



Nutrition Education

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We wish to express our appreciation to the authors, particularly Dr. Carol Byrd-Bredbenner, The Nutrition Information and Resource Center, The College of Human Development, and The Pennsylvania State University for their contributions to this issue of THRESHOLDS.

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The **Publications Manual** of the American Psychological Association (Sec. Ed. 1974) should be followed in preparing manuscripts.

Advertising rates: 1 page ad \$200; half page ads \$110.00 classified ads: up to 50 words, \$8.00, 51-100 words, \$15.00. Address: Business Manager **Thresholds in Education**, P.O. Box 771, DeKalb, IL 60115.

Thresholds is entered as Third Class mail at the Post Office in DeKalb, Illinois under permit number 265 and under provisions of Part 144. Postal Manual Authorization for mailing as a non-profit organization was secured on February 8, 1975.

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Subscription Information. Subscription rates are as follows: one year \$8.00, two years \$15.00, three years \$21.00. For foreign subscriptions other than Canadian add \$2.00 more per year. Send to Editor, **Thresholds in Education**, P.O. Box 771, DeKalb, IL 60115.

Thresholds is a referral journal published quarterly in February, May, August and November.



Federal Funding - Incentive or Challenge to Nutrition Education?

Helen A. Guthrie

Three years ago a group of contributors representing academia, industry, government, school food service and education writing in *THRESHOLDS* (November 1978) struck a very optimistic note on the challenges in nutrition education. Many communicated a sense of euphoria about the level of support on the horizon and were tremendously encouraged by the receptivity of the public to nutrition information.

This issue of *THRESHOLDS* is devoted to a report of the accomplishment and insights of one group of nutrition educators at The Pennsylvania State University. These articles reflect their experiences in evaluation and implementation of a comprehensive approach to integrating nutrition into an existing school curriculum. Their message is much more than a report of the systematic evaluation of a curriculum in terms of cognitive, attitudinal and behavioral changes in both teachers and students. They seek to communicate the subtleties of establishing a successful and innovative program, including the interpersonal relationships, the administrative relationships and the community relationships — each of

which must be nurtured if the program is to succeed.

Unfortunately, nutrition educators today find themselves faced with a dilemma — one which could but should not lead them to despair. Just as they had accumulated sufficient experience, established a track record of successful pilot projects and had trained a sufficient cadre of professional nutrition educators to launch credible and viable programs, the federal funds to which they had attached their hopes began to dwindle rather than grow. The \$30 million of the original entitlement dropped to \$5 million for 1981-82.

This situation, discouraging as it may be to some, can indeed be turned to a challenge that will call on our marketing skills. The product is good. Nutritionists have reached a consensus on the content of the message. The potential for leadership is expanding; and the audience remains receptive. The challenge of maintaining ground becomes one of marketing 'nutrition education.' We can continue to work within the school systems; we can join forces with industry in helping it respond to the growing mandate of helping consumers make informed food choices in an increasingly complex market place; we can seek alternative

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collaborators — volunteer organizations, health educators, consumer organizations, food editors and Madison

Avenue; we can be innovative in capitalizing on emerging technology to reach the whole gamut of target audiences.

As competent nutrition educators we must find ways to multiply our impact without abdicating our obligation to monitor the message. In spite of our limited numbers, we can, and must, guide the communicators, educators and health professionals to use their skill and contacts to deliver a sound consistent message. By teaming up with these professionals, nutritionists have an opportunity to enhance the effectiveness of their efforts and to expand their outreach.

Nutrition educators must renew efforts to garner public support for nutrition education in the school system. Once teachers are trained on the basic principles of nutrition and have resources — curriculum, classroom teaching aids and administrative support available to them, the cost is minimal. The success of a program will depend more on the positive attitude on the part of teachers, administrators and the community than on the massive infusion of funds. If an effective education program leads to any reduction in the amount of food left uneaten, it would indeed be easy to demonstrate savings many times the $\frac{1}{4}$ cent per day available from the initial federal funding of 50¢ per child per year for nutrition education. A collaborative effort between classroom teachers and school food service personnel should easily result in savings well in excess of the cost of the education effort. Documentation of such benefits is not easy but is essential. Impressions alone will seldom sell a program!

We, the authors of articles in this THRESHOLDS issue, wish to express our appreciation for the editorial assistance given by Bonnie Gillis, Nutrition Graduate Assistant at The Pennsylvania State University.



The Realities of Initiating School Nutrition Education

Barbara Shannon

"Nutrition education should occur in in the home!"

"Food and nutrition are in the parents' domain and are not the responsibility of teachers."

These comments express the view held by many teachers and administrators who do not give nutrition high priority among subject matter areas competing for classroom time. Nutrition educators must respond to this reality at the outset of their efforts to initiate or enhance nutrition education in schools.

Nutritionists certainly recognize the role that parents play as nutrition educators. However, there is considerable doubt as to whether parents can adequately fulfill this role given the complexity of nutrition and of today's food market coupled with the prevalence of nutrition misinformation and the general public's lack of sound nutrition knowledge. Thus, nutritionists are increasingly pointing to schools as potentially the best providers of nutrition education for this nation's children.

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This issue of THRESHOLDS focuses on the initiation, implementation and evaluation of school nutrition education programs. No step-by-step specifications for doing this will be enunciated. Indeed, it is highly unlikely that any one approach to providing nutrition education through the schools is suitable for all situations. Rather, the articles in this issue will describe the experiences and insights that we, at The Pennsylvania State University Nutrition Education Center, have gained over a five-year period while participating in projects aimed at incorporating nutrition education into a variety of Pennsylvania schools. We were involved with grades across the entire K-12 span and with schools in both rural and urban settings. We want to share our mistakes and problems along with our successes and accomplishments so that other nutrition educators may learn from our experiences.

Our efforts to initiate nutrition education programs at the school district level usually followed one of two patterns: "outside-initiation" or "school-district-initiation." With the former, we introduced a program to a district. With the latter, the school district initiated the process and elicited our help in introducing and implementing a nutrition education program.

Outside-Initiation

Our outside-initiation efforts were usually begun by contacting the school district superintendent, i.e. the individual generally considered the gate-keeper of the district. If the superintendent expressed interest in our proposal for establishing a nutrition education program, we worked together to obtain school board approval and to elicit the cooperation of school principals, supervisors and teachers. Thus, outside-initiation typically worked from the administrative level down to the classroom teacher. Enthusiasm for the nutrition program often decreased at each level, with those responsible for implementing the program in the

classroom, i.e., the teachers, being least enthusiastic.

We as outsiders, needed approval at each administrative level before approaching the teachers. It was therefore often difficult to involve the teachers during the early planning stages when their input might have helped us to avoid some of the difficulties that invariably arose during implementation. For example, we sometimes were unable to meet with teachers early enough for them to include the nutrition program in their overall planning for the up-coming academic year. In such cases, the program had to be plugged into an already planned calendar. Furthermore, because the teachers were usually the last to be informed about the nutrition program, they sometimes felt it was imposed on them.

These factors did not enhance the attitude of teachers toward nutrition education in schools, so we often encountered some hostility when we conducted their inservice session in preparation for implementation of the program. Carefully planned and executed inservice programs usually overcame the hostility, but occasionally, some of it was carried over through the implementation phase and was an impediment to the effectiveness of the program.

School-District-Initiation

This pattern of initiation usually occurred when a group of teachers and/or principals became interested in the systematic introduction of nutrition education into the curriculum and sought our help. In these situations, we immediately began to work with the teachers because the proposal for initiating a program had already been approved at higher levels.

Rather than viewing the program as one imposed on them, the teachers identified with it and exhibited enthusiasm for it. They seemed to place much less emphasis on nutrition as a competitor for classroom time than did teachers in

outside-initiation situations.

Teachers in these school district initiated programs often identified the needs that they felt should be addressed during the inservice preparatory sessions: this made it much easier for us to plan sessions that were perceived as relevant and that were approached enthusiastically by the teachers.

