometimes d. Never
95. I have food and/or nutrition-related displays in my classroom.
a. Frequently c. Rarely
b. Sometimes d. Never
96. I give instruction related to selecting a nutritionally adequate diet.
a. Frequently c. Rarely
b. Sometimes d. Never
97. I give instruction related to food production.
a. Frequently c. Rarely
b. Sometimes d. Never
98. I give instruction related to food preparation.
a. Frequently c. Rarely
b. Sometimes d. Never
99. I teach functions of various food additives.
a. Frequently c. Rarely
b. Sometimes d. Never
100. I discuss with my students the importance of selecting nourishing snacks.
a. Frequently c. Rarely
b. Sometimes d. Never
101. I give special nutrition guidance to the overweight and underweight students in my classes.
a. Frequently c. Rarely
b. Sometimes d. Never
102. I observe the school eating habits of all my students.
a. Frequently c. Rarely
b. Sometimes d. Never
103. I talk with parents about the nutritional needs of their children.
a. Frequently c. Rarely
b. Sometimes d. Never
104. I talk with parents about the eating habits of their children.
a. Frequently c. Rarely
b. Sometimes d. Never
105. I coordinate my nutrition instruction with the lunchroom menus in my school.
a. Frequently c. Rarely
b. Sometimes d. Never
106. I utilize activities that introduce my students to new foods.
a. Frequently c. Rarely
b. Sometimes d. Never
107. I involve my students in planning school lunch menus.
a. Frequently c. Rarely
b. Sometimes d. Never

108. I use the school cafeteria personnel as resource people in my classroom.

- a. Frequently c. Rarely
b. Sometimes d. Never

109. I use the school cafeteria as a laboratory for instruction.

- a. Frequently c. Rarely
b. Sometimes d. Never

110. I read books and articles related to nutrition.

- a. Frequently c. Rarely
b. Sometimes d. Never

DIRECTIONS: For items 111-115, choose the option which describes how you feel about the thing mentioned in the item.

111. Most school food service personnel are competent to provide nutrition instruction to my students.

- a. Strongly agree c. Disagree
b. Agree d. Strongly disagree

112. Most school food service personnel are in need of nutrition in-service training.

- a. Strongly agree c. Disagree
b. Agree d. Strongly disagree

113. I feel adequately trained to teach nutrition-related topics to my students.

- a. Strongly agree c. Disagree
b. Agree d. Strongly disagree

114. I have sufficient materials to provide nutrition instruction to my students.

- a. Strongly agree c. Disagree
b. Agree d. Strongly disagree

115. I feel nutrition education related in-service training needs of teachers are being met adequately in my school.

- a. Strongly agree c. Disagree
b. Agree d. Strongly disagree



APPENDIX D
Teacher Response Sheet



Needs Assessment Project

Kansas Nutrition Education and Training Program
 Departments of Dietetics, Restaurant and Institutional
 Management
 and Foods and Nutrition
 Justin Hall
 Manhattan, Kansas 66506
 913-532-6966

Teacher Response Sheet

Please read each item carefully in the Nutrition Education Assessment Series test booklet. Record your answers on pages 1 and 2 of this response sheet.

DIRECTIONS: For items 1-55, circle the best answer. Circle only one answer for each item.

- | | | | |
|-------------|-------------|-------------|-------------|
| 1. a b c d | 15. a b c d | 29. a b c d | 43. a b c d |
| 2. a b c d | 16. a b c d | 30. a b c d | 44. a b c d |
| 3. a b c d | 17. a b c d | 31. a b c d | 45. a b c d |
| 4. a b c d | 18. a b c d | 32. a b c d | 46. a b c d |
| 5. a b c d | 19. a b c d | 33. a b c d | 47. a b c d |
| 6. a b c d | 20. a b c d | 34. a b c d | 48. a b c d |
| 7. a b c d | 21. a b c d | 35. a b c d | 49. a b c d |
| 8. a b c d | 22. a b c d | 36. a b c d | 50. a b c d |
| 9. a b c d | 23. a b c d | 37. a b c d | 51. a b c d |
| 10. a b c d | 24. a b c d | 38. a b c d | 52. a b c d |
| 11. a b c d | 25. a b c d | 39. a b c d | 53. a b c d |
| 12. a b c d | 26. a b c d | 40. a b c d | 54. a b c d |
| 13. a b c d | 27. a b c d | 41. a b c d | 55. a b c d |
| 14. a b c d | 28. a b c d | 42. a b c d | |

-2-

DIRECTIONS: For items 56-71, there are no right or wrong answers. Simply choose the option which describes how you feel about the statement.

- | | | | |
|-------------|-------------|-------------|-------------|
| 56. a b c d | 60. a b c d | 64. a b c d | 68. a b c d |
| 57. a b c d | 61. a b c d | 65. a b c d | 69. a b c d |
| 58. a b c d | 62. a b c d | 66. a b c d | 70. a b c d |
| 59. a b c d | 63. a b c d | 67. a b c d | 71. a b c d |
-

DIRECTIONS: For items 72-90, there are no right or wrong answers. Simply choose the option which describes how often you do the thing mentioned in the item.

- | | | | |
|-------------|-------------|-------------|-------------|
| 72. a b c d | 77. a b c d | 82. a b c d | 87. a b c d |
| 73. a b c d | 78. a b c d | 83. a b c d | 88. a b c d |
| 74. a b c d | 79. a b c d | 84. a b c d | 89. a b c d |
| 75. a b c d | 80. a b c d | 85. a b c d | 90. a b c d |
| 76. a b c d | 81. a b c d | 86. a b c d | |
-

DIRECTIONS: For items 91-110, choose the option which best represents how often you do the thing mentioned in the item.