The advantages of school district initiation are obvious. There are also disadvantages. It is more difficult to establish a sequential program across the grades with this approach because it is voluntary in nature and many teachers are not eager for involvement often because they feel the classroom time is already overcrowded. Our experience has been that in elementary schools, kindergarten through third grade teachers are much more interested in teaching nutrition than are fourth through sixth grade teachers. In high school, the home economics and health teachers are, with few exceptions, the only ones who think that teaching nutrition is their role.

Without strong incentives or some type of mandate, the school district initiated, volunteer approach is not a very dependable one for initiating and implementing nutrition education in a comprehensive manner throughout the K-12 grade span. The federally-funded Nutrition Education Training Program (NETP), established in 1977, did just that, i.e., provided school districts with an incentive to incorporate nutrition education into the curriculum. The NETP monies were available to school districts for initiating and implementing nutrition education efforts throughout the preschool-grade 12 span. It is most regrettable that NETP funds have been severely curtailed. At the time of this writing, it is uncertain whether the program will be continued at all. This curtailment has occurred just as nutrition education was getting a foothold in schools. However, loss of these funds does not eliminate the need to provide American children with sound nutrition education nor does it negate

the role that schools can play in providing that education.

The headway that nutrition education has made in schools should not be lost. Nutrition educators are now faced with the challenge of serving as facilitators and supporters of those programs that are already in place and they must continue to encourage the initiation of new programs. Although the incentive provided by NETP funding may not continue, nutrition education has gained favor with many teachers, administrators and parents because of the NETP activities to date. Many school districts have purchased nutrition curricular guides and teaching aids. Given this base of interest and materials, a significant level of nutrition education can be continued even if NETP funds are entirely eliminated.

We hope that this issue of THRESHOLDS will provide insights that nutrition educators will find valuable in their efforts to encourage and facilitate school nutrition education programs.





Nutrition Education: The Message

Carol Byrd-Bredbenner

A question of paramount importance in nutrition education is "what to teach?" To answer this question, we need to first determine the goals of nutrition education. Tyler (1949) states that if education is to be planned and continually improve, it is necessary to know the goals desired. According to Todhunter (Graef & Pettingell, 1981), nutrition education should be

concerned with changes in behavioral practices arising through an understanding of the ways in which food selection influences the health and well-being of the individual. It is more than nutrition information. It requires the imparting of information in such a way that an individual is motivated to use that information in his daily life patterns (p.40).

Stated in another way, the goal of nutrition education is to increase nutritional awareness, influence nutrition behavior, and ultimately enhance the quality of life and health.

Recent research results indicate that these goals are indeed appropriate for nutrition education. Nutrition survey results show that a large proportion of U.S. citizens are "nutritionally illiterate" (Fusillo, 1976; U.S. Department of Agriculture, 1975; U.S. Dept. of Commerce, 1972) and that their poor dietary practices adversely affect their health (Mayer,

1971; Sipple, 1971; Stronch, 1976). For example, household consumption surveys of the U.S. Department of Agriculture revealed that between 1955 and 1965, there was a decrease in the number of households reporting adequate levels of food consumption despite increasing income levels and a greater abundance of food. More diets were graded poor in 1965 than in 1955 (Adelson, 1968). In 1977, the food consumed had a higher nutrient-to-calorie ratio than in 1965 although the intake of several nutrients was lower than in 1965 (U.S.D.A., 1980).

Other surveys such as the National Ten State Nutrition Survey (U.S. Department of Health, Education and Welfare, 1972) and the Health and Nutrition Examination Survey (U.S. Department of Health, Education and Welfare, 1974) indicated that poor nutrition did exist in our country with the highest incidence of serious malnutrition being among low-income groups.

Changing social and economic conditions of the U.S. also indicate a need for nutrition education. The traditional meal times are being replaced by irregular eating times, increased snacking, and frequent consumption of meals away from home. Food preparation techniques have also greatly changed. Changes in overall lifestyle and attitudes toward foods and eating have affected the nutrient intake of most segments of the U.S. population (Martin & Beal, 1978).

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Another factor affecting nutritional health is the plethora of books, magazines, and popular articles espousing nutrition (mis)information. Sales of these publications clearly indicate that many Americans want to increase their understanding of nutrition. But examination of the content of these publications indicates that Americans either do not care that they are being misinformed or that they do not have the skills to evaluate the accuracy of the publications they buy. The majority probably fall into the latter category.

When the need for nutrition education is documented and the goals are clear, the next step is to develop a curriculum or examine existing curricula for possible adoption. In developing our curriculum Nutrition In a Changing World, we established a team of professionals from nutrition science, community nutrition education, science education, home economics education, early childhood education, health education, education psychology, curriculum supervision and development, and testing and evaluation. The team participated in these five developmental phases:

- I. Identification of nutrition content for the curriculum.
- II. Development of exemplary curricular units.
- III. Preparation of teachers and other educators for utilizing the units.
- IV. Planning for fuller implementation of the project.
- V. Evaluation of the curriculum of the curriculum and the project (Sherman, Lewis, and Guthrie, 1978).

This article will examine phases I and II. The other phases are discussed elsewhere in this issue.

The first step we took in developing our curriculum was to establish the concepts to be taught. These concepts formed a framework of basic understandings around which our nutrition curriculum, K-12/adult, was

developed. This curriculum is comprehensive, integrated and developmental. The concepts were submitted for review to a small, select group of professionals who were nationally recognized in the field of nutrition and/or were intimately involved in a nutrition education project. The concepts used in the curriculum represent the composite suggestions of this group of people who checked the concepts for accuracy and comprehensiveness.

Our next step in curriculum development was to formulate educational objectives. Careful and deliberate progress at this step was crucial because the objectives provided criteria for choosing materials, designing content outline, developing instructional procedures, and preparing evaluation procedures (Tyler, 1949).

In preparing objectives, our ultimate goal was to enable high school graduates to think, feel, and act in a nutritionally literate way. The objectives were written with the intent that they would be revised as needed to keep the curriculum responsive to current needs (Sherman et al., 1978). The nutritionists identified and prioritized eight sets of learner objectives. These sets of objectives were used to develop our comprehensive preschool-12/adult curriculum.

Based on the priority ranking of the nutritionists surveyed (Barnette & Branca, 1978), the main objective of the curriculum was identified as personal nutrition decision-making for one's health. According to the nutritionists, a student making personal nutrition decisions should be able to

1. Analyze his or her own food intake in relation to health needs and take corrective action if necessary.
2. Describe how nutrition affects health.
3. Recognize the need for a variety foods in the diet.
4. Recognize how nutrition needs change throughout the lifecycle.

Other than personal decision making, the nutritionists recognized seven other sets of learner objectives. Students completing a comprehensive curriculum should be able to

1. Apply scientific and practical information in food choice decisions.
2. Plan nutritionally adequate meals.
3. Propose solutions to family and community nutrition-related problems.
4. Explain the relationships of food, nutrients and bodily functions.
5. Describe social and cultural aspects of food choice and use.
6. Identify and propose solutions to global nutrition-related problems.
7. Explore nutrition as a career option (Barnette and Branca, 1978).

This information on the priority of nutrition content areas as supplied by the nutritionists surveyed was used in determining the scope and sequence for units and lessons in Nutrition In A Changing World. In addition, findings from the National Ten State Nutrition Survey (U.S. DHEW, 1972), the Health and Nutrition Examination Study (U.S. DHEW, 1974), and information on the developmental stages of children and adolescents were used for guiding the development of scope and sequence (Sherman, et al., 1978). Several sources were used in this process because no one source is adequate to provide a basis for wise, competent decisions about objectives (Tyler, 1949).

After identifying content areas and determining scope and sequence, we prepared lessons that were in keeping with the scope and sequence and that were appropriate to the audience. The lessons take a nutrient approach to nutrition education rather than the Basic Food Groups approach. Although we recognize the usefulness of the Basic Food Groups, we also recognize that selecting a nutritious diet today requires an understanding of nutrients

in addition to a knowledge of the food groups.

We selected the nutrient approach because the effectiveness of teaching nutrition using the Basic Food Group approach has been increasingly questioned (Poolton, 1972). Poolton (1972) asserted that the Food Group approach tells students what to learn and implies that this is all there is to know about nutrition. She believed that such an approach may leave students with the impression that eating nutritious foods is incompatible with eating popular foods. Students may feel that the Food Group approach imposes unacceptable and impractical restrictions. Poolton goes on to say that continual uses of the food group approach may hamper interest in nutrition. Her research with junior high students (Note 1) indicated that a lack of interest was found in students who had, in earlier grades, used nutrition lessons based on the Food Group approach.

An argument used by supporters of the Food Group approach is that the nutrient approach is much too complex for the average student. However, Leverton (Note 2) reported that students are capable of understanding more detailed nutrition information than they are often given credit for. She indicated the need in nutrition education for more specific information about nutrients and nutrition information sources. The Basic Food Group approach may provide a suitable beginning but progressive lessons must be increasingly complex if student interest is to be maintained.

Another important step in developing a curriculum is deciding when during the school years nutrition should be taught and what the progression or organization of lessons should be. Food habits begin to form almost as soon as a child is born (Hill, 1976), and many attitudes and habits toward eating and mealtime are established during the first few years of life. Therefore, the earlier in a child's life that nutrition education begins, the more likely the child will form desirable

food habits that can last a lifetime. Many educators have indeed found that habits are more easily influenced during early childhood than at any other time (Hill, 1976).

Although nutrition education should begin in the earliest grade possible, it should not end there. A comprehensive nutrition education curriculum should span all grades and continually build on past learning rather than simply repeating the "same old thing." Such a curriculum enables students to be "nutritionally literate" or to have the ability and motivation to make wise dietary decisions and to competently deal with future changes in our food supply. Without planned and sequenced nutrition education throughout schooling, a working knowledge of nutrition is improbable. Although there is no guarantee that a "functional level of nutrition knowledge" will produce rational nutritional behavior, irrational behavior is inevitable in the absence of knowledge.

After deciding that nutrition should be taught at all grade levels, we chose to organize the content of Nutrition In A Changing World in a spiral format. That is, learning at each grade level broadened and deepened learning at earlier grade levels.

We used three major criteria -- continuity, sequence, and integration -- in constructing and organizing lessons or learning experiences. Continuity, the vertical reiteration of the major curriculum elements, gives students a continued opportunity to develop and practice skills (Tyler, 1949). For example, the development of skills for selecting a nutritious diet is very important. Consequently, this concept is addressed time and again in various parts of Nutrition In A Changing World.

The sequence criteria was used so as to avoid reiterating concepts at the same level in various lessons (Tyler, 1949). We developed our lessons so that each successive lesson broadened and deepened the previous one. For example,

when presenting the skills for selecting a nutritious diet, we began at the preschool level by broadening their perspective of what may be considered food. This concept was further developed at successive grade levels. Primary students (grades one through three) learn how to select foods based on nutrient content. Intermediate students learn food sources of nutrients and how the body uses the nutrients. Secondary students learn meal planning and explore their responsibility and concerns for national and international decisions that affect the nutrition of their families. By sequencing successive lessons, we were able to avoid duplication and emphasize higher levels of learning (Tyler, 1949).

Finally, integration was used in developing the curriculum to help the student have a unified view of nutrition (Tyler, 1949). The lessons were designed so that students can understand how skills developed in nutrition education can be used in varying situations. Lessons were developed to enable students to use the skills learned in class in their daily living situations.

After deciding what to teach and how to organize the lessons, we then determined how to teach nutrition. We followed Tyler's (1949) principles in selecting learning experiences likely to help students attain the objectives and in setting up the learning experiences. The learning experiences enable students to practice the behaviors stated in the objectives and to gain satisfaction from this practice. The learning experiences are also appropriate to student capabilities and attainments and lead to more than a single outcome. In addition, several learning experiences for each objective at each level were developed to allow for individual needs, differences, and preferences.

Tyler (1949) asserted that because learning takes place through experience and through reactions to the environment by the learner, a learning experience must allow the learner to interact with external conditions in the environment. We have found that a wide variety of

learning experiences that allow students to be actively involved are essential for sparking and holding student interest. The learning experiences in our curriculum were all designed to be experiential and to relate to real life situations. Another important aspect of our learning experiences is that they develop cognitive, affective, and psychomotor skills.

The last step in our curriculum development was the preparation of evaluation techniques. This step was essential for determining whether the learning experiences enabled the students to achieve the objectives or the desired outcomes. The evaluation instruments that we developed measured nutrition knowledge, attitudes toward nutrition, and dietary behavior. Evaluation is discussed in more detail in another article in this THRESHOLDS issue.

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Nutrition Education for Teachers: Preservice or Inservice

Lily Hsu O'Connell
Carol Byrd-Bredbenner
Christine J. Lewis

Teachers expected to teach nutrition education in their classrooms are likely to be bombarded with questions from their students concerning nutrition's role in athletics and pregnancy, and the nutritional effects of alcohol. Most teachers are not able to confidently answer these questions. Their dilemma is in part due to a lack of preservice and inservice training in nutrition.

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Preservice Programs

The White House Conference on Food, Nutrition and Health in 1969 (Mayer, 1969) made several recommendations concerning those persons who have responsibility for nutrition education in schools. It was stated that adequate preparation for teaching nutrition in the schools requires adequate training for teachers in nutrition. It was recommended that "state departments of education encourage individual universities and colleges to incorporate appropriate nutrition units in existing courses for teachers, school nurses, school health personnel, and school food service

personnel and should keep up-to-date in nutrition education and educational techniques" (Mayer, 1969). Although this recommendation was made in 1969, little was done to improve the situation until 1977 when Public Law 95-166 provided funding for inservice training through the Nutrition Education and Training Program.

Godshall (1958) and later LaChance (1971) pointed out that a major obstacle to improving the nutritional status in our country is that the teachers who have a direct responsibility for teaching nutrition, have little or no nutrition training and lack teaching methods to convey nutrition knowledge.

In 1968, Pearson (Note 1) reported that of the two million teachers in the U.S., approximately 66% graduated from colleges where often little opportunity exists to take courses in nutrition. Of the remaining 33% who attend universities which offer nutrition courses, only a small number take a separate course in nutrition. These findings are supported by several other research studies (Byrd, Note 2; Byrd-Bredbenner, Note 3; Kies and Petersen, 1972; Marr, Shannon, and Spanier, 1980).

Although teachers may have a limited understanding of nutrition, Semrow (1956) and O'Farrell (Note 4) both reported agreement among educators that nutrition education should be taught throughout the school years. Teachers also agreed that their lack of preparation limited the effectiveness of nutrition education. It has been suggested that this lack of preparation could be eliminated by requiring undergraduate courses in nutrition education (O'Farrell, Note 4).

Few states mandate a preservice nutrition course for teacher certification. Several states require a preservice nutrition course for health teachers, and most states require such courses for home economics teachers. Several surveys have been conducted to determine the extent of nutrition preparation at the preservice level. An examination of these studies reveals that few teachers, except secondary home

economics and health teachers, receive any preservice training in nutrition (Byrd, Note 2; Byrd-Bredbenner, Note 3; Cook, Eiler and Kaminaka, 1977; Cortes and Standal, 1973; Levine, McChesney and Brush, 1979).

The need for preservice nutrition courses is evident from repeated findings that teachers' knowledge of basic nutrition is limited (Byrd, Note 2; Byrd-Bredbenner, Note 3; Petersen, Kies, 1972). A preservice nutrition course conducted as an integral part of an undergraduate curriculum would be useful for preparing new teachers to teach nutrition.