- | | | | |
|-------------|--------------|--------------|--------------|
| 91. a b c d | 96. a b c d | 101. a b c d | 106. a b c d |
| 92. a b c d | 97. a b c d | 102. a b c d | 107. a b c d |
| 93. a b c d | 98. a b c d | 103. a b c d | 108. a b c d |
| 94. a b c d | 99. a b c d | 104. a b c d | 109. a b c d |
| 95. a b c d | 100. a b c d | 105. a b c d | 110. a b c d |
-

DIRECTIONS: For items 111-115, choose the option which describes how you feel about the thing mentioned in the item.

- | | | | |
|--------------|--------------|--------------|--------------|
| 111. a b c d | 113. a b c d | 114. a b c d | 115. a b c d |
| 112. a b c d | | | |

-4-

Part III. Nutrition Education in Your Classroom

10. Indicate at which grade(s) you believe nutrition should be taught.

- ☐ (a) K
☐ (b) 1st
☐ (c) 2nd
☐ (d) 3rd
☐ (e) 4th
☐ (f) 5th
☐ (g) 6th

11a. Are you teaching nutrition to your students at the present time?

- ☐ (1) no
☐ (2) yes

11b. If yes, from which of the following sources do you obtain nutrition information. Check as many as apply to you.

- ☐ (1) school nurse
☐ (2) physician
☐ (3) home economist
☐ (4) home economics teacher
☐ (5) school foodservice personnel
☐ (6) television, radio
☐ (7) extension bulletins
☐ (8) books, please specify: _____
☐ (9) magazines, please specify: _____
☐ (10) professional journals, please specify: _____
☐ (11) other _____

11c. What materials do you use most frequently to teach nutrition?

- ☐ (1) science book
☐ (2) health book, please specify: _____
☐ (3) other books, please specify: _____
☐ (4) pamphlets
☐ (5) films
☐ (6) filmstrips
☐ (7) posters
☐ (8) curriculum guide, please specify: _____
☐ (9) other, please specify: _____

12. If nutrition is integrated in other subjects which subject do you include it with? Check as many as apply to you.

- ☐ (1) art
☐ (2) music
☐ (3) health
☐ (4) science
☐ (5) spelling
☐ (6) social studies
☐ (7) English
☐ (8) math
☐ (9) other, please specify: _____

13. Have you observed any improvement in food habits of children as a result of your nutrition instruction?

- ☐ (1) no
☐ (2) yes
☐ (3) not applicable, do not teach nutrition

Your suggestions for the Nutrition Education and Training Program in Kansas elementary schools (e.g., needs, type of materials that would be useful, etc.):

When you have completed all items, please return this response sheet in the attached, stamped envelope to Cynthia Foley at Kansas State University.

APPENDIX E

Correspondence for Distribution of Instruments

(Letterhead)

(Transmittal Letter to Principal Regarding Survey of Elementary Teachers and Foodservice Personnel)

January 14, 1980

In a letter we sent to you before Christmas we described the procedure for obtaining data from the teachers and foodservice personnel in your school for the Needs Assessment Project of the Kansas Nutrition Education and Training Program.

Enclosed are the packets of materials that are to be distributed to the teachers and foodservice personnel in your school. These packets include a letter explaining the survey, a test booklet, response sheet, and a return envelope. The teachers' and foodservice personnel's names are written on the letters. Please distribute the materials to the appropriate foodservice personnel and kindergarten through sixth grade teachers in your school. Each person should return the response sheet directly to Kansas State University.

Your help in this project is greatly appreciated. Thank you for your cooperation. We look forward to meeting you at the time of our on-site visit to collect data from fifth grade students.

Sincerely,

Approved:

Cynthia S. Foley
Project Coordinator

Rita A. Hamman, Director
School Food Service SectionAllene G. Vaden, Ph.D., R.D.
Project Co-Director and
Associate Professor of Dietetics,
Restaurant and Institutional
Management

Percy Sillin, Ph.D.
Assistant Commissioner, Agency
Services
Kansas State Department of
EducationG. Kathleen Newell, Ph.D., R.D.
Project Co-Director and
Associate Professor of Foods and
Nutrition
Kansas State University

(Letterhead)

(Cover Letter to All Elementary Teachers at Selected Schools)

January 14, 1980

Dear

In conjunction with the Kansas State Department of Education, Kansas State University is conducting a project designed to assess the nutrition knowledge and attitudes and dietary behavior of elementary teachers, children, and foodservice personnel. This project is part of the Kansas Nutrition Education and Training Program which was established with funds from the Child Nutrition Amendment, P.L. 95-166, enacted by the United States Congress in 1977. The purpose of this assessment is to identify needs for nutrition education and to provide information for planning nutrition education programs.

Your school has been selected to participate in this study. All elementary teachers, fifth graders, and foodservice personnel in the selected schools are being asked to take part in the project. A representative sample of about 100 Kansas Elementary Schools has been asked to cooperate in the needs assessment. We need your cooperation for the success of the project. The superintendent in your school district and the principal in your school have approved cooperation in the project. We hope you will take part in the project, however, your participation is voluntary. All responses will be kept confidential, so please be frank and open with your answers. Your name will not be linked with your responses. Data will be summarized for the entire group of elementary teachers.

Attached are a test booklet and a blue response sheet. Please respond to each of the items in the test booklet on the first two pages of the blue response sheet without referring to any resource material or conferring with other persons. Also, please complete the general information section on pages 3 and 4 of the blue response sheet. The completed response sheet should be returned to us in the attached, stamped envelope. You may keep the test booklet--return only the blue response sheet.

-over-

We would appreciate hearing from you within one week. Thank you for your cooperation.

Sincerely,

Approved:

Cynthia S. Foley
Project Coordinator

Rita A. Hamman, Director
School Food Service Section

Allene G. Vaden, Ph.D., R.D.
Project Co-Director and
Associate Professor of Dietetics,
Restaurant and Institutional
Management

Percy Sillin, Ph.D.
Assistant Commissioner, Agency
Services
Kansas State Department of
Education

G. Kathleen Newell, Ph.D., R.D.
Project Co-Director and
Associate Professor of Foods and
Nutrition
Kansas State University

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(Letterhead)

(Followup Letter to Teachers and Foodservice Personnel
Not Completing Entire Response Sheet)

March 1980

Dear _____:

Thank you for completing the test for the Needs Assessment Project. In order for the data to be used from your questionnaire, we need to have you complete the items on pages 3 and 4. This information is needed to describe the sample of teachers and foodservice personnel and for analyzing relationships in the data.