While it is important to prepare new teachers to teach nutrition, it is also important to educate those already teaching. Inservice teachers' lack of nutrition training, and nutrition education teaching methods is a major obstacle in nutrition education. This can be overcome by enlisting the support and assistance of those who are concerned about nutrition and setting up nutrition inservice programs.

Inservice Programs

Teacher inservice refers to continuing education programs of varying lengths and formats. If nutrition education is to be effective in improving the nutritional well-being of young people, energies should be channeled into improving teacher inservice.

Inservice programs for teachers in nutrition education are needed and will continue to be needed because the objective of any inservice program is to update teachers on information gained during undergraduate training. The objective of preservice training in nutrition is to provide teachers with a basic understanding of nutrition principles and their application to various stages of the life cycle and to controversial issues. Inservice programs in nutrition are aimed at helping teachers keep pace with the rapidly expanding fields of nutrition and nutrition education techniques. Preservice was never meant to take the place of inservice nor vice versa. Each form of teacher education,

preservice and inservice, fulfills a specific need.

Because most states do not require a nutrition course for certification and many teachers are entering teaching positions with little or no background, nutrition inservice programs have needed to be more than an update on recent findings. This expanded role of inservice, one of providing both basic information and update, will be necessary for teachers in the field until colleges and universities include nutrition in their degree requirements.

Inservice programs are appealing to teachers as a means of disseminating nutrition information for several reasons. First they can be planned to meet the specific needs of teachers and students (Grogan, 1978). And second, most inservice programs allow for and demand flexibility, sharing of ideas, and professional interaction.

Interest in nutrition education inservice programs has been expressed by teachers. Cortes and Standal (1973) reported more than half of the teachers in their study felt that inservice training was needed. More recently, Ferb et al. (1980) in an assessment of state Nutrition Education and Training Programs (NETP) reported that a lack of inservice opportunities was seen as a problem by teachers in twenty-five states. Although interest in nutrition inservice has been expressed by teachers, attendance or participation in nutrition education inservice has not been overwhelming. Cook, Eiler and Kaminaka (1977) interviewed elementary teachers from New York and New Jersey and found that only 3.3% had attended a nutrition inservice program. Similarly, Cortes and Standal (1973) reported that, only 7% of teachers in grades K-3 and 3% of teachers in grades 4-6 has attended a nutrition inservice program. These low rates of participation in nutrition inservice programs are not due to a lack of interest. Poor attendance of nutrition inservice programs may be due to factors related to inservice planning such as poor logistics and the presentation of irrelevant information.

Planning An Inservice

To alleviate the lack of nutrition

inservice programs available and to maintain teacher interest, it is important to plan inservice programs that meet the needs of teachers. Too often inservice programs are based on an administrator's personal perceptions of the district's needs and/or the availability of resources at the local college level (Mangieri and McWilliams, 1976). Ingersoll (1976) was able to determine through a needs assessment of teachers that inservice should:

- a) be relevant to teacher needs,
- b) provide solutions to problems teachers may encounter in school, and
- c) respond to teachers' input in a positive and constructive manner.

Content of the inservice should be specific or narrow in scope. It should be presented in a manageable form for teachers' future use so as to avoid having teachers feel they have wasted time. Teachers respond more positively to ideas adaptable to individual classroom settings (George and Nelson, 1971). These ideas should refer not only to content but give answers to problems often encountered such as how to actively involve school food service personnel or where support services and resources in nutrition education are located. Resources often play an important role in the continued success of nutrition education programs.

Allowing teachers and librarians an opportunity to examine the array of books, pamphlets, learning packages, and audiovisuals available is often appreciated.

Plans for nutrition inservice should also include active participation of teachers. Active participation is a valuable educational tool and should be utilized throughout the inservice program. Several investigators have stressed that inservice should include different modes of instruction such as lecture, discussion and action-oriented experience (Ainsworth, 1976; Callahan, 1973; Hounshell and Ligett, 1976; Mangieri and McWilliams, 1976). Equally important in an inservice program is the utilization of feedback mechanisms to permit teacher-sharing. Giving teachers

an opportunity to express how effective they have found various resources and/or activities in nutrition to be with their peers is one way to provide teacher-sharing. Inservice programs which encompass these are more likely to be viewed by teachers as having immediate and practical use.

Other factors that may affect the success of an inservice program are logistics such as:

- a) time of day,
- b) size of the group
- c) convenience and/or appropriateness of location, and
- d) compensation for teachers.

Most inservice programs are a single session of between two to six hours (Callahan, 1973). Well received inservice programs of multiple sessions have also been presented. Receptiveness of an inservice program seems to be more dependent on the time of day rather than the number of sessions (Ingersoll, 1976). A tendency for larger enrollment in nutrition inservice programs has been seen in various inservice programs planned by the Nutrition Education Project at The Pennsylvania State University when they were scheduled for late afternoon. Favorable times for scheduling inservice appears to be in the afternoon following early dismissal of students. Inservice programs conducted on weekends or evenings may interfere with teachers' personal responsibilities and are often less popular.

An inservice is best when the number of teachers attending is limited to groups of less than fifty. Active participation and feedback of teachers is difficult to achieve with larger groups. The specific needs of each teacher can be better met when a limit on enrollment is set for the inservice program.

It is important to select an inservice site that is convenient for the target group and one which is conducive to the activities planned for the inservice program. Physical considerations of the location such as the size of the room, its appropriateness for audiovisual use and its work

space for activities should not be neglected when planning an inservice program. The effectiveness of demonstrated learning activities and teacher input may be hampered during an inservice if the inservice site is inappropriate.

It has been our experience that inservice programs scheduled outside of school time i.e., after school, in the evening, or on weekends, have better participation when teachers are somehow compensated for their time and effort. Because the inservice programs are part of the teachers' professional training and related to their occupation, it seems only appropriate that teachers should receive some compensation. Inservice in general, and post graduate education for teachers has always been encouraged and supported through release time, continuing education or inservice credit, graduate credit, and/or monetary compensation by school districts in the past. Continued support of some type by school districts would appear to be a worthwhile endeavor.

Types of Inservice Programs. Inservice programs vary in content and length. Generally they can be thought of as falling into two categories:

- 1) Activity-Oriented, and
- 2) Comprehensive.

Activity-Oriented Inservice — An Activity-Oriented inservice program is the type most often requested. It is usually presented in a single half-day or full-day session which may account for its popularity.

Teachers interested in implementing nutrition education in their classrooms are often faced with the dual problem of identifying materials available and then evaluating their reliability and appropriateness. One objective of the Activity-Oriented inservice program is to acquaint teachers with a wide range of appropriate and nutritionally accurate resources of differing formats such as print materials, learning packages, posters, games and audiovisuals. This objective is more easily met if numerous examples of nutrition education

materials are provided for the teachers to examine and in most cases preview. Teachers often do not have the training or the time to judge the appropriateness of the plethora of nutrition education materials that exist. It is therefore helpful to provide lists of materials available, either free or for sale or rent, that have been screened by nutritionists for nutritional accuracy and other important considerations. Issues in selecting and using resources are presented in another article in this THRESHOLDS issue.

A second objective of an Activity-Oriented inservice program is to provide teachers with examples of nutrition teaching techniques. Learning activities involving the teachers enable them to see how easily nutrition education can be implemented in their classrooms. Although understanding specific nutrition information is not an objective of the Activity-Oriented inservice program, teachers do gain some information through participation in learning activities and through the examination of various resource materials.

Activity-Oriented inservice programs are viewed by teachers as providing useful and practical information. Identification of support services that can assist teachers in locating nutrition information and nutrition education resources may increase the effectiveness and usefulness of the inservice program.

Activity-Oriented inservice programs do provide useful and needed information for teachers, however, such programs do not deliver the full background in nutrition that is necessary for teachers planning a comprehensive nutrition education program for their class.

Comprehensive Inservice — The second type of inservice attempts to meet the objectives of the Activity-Oriented inservice program and also provide nutrition background information for teachers. The Comprehensive inservice program is designed not only to provide teachers with teaching techniques and resources in nutrition education but also to

instruct or update teachers on basic nutrition principles and/or controversies in nutrition.

There is more variability in the length of the inservice, ranging from six to forty-five hours. The number of sessions depends on the depth and extent of the nutrition principles to be presented.

The needs of the teachers are more clearly visible when participants are encouraged to express their opinions on issues and controversies. These areas can then be explored in more depth. Many issues in nutrition do not have a single answer, not even if the issues are resolved. The information surrounding the issues is likely to be remembered by the participants because of the personal approach.

An important aspect of the Comprehensive inservice program is to show teachers how the nutrition principles presented in the workshop can be distilled and incorporated into learning activities for their classroom.

In addition to learning activities, teachers should be made aware of resources in nutrition education that are reliable and appropriate for students.

Research indicates that teachers who participate in workshops incorporating nutrition principles and teaching techniques are more able to implement nutrition education into their classrooms and schools (Rhodes, 1974; Sodowsky, 1973; Henneman, Fox and Krentz, 1976). A Comprehensive inservice program should give teachers a sense of confidence in planning lessons and/or an extensive program in nutrition for their class.

INSERVICE PROGRAMS DEVELOPED AT THE PENNSYLVANIA STATE UNIVERSITY

Various nutrition education inservice programs, designed by the nutrition department at The Pennsylvania State University, have been implemented throughout Pennsylvania. These inservice programs were designed to meet the needs of a particular group of teachers or school district. Both types

of inservice programs discussed above, Activity-Oriented and Comprehensive, were presented.

An Activity-Oriented inservice program frequently requested by schools focused attention on the implementation of the curriculum "Nutrition in a Changing World" (Shannon, Bell, Marbach, O'Connell, Graves, Nicely, 1981). This inservice consisted of one three-hour session and addressed teaching techniques and nutrition education resources in addition to the curriculum, "Nutrition in a Changing World." Resource centers such as the Nutrition Information and Resource Center at The Pennsylvania State University and the Food and Nutrition Educational Information Center (component of the National Agricultural Library) were identified as appropriate support services in nutrition. Nutrition information per se was not presented in this particular inservice. The repeated requests for this type of inservice and comments volunteered by participants indicated that teachers found such inservices to be useful and practical.

School districts often requested another type of brief inservice program for their faculty: one which incorporated nutrition content as well as teaching techniques and resources. This type of inservice program was usually held after school on Saturdays for a total of six to eight hours in two or three sessions. Because our time with the teachers was limited, we decided to present only the nutrition content that we felt was most critical and useful to teachers.

We have often used the Dietary Guidelines as a vehicle for presenting basic nutrition information at these short inservice programs. These seven recommendations are a convenient learning tool for several reasons.

The 1980 Dietary Guidelines:

- 1) are easy to remember,
- 2) address diet-related health issues relevant to adults as well as school children, and
- 3) provide a mechanism for inservice leaders to introduce and discuss

functions and food sources of nutrients.

Appropriate hands-on activities for the classroom were interspersed throughout these sessions. During this inservice program, teachers were also given an opportunity to share and exchange ideas and activities in nutrition education that they may have seen or developed. This provided inservice participants with an immediate example of how basic information can be taught in the classroom and applied in daily living. Before concluding the inservice program, the inservice leader introduced various nutrition education resources (print and nonprint materials) for students and teachers. This Comprehensive inservice program was successful because it was relevant to teachers' needs, encouraged teacher input, provided practical learning activities, and was conveniently scheduled.

Teachers have also requested another type of brief inservice program, one which contained only nutrition content. These elementary teachers had already implemented nutrition education in their school and had participated in an Activity-Oriented inservice. In addition, they were using a nutrition curriculum which provided both some nutrition content and detailed activities. As the teachers worked with nutrition education for their students, they began to sense increasingly some shortcomings in their own understanding of basic nutrition principles. Consequently, they requested a four-hour program designed to acquaint them with the basic functions and structures of nutrients, and with simple tools for determining the adequacy of diets. The teachers specifically requested that this program be a learning experience for them as individuals, rather than a program to help them implement nutrition education for their students.

The program was offered in two two-hour sessions, the first providing an introduction to the six nutrient classes, and the second providing a rationale for the Basic Food Groups, the Dietary Guidelines, and sensible weight control. Activities were conducted

during both sessions to help reinforce or clarify important points. While some of the activities could be adapted for elementary classroom use, they were designed primarily for adults.

A fourth inservice program that carried graduate credit was offered to teachers in western Pennsylvania in the Fall of 1978 (Shannon, Bell, Marbach, O'Connell, Graves and Nicely, 1981). Teachers enrolled in this inservice met all day for six consecutive Saturdays, for a total of forty-five hours. This inservice program included basic nutrition principles, application of principles throughout the life cycle and nutrition education teaching techniques. The inservice program utilized lecture, group discussion, self-instruction and videotapes. Approximately one-third of the course was devoted to teaching activities and nutrition education resources.

Teachers enrolled in the course were responsible for developing lesson plans appropriate for the grade level that they taught. The forty-five hour inservice program was rated as "good" in meeting the objectives of the inservice by the teachers who completed the program.

Conclusion

Four different inservice programs were developed by The Pennsylvania State University Nutrition Program. These programs were designed to meet the nutrition education needs expressed by teachers and/or school districts. These inservice programs were both outside-initiated and school-district-initiated. The format in each case provided teachers with useful information and tools that could be easily implemented in their classrooms.

The growing field of nutrition will keep inservice a necessary part of a teacher's professional training. If nutrition inservice is to continue to have an impact, it must provide the necessary materials, give teachers the skills to integrate, synthesize and process new information and motivate students to act on the knowledge that has been gained. Our experience with planning and implementing nutrition

education inservice programs has been positive. The success of future inservice programs depends on having teachers identify, through a needs assessment, information and skills they lack. Other factors to consider when planning an inservice are opportunities for teacher-sharing and convenience of the inservice site. The need for inservice programs in nutrition is evident by the minimal preservice training required of education majors and by the small number of teachers who have attended a nutrition education inservice program. Many parameters have been identified by teachers as important to include in planning and conducting inservice programs. We have been able to incorporate these parameters into various inservice programs and have found them to contribute significantly to the success of the inservice program.

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Nutrition Education: Resources for Schools

Christine J. Lewis

Appropriate nutrition education resources are vital factors in the success of school nutrition education programs. These resources can range from pamphlets, books, films, and "learning packages" to professionals in the community. This article will provide some guidance for locating, evaluating and using the array of nutrition education resources available.

People Resources

Nutrition education programs can and often must go beyond including nutrition in the curriculum. Progressive nutrition education makes effective use of "people resources", i.e. nutrition professionals speaking at inservice and update sessions for teachers and food service personnel, or acting as special presenters in classes or at parent-teacher meetings. Where do schools locate qualified professionals for such needs? There are a number of possible sources.

Each state has either a public health nutritionist or a nutrition component within the health department that may be able to offer a qualified speaker or consultant. The Cooperative Extension county home economist can often provide assistance for school nutrition education programs or can contact a qualified nutritionist at the state's land grant university.

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Additionally, dietitians at the local hospital may be able to act as a resource if their background and training have provided them with some understanding of the needs of school nutrition programs.

The professionals contacted should be screened for appropriate qualifications, including membership in a legitimate nutrition organization. Currently, there are a number of legitimate-sounding nutrition organizations which are no more than fronts for special food and vitamin businesses or for useless "clinical testing" conducted by unqualified persons. Qualified nutrition professionals, on the other hand, most often belong to at least one of the following organizations: Society for Nutrition Education (SNE), American Dietetics Association (ADA), American Institute of Nutrition (AIN), Federation of American Societies for Experimental Biology (FASEB), and American Society for Clinical Nutrition (ASCN).