Your name will not be linked with your responses. The number on the response sheet was for followup purposes only. Data will be grouped and analyzed for the entire group of teachers and foodservice personnel.

We appreciate your cooperation. We have enclosed a stamped envelope for you to return the questionnaire to us. Thank you for your helpfulness and cooperation.

Sincerely,

Cynthia S. Foley
Project Coordinator

Allene G. Vaden, Ph.D., R.D.
Project Co-Director and
Associate Professor of Dietetics,
Restaurant and Institutional
Management

G. Kathleen Newell, Ph.D., R.D.
Project Co-Director and
Associate Professor of Foods and
Nutrition

ns

(Letterhead)

(Followup Letter to Nonresponding Teachers
and Foodservice Personnel)

February 11, 1980

Dear: _____

In January, you should have received a packet from us which included a test booklet and a response sheet. As you may recall from our earlier letter, this survey is part of the Needs Assessment Project of the Kansas Nutrition Education and Training Program. The Needs Assessment is being conducted by Kansas State University in cooperation with the Kansas State Department of Education. Data will be used for program planning for nutrition education in the State.

If you have not had time to complete the response sheet sent in the earlier mailing, we would appreciate it if you would take time to respond now. We need your help. If our letter passes your reply in the mail, thanks, and please ignore this request! We are anxious to get as many replies as possible in order for the results to be accurate and reliable. We need to receive replies from at least 65 to 70%--or more if possible.

In the event you need an additional response sheet, we are enclosing one for your convenience in replying. Hopefully, you have the test booklet; however, let us know if you need a copy. Please complete all four pages of the response sheet. The first two pages are for recording your answers to the items in the test booklet. Pages 3 and 4 will provide us some general information to use in analyzing the data.

Your name will not be linked with your responses. The number on the response sheet is for purposes of followup only. Data will be grouped and analyzed for the entire group of respondents.

-over-

We appreciate your cooperation! Enclosed is a stamped, addressed envelope for you to return the response sheet to us. Thank you.

Sincerely,

Cynthia S. Foley
Project Coordinator

Allene G. Vaden, Ph.D., R.D.
Project Co-Director and
Associate Professor of Dietetics,
Restaurant and Institutional
Management

G. Kathleen Newell, Ph.D., R.D.
Project Co-Director and
Associate Professor of Foods and
Nutrition
Kansas State University

ns

Enclosure

APPENDIX F

Form for Recording Survey Distribution and Returns

APPENDIX G
Coding of Questionnaire Data

CODING OF QUESTIONNAIRE DATA

Teacher Response Sheet

BED number = 1-10
USD number = official Kansas State Department of Education Unified
School District (USD) number
School number = 1-6; in cases of multiple schools in the same USD each
school was assigned a number
I.D. number = 1-1,089
Questions 1-115 were keypunched as a, b, c, d

General Information Sheet

Part I. Demographic Information

1. Age
 - (1) = under 21
 - (2) = 21-30
 - (3) = 31-40
 - (4) = 41-50
 - (5) = 51-60
 - (6) = over 60
2. Sex
 - (1) = male
 - (2) = female
3. Grade level taught
 - 0 = kindergarten
 - 1-6 = first-sixth grade
 - 7 = others (team taught, departmentalized, grade combinations)
4. Class size
Enter number of students in the class
5. Years teaching experience
Enter number of years teaching elementary school

Part II. Educational Background

6. Education Level

Record the highest degree if there was more than one response.

- (1) = Bachelor's degree
- (2) = Bachelor's degree with additional hours
- (3) = Master's degree
- (4) = Master's degree with additional hours
- (5) = Ed.D. or Ph.D. degree
- (6) = Other

7. Area of Specialization

- (1) = Elementary education, childhood education, kindergarten
- (2) = Special education, gifted, learning disability, media, handicapped
- (3) = Secondary education, adult education, junior high, all others

8a. Nutrition training

- (1) = no
- (2) = yes

8b. Type of training

Code: 1 = YES, 2 = NO

- (1) high school course
- (2) college course/continuing education course
- (3) workshop
- (4) correspondence course

8b.1. Recency and Amount of Training

Code year of attendance for: college/continuing education course, workshop, or correspondence course

- (1) = 1975-1979
- (2) = 1970-1974
- (3) = 1960-1969
- (4) = prior to 1960

8b.2. Semester Hours¹

- (1) = 1-3 semester hours
- (2) = 4-6 semester hours
- (3) = 7-10 semester hours
- (4) = over 10 semester hours

8c. Topics covered:

Code: 1 = YES, 2 = NO

- (1) nutrition concepts
- (2) methods for teaching nutrition
- (3) selection and/or development of nutrition education materials for teacher use
- (4) selection and/or development of nutrition education materials for use with children

¹Quarter hours converted to semester hours (2/3 hr. = 1 semester hr.).