Print and Audiovisual Resources

Print and audiovisual nutrition education resources include:

films	pamphlets
filmstrips	books
games	posters
curriculum/learning packages	
activity instructions	

The appendix at the end of this article lists an array of generally reliable sources of such materials and other resources. However, a few special or unique sources justify highlighting.

The Journal for Nutrition Education, published by the Society for Nutrition Education provides a valuable service in the "Reviews" section at the back of each issue. This section gives complete ordering and cost information for nutrition education materials, as well as an evaluation written by professionals in the field. Furthermore, the Society for Nutrition Education publishes lists of recommended resources for a number of audiences.

The Food and Nutrition Information Center (FNIC), a component of the National Agricultural Library, collects materials relevant to food and nutrition and provides a free lending service to, among other recipients, schools and libraries. While there is no attempt on the part of FNIC to evaluate the resources, many educators will find the lending of audiovisuals particularly helpful. The audiovisuals available from FNIC are listed in catalogs published by Oryx Press (see appendix).

The Education and Resource and Information Center (ERIC) is a national computer-based information system. Its data bases relevant to nutrition education can be tapped in a number of ways as listed in this article's appendix.

The Nutrition Information and Resource Center, a component of the College of Human Development at The Pennsylvania State University, makes available listings of recommended nutrition resources for schools. These recommendations are based on evaluation criteria developed by the Center. While the lists are not inclusive of all worthwhile materials, they represent outstanding resources located by the Center.

Evaluation of Print and Audiovisual Resources

We evaluate the materials collected at the Nutrition Information and Resource Center because the field of nutrition is plagued by faddist misinformation, biased presentation of

facts, and scientific inaccuracy. Furthermore, not all educators are trained to evaluate the accuracy and objectivity of nutrition education materials. Yet, unless the materials used are acceptable and accurate, a nutrition education program can be undermined.

To assist educators in selecting resources, we concentrate on an evaluation of four criteria. Comprehensive and sophisticated evaluation tools have been developed by others. In comparison our evaluation process is modest but workable. Our criteria are:

1. Appropriateness for age or group
2. Technical quality and attractiveness
3. Accuracy of information
4. Balanced presentation

We acknowledge that at some point each of these criterion is subject to varying interpretations, but we try to focus on the basic sense behind each criterion as understood by most nutritionists and nutrition educators.

1. Appropriateness for Age or Group. A resource cannot fulfill its purpose unless it is geared to the developmental stage or level of understanding of its intended audience. Thus, our first criterion involves a check for reading level and for concepts that are too difficult or too simplistic. This criterion is also expanded to include a check for nutrition information appropriate for the age or group. For example, it makes little sense to develop or use a pamphlet for low income homemakers that describes the role of caviar in family meals.

Because the use of resources varies within the classroom and because use is not limited to the classroom, the intended purpose of nutrition education materials must be considered when selecting and using resources. Resources can be used for a number of reasons ranging from developing simple awareness (such as posters that proclaim the importance of nutrition) to providing a detailed curriculum. In

addition to resources for use with students and teachers, there are materials for use with foodservice personnel, parents, and librarians.

Resources should be matched not only to the audience but also to the background and expertise of the educator. Various educators will need materials that provide various levels of reinforcement, clarification, and suggestions for expanded discussion.

Some developers of nutrition education resources realize the importance of formally specifying objectives for a resource and providing some type of evaluation tool that measures its "success" in meeting the objectives. In some cases the developer has gone beyond specifying objectives and has expanded the resource into a "learning package." For instance, a filmstrip may be accompanied by a teacher's guide that includes instructions for future activities as well as a poster and flashcards for reinforcement. When the resource becomes more comprehensive, as in the case of a curriculum guide, it is very important that objectives and evaluation tools be specified. Unfortunately, this practice is not a part of the design of the majority of the materials currently available. Thus, individual educators must often take the responsibility for determining the objectives and developing some form of evaluation. However, this emphasis on objectives specification should not belittle the important role that less elaborate materials, such as posters and simple activities can play in creating awareness or reinforcing a point.

2. Technical Quality and Attractiveness. The clarity of sound, the readability of print, the use of color, the spacing of information, the durability of the materials, and even the acting ability of film actors can contribute to the success of a resource. In general, the better the quality and the more attractive a resource, the better it will be received. This, in turn, increases the

likelihood of its accomplishing its objectives.

Budget considerations should include obtaining the best quality resources whenever possible. Materials with high technical quality are usually expensive to produce and therefore tend to be higher priced. If the choice is between one good quality resource and several lower quality resource, it is likely that the one good quality resource will prove more useful because it will probably be used more frequently than the several poorer quality materials.

3. Accuracy. We confine our evaluation of accuracy to a check for scientific truths or the correctness of a statement per se. Attempts to evaluate the possible bias of materials do not fall under the domain of accuracy, but rather are described below in criterion #4: Balanced Presentation. In the case here of criterion #3, the accuracy or "simple correctness" of each statement is checked against established scientific truths. Because inaccurate nutrition information has no place in the hands of students and educators, we do not compromise in the area of nutritional accuracy and do not recommend inaccurate materials.

4. Balanced Presentation. A balanced presentation, in terms of nutrition education materials, sets the main topic--whether it be a particular food or group of foods or a recommended eating pattern--in the context of total nutrition. Our concern is that the material not stress a single food or a single issue to the extent that one is left with a lopsided impression of nutrition. Nor should the material misleadingly omit certain facts. Rather, the food, the groups of foods, or the eating pattern should be appropriately presented as playing a role in a total nutrition plan. For instance, including general guidelines for balancing one's diet helps to set a topic in the context of overall good nutrition.

Concern has been voiced about the use in schools of nutrition education

materials produced by food industries. "Industry-produced" materials are those produced by an education division of any food corporation and those produced by councils or boards that represent a commodity but not a specific producer or manufacturer.

There is disagreement as to what the role of industry should be in providing nutrition education materials. At one extreme are those who are critical of any role that industry plays in nutrition education because they maintain that no industry group can afford to teach the lesson "eat less of what we make", even if that lesson is nutritionally sound. At the other extreme are those who maintain that industry is obligated to provide direct nutrition education services to educators. A third point of view is that industry has the obligation to provide objective information about the composition of their products, but that they should not be directly involved in other nutrition education efforts. Rather, their educational role should be an indirect one of support for the efforts of nutrition educators in nonindustrial settings such as universities, foundations and other research agencies.

Industry-produced nutrition education materials range from simple one-page leaflets, games, and food composition tables, to comprehensive nutrition curriculum guides for K-12 teachers. The scientific soundness of these materials in relation to industry bias varies greatly and their educational effectiveness is seldom documented. However, if they present nutritionally sound information, the materials may be useful to educators. Moreover, industry-produced materials are likely to be used increasingly as education budgets are reduced and funds for supplementary materials diminish. A major concern then arises. How does a teacher choose wisely from the array of industry-produced materials?

These materials can be evaluated using our four criteria. Appropriateness for age, technical quality, and accuracy checks are similar whether or

not the material is produced by a food industry. Balanced presentation, in terms of industry-produced materials, becomes largely an issue of promotion. As defined by Margaret Phillips in testimony before the Federal Trade Commission (Gussow, 1979), educational materials are those that do not unduly emphasize or push a single product or class of products. Promotional materials on the other hand, are those whose origin or source is apparent within the message even when the credit line is excluded.

It may be unrealistic to expect every food industry to be able to provide resources free of all promotion. Currently, there are a large number of industry-produced materials that both educate and promote. Should materials that contain promotion be used in schools?

We feel that care must be taken in recommending such resources. Materials are better utilized and of course more easily recommended if promotion is kept confined and is not an integral part of the nutrition education message. For example, imagine two posters. One states "Diamond brand carrots have vitamin A", and the second poster says "Carrots have vitamin A", with the company name (Diamond) in the poster's corner. In the latter poster, while company promotion occurs, there is an accurate and generalizable nutrition message and the promotion is not an integral part of this message. Educators are more likely to feel comfortable using materials typified by the second poster.