9. Preferred forms of assistance for nutrition instruction

Code: 1 = YES, 2 = NO

- (1) summer school courses in nutrition
- (2) nutrition workshops during the school year
- (3) provision of nutrition education materials
- (4) other

Part III. Nutrition Education in Your Classroom

10. Grade Level for Nutrition Instruction

0 = kindergarten

1-6 = first to sixth grade

7 = all grades or a combination of grades

11a. Present Nutrition Instruction

(1) = no

(2) = yes

11b. Nutrition Information Sources Used

Code: 1 = YES, 2 = NO

- (1) school nurse
- (2) physician
- (3) home economist
- (4) home economics teacher
- (5) school foodservice personnel
- (6) television, radio
- (7) extension bulletins
- (8) books
- (9) magazines
- (10) professional journals
- (11) other

11c. Nutrition Materials Used

Code: 1 = YES, 2 = NO

- (1) science book
- (2) health book
- (3) other books
- (4) pamphlets
- (5) films
- (6) filmstrips
- (7) posters
- (8) curriculum guide
- (9) other

12. Courses where nutrition is integrated

Code: 1 = YES, 2 = NO

- (1) art
- (2) music
- (3) health
- (4) science
- (5) spelling
- (6) social studies
- (7) English
- (8) math
- (9) other

13. Children's food habit improvement

- (1) no
- (2) yes
- (3) not applicable, do not teach nutrition

APPENDIX H

Scoring Key for Nutrition Knowledge Test

NUTRITION EDUCATION ASSESSMENT SERIES (NEAS)
TEACHER EDITION

SCORING KEY FOR KNOWLEDGE ITEMS

1. b	20. d	38. b
2. a	21. d	39. d
3. b	22. a	40. b
4. b	23. c	41. b
5. b	24. a	42. c
6. b	25. d	43. b
7. b	26. b	44. c
8. a	27. a	45. c
9. a	28. d	46. d
10. a	29. d	47. d
11. a	30. a	48. c
12. c	31. a	49. c
13. c	32. a	50. b
14. c	33. c	51. b
15. d	34. c	52. c
16. d	35. b	53. d
17. b	36. a	54. a
18. d	37. b	55. a
19. b		

APPENDIX I
Memorandum and Evaluation Forms for
Nutrition Trained Panel

(Letterhead)

May 20, 1980

To: Panel for Needs Assessment Project

From: Allene G. Vaden, Ph.D., R.D.
G. Kathleen Newell, Ph.D., R.D.
Project Co-Directors

Re: Evaluation of items on questionnaires for teachers, food-service personnel and elementary children

We appreciate your willingness to serve on the expert panel to assist us in developing an approach to evaluating items on the questionnaires for the three sample groups in the Needs Assessment Project: elementary teachers, foodservice personnel, and elementary children.

Please follow the directions for each of the parts of the evaluation, Parts 1-6, and respond as indicated. If possible, would you please complete your evaluation within one week? One of the project team will be in contact with you.

If we find disagreements among the panel, we may want to meet as a group and discuss specific points of disagreement. We will contact you later if a meeting is necessary. Thank you again.

ns

**KANSAS NUTRITION EDUCATION AND TRAINING PROGRAM
NEEDS ASSESSMENT PROJECT
Kansas State University
in cooperation with the Kansas State
Department of Education**

Part 1. Please read each of the statements (nos. 56-71) on the attached page and indicate, as an expert in nutrition, whether you believe agreement or disagreement represents a positive attitude related to nutrition among teachers and foodservice personnel. In the space below, indicate a for agree and d for disagree. If you are not sure or believe that the item does not clearly reflect a positive or negative attitude, indicate with a question mark (?).

Please review each of the statements again and indicate the importance you would attach to each of the items in terms of its value to positive nutrition attitudes, using the following scale:

- 1 = extremely important
- 2 = important
- 3 = somewhat important
- 4 = not very important
- 5 = definitely not important
- 6 = uncertain

Item no.	What represents positive attitude? Circle: a=agree d=disagree ?=unsure			How important is the attitude? Circle: 1, 2, 3, 4, 5 or 6			Item no.	What represents positive attitude? Circle: a=agree d=disagree ?=unsure			How important is the attitude? Circle: 1, 2, 3, 4, 5 or 6								
56.	a	d	?	1	2	3	4	5	6	64.	a	d	?	1	2	3	4	5	6
57.	a	d	?	1	2	3	4	5	6	65.	a	d	?	1	2	3	4	5	6
58.	a	d	?	1	2	3	4	5	6	66.	a	d	?	1	2	3	4	5	6
59.	a	d	?	1	2	3	4	5	6	67.	a	d	?	1	2	3	4	5	6
60.	a	d	?	1	2	3	4	5	6	68.	a	d	?	1	2	3	4	5	6
61.	a	d	?	1	2	3	4	5	6	69.	a	d	?	1	2	3	4	5	6
62.	a	d	?	1	2	3	4	5	6	70.	a	d	?	1	2	3	4	5	6
63.	a	d	?	1	2	3	4	5	6	71.	a	d	?	1	2	3	4	5	6

56. Good eating habits are important for good health.
 a. Strongly agree c. Disagree
 b. Agree d. Strongly disagree
57. My current diet is a well-balanced, nutritious one.
 a. Strongly agree c. Disagree
 b. Agree d. Strongly disagree
58. Crash dieting is a good way to lose weight.
 a. Strongly agree c. Disagree
 b. Agree d. Strongly disagree
59. I am interested in the nutritional value of what I eat.
 a. Strongly agree c. Disagree
 b. Agree d. Strongly disagree
60. Foods higher in nutrient content are less tasty than other foods.
 a. Strongly agree c. Disagree
 b. Agree d. Strongly disagree
61. If people simply eat what they like, they will have a nutritious diet.
 a. Strongly agree c. Disagree
 b. Agree d. Strongly disagree
62. The best way to lose weight is to eliminate foods containing fat from the diet.
 a. Strongly agree c. Disagree
 b. Agree d. Strongly disagree
63. Part of the pleasure of eating is sitting and talking with people I like.
 a. Strongly agree c. Disagree
 b. Agree d. Strongly disagree
64. It is a good nutritional habit to drink several glasses of water daily.
 a. Strongly agree c. Disagree
 b. Agree d. Strongly disagree
65. Foods which supply more nutrients cost more than foods with fewer nutrients.
 a. Strongly agree c. Disagree
 b. Agree d. Strongly disagree
66. In general, highly processed foods have fewer nutrients than less highly processed foods.
 a. Strongly agree c. Disagree
 b. Agree d. Strongly disagree
67. In America today, it is nearly impossible to get all the nutrients one needs unless one takes a vitamin supplement.
 a. Strongly agree c. Disagree
 b. Agree d. Strongly disagree
68. Foods grown with natural fertilizers are more nutritious than foods grown with synthetic fertilizers.
 a. Strongly agree c. Disagree
 b. Agree d. Strongly disagree
69. The labels on packaged food help the wise consumer to decide how nutritious a food is.
 a. Strongly agree c. Disagree
 b. Agree d. Strongly disagree
70. The lunches served in school are tasty.
 a. Strongly agree c. Disagree
 b. Agree d. Strongly disagree
71. The lunches served in school are good for me.
 a. Strongly agree c. Disagree
 b. Agree d. Strongly disagree

Part 2. Please read each of the statements on the attached page (items 72-90) and indicate, as an expert in nutrition, whether the nutrition-related practice is desirable or undesirable for teachers or foodservice personnel. Use the following scale:

D = desirable
U = undesirable
? = neither desirable nor undesirable

Review the statements again and indicate the importance you would attach to each of the items in terms of its value to positive nutrition-related practices, using the following scale:

1 = extremely important
2 = important
3 = somewhat important
4 = not very important
5 = definitely not important
6 = uncertain

Item no.	Is practice desirable or undesirable? Circle: D, U, or ?	How important is the practice? Circle: 1, 2, 3, 4, 5, or 6	Item no.	Is practice desirable or undesirable? Circle: D, U, or ?	How important is the practice? Circle: 1, 2, 3, 4, 5, or 6
72.	D U ?	1 2 3 4 5 6	82.	D U ?	1 2 3 4 5 6
73.	D U ?	1 2 3 4 5 6	83.	D U ?	1 2 3 4 5 6
74.	D U ?	1 2 3 4 5 6	84.	D U ?	1 2 3 4 5 6
75.	D U ?	1 2 3 4 5 6	85.	D U ?	1 2 3 4 5 6
76.	D U ?	1 2 3 4 5 6	86.	D U ?	1 2 3 4 5 6
77.	D U ?	1 2 3 4 5 6	87.	D U ?	1 2 3 4 5 6
78.	D U ?	1 2 3 4 5 6	88.	D U ?	1 2 3 4 5 6
79.	D U ?	1 2 3 4 5 6	89.	D U ?	1 2 3 4 5 6
80.	D U ?	1 2 3 4 5 6	90.	D U ?	1 2 3 4 5 6
81.	D U ?	1 2 3 4 5 6			

72. I combine good eating habits and exercise to maintain proper body weight.

- | | |
|------------|-----------|
| a. Always | c. Seldom |
| b. Usually | d. Never |

73. I eat "sweets" for snacks.

- | | |
|------------|-----------|
| a. Always | c. Seldom |
| b. Usually | d. Never |

74. I eat fruits for snacks.

- | | |
|------------|-----------|
| a. Always | c. Seldom |
| b. Usually | d. Never |

75. I eat vegetables for snacks.

- | | |
|------------|-----------|
| a. Always | c. Seldom |
| b. Usually | d. Never |

76. I select foods to make up a balanced diet.

- | | |
|------------|-----------|
| a. Always | c. Seldom |
| b. Usually | d. Never |

77. I use a vitamin supplement.

- | | |
|------------|-----------|
| a. Always | c. Seldom |
| b. Usually | d. Never |

78. I eat foods like potato chips, corn chips or cheese curls for snacks.

- | | |
|------------|-----------|
| a. Always | c. Seldom |
| b. Usually | d. Never |

79. I eat breakfast.

- | | |
|------------|-----------|
| a. Always | b. Seldom |
| b. Usually | d. Never |

80. I eat a snack before going to bed.

- | | |
|------------|-----------|
| a. Always | c. Seldom |
| b. Usually | d. Never |

81. I eat a snack between lunch and supper.

- | | |
|------------|-----------|
| a. Always | c. Seldom |
| b. Usually | d. Never |

82. After I finish a meal I feel "stuffed".

- | | |
|------------|-----------|
| a. Always | c. Seldom |
| b. Usually | d. Never |

83. Between meals I drink "soft drinks".

- | | |
|------------|-----------|
| a. Always | c. Seldom |
| b. Usually | d. Never |

84. I drink fruit or vegetable juices every day.

- | | |
|------------|-----------|
| a. Always | c. Seldom |
| b. Usually | d. Never |

85. I drink more than one cup of coffee in a day.

- | | |
|------------|-----------|
| a. Always | c. Seldom |
| b. Usually | d. Never |

86. I drink two or more ounces of alcohol in a day.

- | | |
|------------|-----------|
| a. Always | c. Seldom |
| b. Usually | d. Never |

87. I read the ingredients label on a package of processed food before I buy it.

- | | |
|------------|-----------|
| a. Always | c. Seldom |
| b. Usually | d. Never |

88. I read the nutritional label on the foods I buy.

- | | |
|------------|-----------|
| a. Always | c. Seldom |
| b. Usually | d. Never |

89. I eat the lunches served at school.

- | | |
|------------|-----------|
| a. Always | c. Seldom |
| b. Usually | d. Never |

90. I buy soft drinks or "sweets" at school for snacks.

- | | |
|------------|-----------|
| a. Always | c. Seldom |
| b. Usually | d. Never |

GO ON 

Part 3. Please read each of the statements (nos. 91-110) on the attached page and indicate the importance you would attach to each of the nutrition education practices for teachers in the elementary grades, using the following scale:

- 1 = extremely important
- 2 = important
- 3 = somewhat important
- 4 = not very important
- 5 = definitely not important
- 6 = uncertain