In addition to checking the location of direct promotion, the educational information of the material should be checked for possible indirect promotion. As mentioned earlier, the main topic should be set in the context of total nutrition, important facts should not be omitted, nor should a lopsided impression of nutrition emerge.

The decision to use industry produced resources is that of the individual educator. In evaluating such resources, educators may find it helpful

to define the nature and the extent of the role that the resource is to play within the entire nutrition education program. The four evaluative criteria outlined above, with special attention given to balanced presentation, can be helpful in screening industry-produced materials for educational use.

Summary

When properly chosen, nutrition education resources can provide important support for all aspects of school-based nutrition education. It is evident that a number of factors need to be considered in selecting these materials including its intended use, technical quality, accuracy, and the balance of its presentation.

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APPENDIX Sources of Nutrition Education Resources

Professional Organizations

Society for Nutrition Education
Journal for Nutrition Education
2140 Shattuck Avenue, Suite 1110
Berkeley, CA 94704

American Dental Association
Bureau of Health Education and
Audiovisual Services
211 East Chicago Avenue
Chicago, IL 60611

American Dietetic Association
430 North Michigan Avenue
Chicago, IL 60611

American Medical Association
Health Education/Materials
Department of Food and Nutrition
535 North Dearborn Street
Chicago, IL 60610

American School Food Service
Association
4101 East Iliff
Denver, CO 80222

Chicago Nutrition Association
8158 South Kedzie Avenue
Chicago, IL 60652

Government Agencies

Food and Nutrition Information Center
National Agricultural Library
Room 304
Beltsville, MD
301-344-3719

(catalogues from:
Oryx Press
2214 N. Central at Encanto
Phoenix, AZ 85004)

Cooperative Extension - Local County
Office

State and Local Public Health
Departments (located in State
capitals and local counties)

Consumer Information Center
General Services Administration
Pueblo, CO 81009

Consumer Publications
Consumer and Food Economics Institute
Science and Education Administration
U.S. Department of Agriculture
Federal Building
Hyattsville, MD 20782

Education Resource and Information Ctr.
(ERIC)
U.S. Department of Education
National Institute of Education
Washington, D.C. 20208

Information available from:
ERIC Processing Reference
Facility
8433 Rugby Avenue Suite 303
Bethesda, MD 20014
301-656-9723

Data bases can usually be accessed
through:

School Districts
Intermediate Units
State departments of
education
Colleges and universities
Special clearinghouses

Office of Governmental and Public
Affairs

U.S. Department of Agriculture
Washington, DC 20250

Office of Public Affairs
Food and Drug Administration
Public Health Service
U.S. DHEW
5600 Fishers Lane
Rockville, MD 20857

Program Services Branch
Bureau of Community Health Services
Health Services Administration
Public Health Service
U.S. DHEW
5600 Fishers Lane
Bethesda, MD 20857

Superintendent of Documents
U.S. Government Printing Office
Washington, DC 20402

Voluntary Health Organizations

American Heart Association
44 East 23 Street
New York, NY 10010

The Children's Foundation
1420 New York Avenue, N.W.,
Suite 800
Washington, DC 20005

National Foundation March of Dimes
Professional Education Department
1275 Mamaroneck Avenue
White Plains, NY 10605

Universities

Cornell University
Mailing Room
Building 7, Research Park
Ithaca, NY 14853

Nutrition Information and Resource Ctr.
Benedict House
The Pennsylvania State University
University Park, PA 16802

University of Minnesota
Agriculture Extension Service
St. Paul, MN. 55108

Industry Associated Companies and
Commercial Agencies

Best Foods
Nutrition Information Service
Box 307
Coventry, CT 06238

Institute of Food Technologists
111 N. LaSalle Street
Chicago, IL 60601

National Dairy Council
6300 North River Rd.
Rosemont, IL 60018

General Mills
Nutrition Information
Box 1500
Minneapolis, MN 55460

Kraft, Inc.
P.O. Box 802
South Holland, IL 60677

Nutrition Foundation
Office of Education
888 Seventeenth Street, N.W.
Washington, DC 20006

Ross Laboratories
Educational Services
625 Cleveland Avenue
Columbus, OH 43215

Weight Watchers International, Inc.
800 Community Drive
Manhasset, NY 11030





Realities of Assessing School Nutrition Education

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The intended outcome of nutrition education is that students will gain an understanding and appreciation of nutrition in order to make dietary choices which will allow for optimal health. Thus, evaluation of nutrition education programs may include cognitive, attitudinal, behavioral, or clinical/laboratory assessment, or any combination of these. Studies intended to evaluate the effectiveness of nutrition education should be designed in keeping with the same principles that apply to any study in which the objective is to attribute outcomes to treatment. Many excellent treatises have been written on these principles so the issue of study design will not be dealt with here. Instead, attention will be given to assessment approaches and the issues associated with these, particularly those which have been troublesome to us in assessing the school nutrition education programs initiated through our Penn State Nutrition Education Center.

Cognitive Assessment

The cognitive effectiveness of nutrition education is most commonly examined by determining whether the nutrition knowledge of students is influenced by the education program. Nutrition knowledge tests are generally used for this purpose and these should

be designed so that the results obtained are both valid and reliable. This means that the results of the test should consistently reflect the influence of the education on the students nutrition knowledge. An excellent discussion of validity and reliability as related to test instrument construction is given by Ahmann and Glock (1975).

In establishing test validity it is of particular importance to consider the quality of the test items, the clarity of the directions for answering the items and the degree of representative sampling of the content to be covered. We have found it relatively easy to assure representative sampling of the content through the table of specifications approach. Content accuracy of items can be assured by having a panel of experts review them. However, this does not mean that students will be able to handle all of the items in a reasonable period of time or that students will understand the items and the directions for answering them. Such factors are particularly important in regard to obtaining valid test results and can only be taken into account by pretesting the instrument with students as similar as possible to those who will participate in the evaluation.

In our experience, the time and effort devoted to pretesting instruments was invaluable. For example, when we first began working with preschool children, we greatly over-estimated the number of test items preschoolers could handle at one sitting. We also found that administering the test to small groups of about ten children was often necessary to keep preschool children from sharing answers.

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In addition to validity, reliability should also be established prior to use of an instrument in an evaluation study. We have encountered some difficulties in this regard. Test scores are most reliable when they primarily reflect the true variance among students' knowledge, attitude or whatever is being assessed and least reflect the variance in the test itself or the testing and grading procedures.

Numerical values used to indicate the reliability of test results are called reliability coefficients. These coefficients specify the proportion of the total variance (both that among students and that due to problems with the test, grading procedures, etc.) that can be attributed to the true variance among students (Lemke and Wiersma, 1976). Thus, reliability coefficients are equal to the true variance among students divided by the total variance.

A high reliability coefficient indicates that the results of the test are mainly a reflection of the true variance among the students. Obviously, when there is little total variance in the test scores, the variance due to the test itself or the testing and grading situations must be exceedingly small to yield a high reliability coefficient.

In pretesting our test instruments, we have usually had to work with students who had not received instruction via our nutrition education programs. Thus, scores of these students tended to be uniformly low with very little variance. Consequently, reliability coefficients were low because there was so little variance among the students' scores. That did not necessarily mean the coefficients would have been low had the students received instruction prior to taking the test. Indeed, the reliability coefficients we usually obtained using the posttest scores of students participating in the actual evaluation were fairly respectable, i.e., above 0.60 (where 1.0 is the highest possible coefficient). This demonstrates that test instruments should ideally be pretested with students who have

received instruction and when necessary the instruments should be refined and retested until acceptable reliability coefficients are obtained. However, time constraints and resource limitations often preclude this. Under such conditions care with test construction and with later modification according to pretest results from an uninstructed group will increase the chances that test results will be reliable.