How important is the practice?							How important is the practice?						
Item no.	Circle: 1, 2, 3, 4, 5, or 6						Item no.	Circle: 1, 2, 3, 4, 5, or 6					
91.	1	2	3	4	5	6	101.	1	2	3	4	5	6
92.	1	2	3	4	5	6	102.	1	2	3	4	5	6
93.	1	2	3	4	5	6	103.	1	2	3	4	5	6
94.	1	2	3	4	5	6	104.	1	2	3	4	5	6
95.	1	2	3	4	5	6	105.	1	2	3	4	5	6
96.	1	2	3	4	5	6	106.	1	2	3	4	5	6
97.	1	2	3	4	5	6	107.	1	2	3	4	5	6
98.	1	2	3	4	5	6	108.	1	2	3	4	5	6
99.	1	2	3	4	5	6	109.	1	2	3	4	5	6
100.	1	2	3	4	5	6	110.	1	2	3	4	5	6

91. I participate in staff development activities related to teaching nutrition.
a. Frequently c. Rarely
b. Sometimes d. Never
92. I discuss with my students the food habits of other world cultures.
a. Frequently c. Rarely
b. Sometimes d. Never
93. I teach vocabulary associated with food and nutrition.
a. Frequently c. Rarely
b. Sometimes d. Never
94. I give instruction related to safe practices in food storage.
a. Frequently c. Rarely
b. Sometimes d. Never
95. I have food and/or nutrition-related displays in my classroom.
a. Frequently c. Rarely
b. Sometimes d. Never
96. I give instruction related to selecting a nutritionally adequate diet.
a. Frequently c. Rarely
b. Sometimes d. Never
97. I give instruction related to food production.
a. Frequently c. Rarely
b. Sometimes d. Never
98. I give instruction related to food preparation.
a. Frequently c. Rarely
b. Sometimes d. Never
99. I teach functions of various food additives.
a. Frequently c. Rarely
b. Sometimes d. Never
100. I discuss with my students the importance of selecting nourishing snacks.
a. Frequently c. Rarely
b. Sometimes d. Never
101. I give special nutrition guidance to the overweight and underweight students in my classes.
a. Frequently c. Rarely
b. Sometimes d. Never
102. I observe the school eating habits of all my students.
a. Frequently c. Rarely
b. Sometimes d. Never
103. I talk with parents about the nutritional needs of their children.
a. Frequently c. Rarely
b. Sometimes d. Never
104. I talk with parents about the eating habits of their children.
a. Frequently c. Rarely
b. Sometimes d. Never
105. I coordinate my nutrition instruction with the lunchroom menus in my school.
a. Frequently c. Rarely
b. Sometimes d. Never
106. I utilize activities that introduce my students to new foods.
a. Frequently c. Rarely
b. Sometimes d. Never
107. I involve my students in planning school lunch menus.
a. Frequently c. Rarely
b. Sometimes d. Never
108. I use the school cafeteria personnel as resource people in my classroom.
a. Frequently c. Rarely
b. Sometimes d. Never
109. I use the school cafeteria as a laboratory for instruction.
a. Frequently c. Rarely
b. Sometimes d. Never
110. I read books and articles related to nutrition.
a. Frequently c. Rarely
b. Sometimes d. Never

APPENDIX J
Responses of Nutrition Trained Panel
(Tables 28-31)

Table 28: Responses of nutrition trained panel members (N = 13) on evaluations of nutrition-related attitude items (Teacher and Food Service Personnel Editions)

item number ¹	response that indicates positive nutrition attitudes		importance to positive nutrition attitudes ²					
	agree	disagree	unsure	1	2	3	4	5
	----- % of panel members -----			----- % of panel members -----				
56	100.0	--	--	92.3	7.7	--	--	--
57	76.9	7.7	15.4	46.1	30.8	7.7	--	15.4
58	23.1	76.9	--	46.1	30.8	23.1	--	--
59	100.0	--	--	69.2	30.8	--	--	--
60	15.4	69.2	15.4	30.7	15.4	30.8	15.4	--
61	7.7	76.9	15.4	30.8	23.1	33.4	--	7.7
62	30.8	69.2	--	46.2	30.7	15.4	7.7	--
63	84.6	--	15.4	16.7	41.6	16.7	25.0	--
64	92.3	--	7.7	53.8	30.8	15.4	--	--
65	15.4	84.6	--	30.8	7.7	53.8	--	7.7

¹Item number refers to test question number in Nutrition Education Assessment Series, Teacher and Food Service Personnel edition, PDE Associates, Inc., 1979.

²Importance scale: 1 = extremely important, 2 = important, 3 = somewhat important, 4 = not very important, 5 = definitely not important, and 6 = uncertain.

Table 28: (cont..)

item number	response that indicates positive nutrition attitudes			importance to positive nutrition attitudes					
	agree	disagree	unsure	1	2	3	4	5	6
	—— % of panel members ——			—— % of panel members ——					
66	69.2	23.1	7.7	15.4	30.8	46.1	--	--	7.7
67	15.4	76.9	7.7	38.5	38.4	23.1	--	--	--
68	23.1	69.2	7.7	15.4	30.8	38.4	7.7	--	7.7
69	100.0	--	--	7.7	61.5	23.1	7.7	--	--
70 ³	38.5	--	61.5	8.3	33.3	33.4	8.3	--	16.7
71	100.0	--	--	30.8	38.4	15.4	15.4	--	--

³Item excluded in development of nutrition-related attitudes scale.

Table 29: Responses of nutrition trained panel members (N = 13) on evaluation of nutrition-related practice items (Teacher and Food Service Personnel Editions)

item number ¹	evaluation of practice		importance to positive nutrition practices ²					
	desir- able	undesir- able	unsure	1	2	3	4	5
	— % of panel members —			— % of panel members —				
72	92.3	7.7	--	92.3	7.7	--	--	--
73	15.4	76.9	7.7	15.4	53.8	30.8	--	--
74	92.3	--	7.7	23.1	69.2	7.7	--	--
75	84.6	--	15.4	30.8	61.5	7.7	--	--
76	84.6	7.7	7.7	100.0	--	--	--	--
77 ³	7.7	38.5	53.8	8.3	8.4	50.0	8.3	8.3
78	23.1	69.2	7.7	15.4	15.4	53.8	7.7	7.7
79	92.3	--	7.7	61.5	38.5	--	--	--
80 ³	30.8	15.4	53.8	8.3	16.7	33.4	33.3	--
81	23.1	15.4	61.5	8.3	8.3	33.3	41.7	--
82	7.7	84.6	7.7	30.8	53.8	15.4	--	--

¹Item number refers to test question number in Nutrition Education Assessment Series, Teacher and Food Service Personnel edition, PDE Associates, Inc., 1979.

²Importance scale: 1 = extremely important, 2 = important, 3 = somewhat important, 4 = not very important, 5 = definitely not important, and 6 = uncertain.

³Items excluded in development of nutrition-related practices scale.

Table 29: (cont.)

item number	evaluation of practice			importance to positive nutrition practices					
	desir- able	undesir- able	unsure	1	2	3	4	5	6
	— % of panel members —			— % of panel members —					
83	7.7	76.9	15.4	30.8	15.4	46.1	7.7	--	--
84	76.9	--	23.1	30.8	23.0	30.8	15.4	--	--
85 ³	15.4	23.1	61.5	8.3	--	33.3	33.4	8.3	16.7
86	7.7	69.2	23.1	23.1	38.4	30.8	7.7	--	--
87	84.6	--	15.4	7.7	61.5	30.8	--	--	--
88	92.3	--	7.7	7.7	69.2	23.1	--	--	--
89	61.5	--	38.5	16.7	41.6	16.7	16.7	--	8.3
90	15.4	69.2	15.4	46.1	38.5	7.7	--	7.7	--

Table 30: Responses of nutrition trained panel members (N = 13) on evaluation of nutrition education practices (Teacher Edition)

item number ¹	importance of practice ²					
	1	2	3	4	5	6
	% of panel members					
91	84.6	15.4	--	--	--	--
92	7.7	30.8	61.5	--	--	--
93	53.8	38.5	7.7	--	--	--
94	38.4	30.8	30.8	--	--	--
95	46.2	46.1	7.7	--	--	--
96	100.0	--	--	--	--	--
97	7.7	15.4	46.1	30.8	--	--
98	7.7	30.8	53.8	7.7	--	--
99	--	38.5	53.8	--	7.7	--
100	84.6	15.4	--	--	--	--
101 ³	23.1	30.7	7.7	7.7	7.7	23.1
102	46.1	38.5	7.7	--	--	7.7
103	30.8	46.1	15.4	--	--	7.7
104	38.5	46.1	7.7	--	--	7.7
105	53.8	30.8	7.7	7.7	--	--
106	53.8	30.8	15.4	--	--	--
107	38.4	30.8	30.8	--	--	--
108	30.7	15.4	38.5	--	--	15.4
109	30.8	53.8	7.7	7.7	--	--
110	38.5	53.8	--	--	--	7.7

¹Item number refers to test question number in Nutrition Education Assessment Series, Teacher and Food Service Personnel editions, PDE Associates, Inc., 1979.

²Importance scale: 1 = extremely important, 2 = important, 3 = somewhat important, 4 = not very important, 5 = definitely not important, and 6 = uncertain.

³Item excluded in development of nutrition education practices scale.

Table 31: Mean and standard deviation from importance ratings of nutrition trained panel for attitudes/habits items and priority scores assigned

item number	mean	standard deviation	priority score ¹
nutrition-related attitude items			
56	1.08	0.28	5
57	2.23	1.79	2
58	1.77	0.83	3
59	1.31	0.48	5
60	2.62	1.50	1
61	2.38	1.39	1
62	1.85	0.99	4
63	2.50	1.09	1
64	1.62	0.77	5
65	2.46	1.20	1
66	2.62	1.26	1
67	1.85	0.80	4
68	2.69	1.32	1
69	2.31	0.75	3
70	3.08	1.56	1
71	2.15	1.07	2
nutrition-related practice items			
72	1.08	0.28	5
73	2.15	0.69	3
74	1.85	0.55	5
75	1.77	0.60	5
76	1.00	0.00	5
77	3.50	1.51	1
78	2.77	1.09	1
79	1.38	0.51	5
80	3.25	1.29	1
81	3.42	1.24	1
82	1.85	0.69	5
83	2.31	1.03	2
84	2.31	1.11	2
85	3.83	1.40	1
86	2.23	0.93	2
87	2.23	0.60	3
88	2.15	0.55	3
89	2.67	1.44	1
90	1.85	1.14	4

¹ Refer to Table 3 for priority score grid.

Table 31: (cont.)

item number	mean	standard deviation	priority score
nutrition education practice items			
91	1.15	0.38	5
92	2.54	0.66	1
93	1.54	0.66	5
94	1.92	0.86	2
95	1.62	0.65	5
96	1.00	0.00	5
97	3.00	0.91	1
98	2.62	0.77	1
99	2.77	0.83	1
100	1.15	0.38	5
101	3.15	1.99	1
102	1.92	1.38	2
103	2.15	1.34	2
104	2.00	1.35	2
105	1.69	0.95	4
106	1.62	0.77	5
107	1.92	0.86	2
108	2.69	1.70	1
109	1.92	0.86	2
110	1.92	1.32	2

APPENDIX K

Supplemental Table (Table 32)

Table 32: Responses of Kansas elementary teachers to nutrition knowledge questions

item number by area of measurement ¹	N ²	responses			
		A	B	C	D
		%	%	%	%
basic vocabulary/basic concepts					
1	815	2.2	97.2*	0.5	0.1
2	817	98.9*	1.0	0.1	0.0
3	807	1.1	67.8*	30.7	0.4
4	810	2.1	87.2*	4.7	6.0
5	812	6.3	52.2*	41.5	0.0
6	817	0.4	96.7*	1.8	1.1
7	815	19.5	78.6*	1.0	0.9
8	809	83.4*	2.9	8.3	5.4
9	816	87.1*	8.2	3.0	1.7
10	791	38.2*	33.0	17.3	11.5
11	817	95.2*	1.1	2.7	1.0
12	812	15.9	26.5	56.0*	1.6
13	805	5.0	12.8	68.9*	13.3
14	811	9.7	7.9	74.0*	8.4
nutrition practices					
15	810	8.8	37.6	23.0	30.6*
16	810	12.6	43.7	20.5	23.2*
17	812	7.3	66.0*	23.6	3.1
18	814	1.3	50.9	1.4	46.4*
19	815	14.5	81.7*	1.0	2.8
20	811	27.6	12.7	6.2	53.5*
21	807	20.1	36.5	23.3	20.1*
22	816	92.8*	3.2	0.8	3.2
23	816	3.6	2.1	92.5*	1.8
24	802	42.1*	29.1	18.2	10.6
25	816	6.9	2.1	12.0	79.0*
26	811	12.8	58.2*	20.5	8.5

¹Item number refers to test question number in Nutrition Education Assessment Series, Teacher edition, PDE Associates, Inc., 1979.

²N varies because of nonresponses.

*Correct answer.

Table 32: (cont.)

item number by area of measurement	N	responses			
		A	B	C	D
		%	%	%	%
food selection					
27	815	90.4*	4.2	4.8	0.6
28	813	9.1	5.4	8.7	76.8*
29	804	10.0	40.5	3.9	45.6*
30	814	52.0*	6.5	38.9	2.6
31	816	95.5*	0.6	2.3	1.6
32	810	74.3*	11.1	8.4	6.2
33	814	7.2	0.6	89.6*	2.6
34	817	1.1	1.2	97.0*	0.7
35	810	10.7	55.8*	19.3	14.2
36	816	74.2*	9.3	4.7	11.8
37	816	0.1	88.2*	10.6	1.1
38	812	10.0	34.3*	4.7	51.0
39	817	2.6	1.7	5.6	90.1*
40	817	16.5	77.9*	3.8	1.8
food preparation					
41	807	11.0	53.9*	6.8	28.3
42	810	1.4	1.0	88.6*	9.0
43	813	11.2	79.1*	2.2	7.5
44	815	2.3	8.6	88.7*	0.4
45	814	4.8	1.1	89.7*	4.4
46	816	1.5	0.9	2.3	95.3*
47	817	0.4	0.5	0.6	98.5*
storage procedures					
48	816	2.2	13.1	80.8*	3.9
49	816	0.5	5.3	49.4*	44.8
50	817	78.0	19.9*	0.9	1.2

*Correct answer.

Table 32: (cont.)

item number by area of measurement	N	responses			
		A	B	C	D
		%	%	%	%
advertising claims					
51	815	17.8	68.2*	5.5	8.5
52	812	24.9	1.7	72.7*	0.7
53	809	29.8	3.4	7.2	59.6*
54	811	49.6*	42.3	2.3	5.8
55	811	73.0*	6.0	17.7	3.3

*Correct answer.

NUTRITION-RELATED TRAINING, KNOWLEDGE, ATTITUDES AND PRACTICES
OF SELECTED KANSAS ELEMENTARY TEACHERS

by

LU ANN LAURICE SOLIAH

B.S., North Dakota State University, 1978

AN ABSTRACT OF A MASTER'S THESIS

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Elementary teachers have an important role in the nutritional welfare of children, and their training and attitudes can influence the success of nutrition education. However, few elementary teachers have adequate training in nutrition education during their teacher preparation.

As a part of the Kansas Nutrition Education and Training Program Needs Assessment Project, a mail survey was conducted to assess nutrition-related training, knowledge, attitudes, and dietary practices of elementary teachers in ninety-seven randomly selected schools. Completed instruments were obtained from 817 teachers; the return rate was approximately 75 per cent.

The majority of the teachers were females, between twenty-one and forty years of age. Over half held Bachelor of Science (B.S.) degrees with specialization in elementary education and had completed additional credit hours beyond the B.S. degree.

Kansas elementary teachers had a favorable attitude toward nutrition. Almost all of the teachers agreed good eating habits were important to good health, and that they were interested in the nutritional value of the food they ate. Approximately 81 per cent of the respondents thought their current diet was well-balanced nutritionally.

Almost all of the teachers indicated that nutrition should be taught in all elementary grades or in a combination of grades. Over half reported that they were teaching nutrition to their students at the time of the study.

Nutrition was integrated most frequently in health, science, and social studies, occasionally in art, mathematics, or spelling, and rarely in music or English. Science, health, and nutrition books were listed

frequently as nutrition information sources. Films and filmstrips were used by approximately 75 per cent of the teachers, over half used posters, and about one-third used pamphlets. Over 83 per cent of the teachers rarely or never used school foodservice personnel as resource people in the classroom or the school cafeteria as a laboratory for instruction.

The nutrition knowledge test scores of the teachers throughout the state or among the districts and schools did not differ significantly. Per cent scores for the nutrition knowledge test ranged from 23.6 to 92.7 per cent with a mean of 70.15.

Teachers who had had a college or continuing education nutrition course or who were teaching nutrition presently had higher nutrition knowledge, attitudes, and practice scores, but lower nutrition education practice scores than teachers without nutrition training or who were not teaching the subject. In general, nutrition knowledge scores were correlated positively with scores for nutrition-related attitudes and practices. Nutrition education practice scores were correlated positively with nutrition knowledge scores for the majority of the items.

Only half of the Kansas elementary teachers considered themselves adequately trained to teach nutrition to their students, and fewer than half thought they had sufficient materials for nutrition instruction. Nutrition workshops during the school year and increasing the availability of nutrition education materials were listed as the preferred ways to receive additional nutrition training.