Another problem we have sometimes encountered in regard to the reliability of our test results has to do with the fact that, at some grade levels our nutrition education programs follow more of a mastery than a developmental model. With a successful program, based on the mastery model, most students reach a pre-established level of achievement and this often produces a ceiling effect on posttest scores. Here again the variance among scores is very low and commonly used coefficients of reliability, such as the Kuder Richardson -20 or Kuder Richardson -21, are likely to be low. Under such conditions these coefficients are not appropriate indicators of the reliability of test results and Lemke and Wiersma (1976) have recommended that a modification of the standard error of measurement be used instead.

We have used all multiple choice items on our nutrition knowledge tests for K-12 students and have had no problems with students handling these at any grade level. For K-3 students we used pictures (line drawings) as responses, and the stem of the items was read aloud to the children by the test administrators. Children we worked with in first through third grade were able to use response sheets with two sets of responses per page, but many kindergarten children were confused if more than one set of items appeared on a page.

When administering knowledge tests for evaluating the effectiveness of an educational program, it is very important to train the test administrators so that testing conditions will be as uniform as

possible for the various groups of students in the program. We have used both regular classroom teachers and outside administrators for administering the tests. In the latter case, substitute teachers were used. Students are better acquainted with their regular teacher than with an outsider and may be less threatened or anxious when tests are administered by their own teacher. However, when teachers are exposed to the test instrument at the initiation of a study, the chances of their "teaching-to-the-test" even unconsciously, are increased.

Attitude Assessment

An attitude is considered a construct, that is a "psychological quality we assume exists in order to explain some aspect of behavior" (Gronland, 1976). It follows then that a food/nutrition attitude is a feeling or underlying disposition which is assumed to influence or even engender food behavior. Improvement in food/nutrition attitudes may lead to improvement in food behavior and for this reason, efforts to assess these attitudes are increasingly included in evaluation of nutrition education.

A large body of literature in educational psychology deals with the definition and assessment of attitudes. There is considerable disagreement as to what constitutes an attitude and how an attitude can or should be measured. For our purposes in evaluating nutrition education programs for K-12 students, we have defined a food/nutrition attitude simply as a feeling about food/nutrition that may affect food behavior.

Our approach to assessing these attitudes has been to elicit students feelings about certain food or nutrition matters. For example, we wanted to examine the students' attitude toward eating new foods so we designed a number of questions to elicit their feelings on this. These included such questions as "How do you feel about tasting foods you haven't seen before?" or "How do you feel about trying different foods?".

Students responded by marking a three point Likert-type scale to indicate a positive, neutral or negative feeling. For kindergarten through third grade children, the scale consisted of a smiling, a neutral, and a frowning face to indicate positive, neutral and negative feelings. In grades 4-6 the scale consisted of numerical scores, three, two, and one, to indicate positive neutral and negative feelings. For grades 7-12 we used a 5 point scale to allow for more gradation for expressing feelings. With the elementary school children (K-6), we also included a question mark as the last entry on the scale which could be marked to indicate a lack of experience with the item in question.

Our attitude instruments for K-12 students usually examined two to four attitudes and to prevent a response set, we randomly mixed the questions reflecting the various attitudes throughout the instrument. Several distractor questions were also included to prevent a response set. We used factor analysis to examine the construct validity of the sets of questions designed to reflect the different attitudes. Based on the results of the factor analysis we modified the question sets until the factor loadings and communalities indicated that each set was unidimensional thus allowing us to sum scores on all of the questions in a set and obtain a mean score for the questions reflecting a given attitude.

Even though we have consistently pretested our attitude instruments with students similar to those who later participated in the evaluation studies, to date we have also factor analyzed the response of the participating students. This has been done because the number of students involved in pretesting the instruments was neither great enough nor diverse enough for results obtained from factor analysis of pretest responses to be generalized to the students participating in the evaluation study. Pretesting of the attitude instruments did, however, provide other valuable

information about the clarity and usability of the instrument. For example, at one point we designed a set of questions to elicit children's feelings about nutrition in general. However, when we used those questions in a pretest situation, we found that a surprising number of children, even in sixth grade, did not know the meaning of the word nutrition. Had we used that set of questions on the attitude instrument our results would have erroneously reflected the effect of the education program on cognition, i.e., the knowledge of the word nutrition, rather than on attitude, i.e., feeling about nutrition.

Approaches to measuring children's attitudes which utilize a Likert-type scale such as ours have been criticized. Critics contend that children are likely to choose the smiling face or the highest score because these, in and of themselves, connote "the best" or "most desirable." Our findings (Graves, Shannon, Sims, and Johnson, Note 1) do not support this criticism. Children across all grade levels consistently gave negative responses to the distractors that would be expected to elicit a negative response. Also mean scores on sets of questions reflecting certain attitudes were consistently higher than means reflecting other attitudes. Thus the students were discriminating both between the distractors and the various sets of questions reflecting different attitudes and among the attitudes themselves. We certainly are not implying that this one approach is the only way, nor the best way, to examine the food/nutrition attitudes of students. A number of other approaches are available and should be considered when planning an evaluation study. Sims (1981) has recently reviewed the issues associated with attitudinal assessment in nutrition. It is evident that much more research is needed to help nutrition educators better examine those feelings and dispositions toward food and nutrition that may affect related behaviors.

From the earliest days of nutrition as an identifiable discipline, nutritionists have had a strong interest in assessing the food behavior of individuals and groups. And from those earliest days to the present, the methods for making such assessments have not changed much. Some of the classical methods are highly quantitative and involve the actual measurement of food consumed by subtracting the weight of food not eaten from the weight of food served. In some cases evaluators are interested in the consumption of groups, not individuals. If the groups are large, rather than collecting wastes from each individual's plate, plates may be taken randomly during the serving period to represent food served and then individual plates randomly taken at the waste station for determining wastes. The quantity of specific foods consumed can be determined and elaborate chemical techniques employed to establish the nutrient content of those foods. Such studies that actually involve food weighing are costly, require trained personnel and are used less often than are methods that are more qualitative in nature.

These qualitative methods involve the reporting of food intake. They include:

- 1) a recall of food usually eaten during the previous 24 hours.
- 2) written records of food eaten with the recording occurring at or near the time of eating, and
- 3) diet histories obtained by trained interviewers to determine foods eaten over a specified period of time along with food purchasing patterns and other relevant information about food habits.

Self-administered questionnaires have also been used in collecting this third type of dietary information (Christakis, 1973).

In the elementary grades, K-6, we have not attempted to collect any

self-reported data on food patterns or actual intake. The reasons for this are obvious. In the lower grades (K-3), lack of writing skills preclude good record keeping and even in grades 4-6 problems with accurately remembering what was consumed, not to speak of accurately estimating portion size, argue against recalls even when done by an interviewer.

In the elementary grades we have used parent questionnaires that asked parents if they feel the nutrition education program under study influenced the kinds of foods their children ask for (Shannon, Graves, and Hart, Note 2). If the response is yes, parents are asked to list those foods their children now ask for more often and those they now ask for less often. Because this type of open-ended question does not suggest or lead the parent, we have considerable confidence that the responses do reflect the situation as perceived by the parents. However, the questionnaires are returned voluntarily, and parents who are more interested in nutrition are more likely to return them. This certainly can bias the results.

In one comprehensive nutrition education program for K-6 students we did measure consumption of certain food items served as snacks in kindergarten or as part of the school lunch for first through sixth grades. Consumption was measured over a five-day period before and after the nutrition education program.

In kindergarten the snack consisted of a four-ounce serving of low fat milk and a different food item each day. A major problem encountered was that such a high proportion of the milk and certain food items was consumed initially that there was little room for improvement. This limited our ability to assess the affect of the education on snack consumption. A better approach might be to offer a choice of snacks and allow only one to be chosen. The same snacks should be offered each day and there should be fewer choices than days during which they are offered. When this approach is used, the emphasis is

on the snack chosen most often, although actual consumption of the ones chosen can also be determined.

Our experience in assessing consumption of school lunch items was problematic in nature, to say the least. Measuring the consumption of the lunch items was very time consuming and difficult to control. The representative weight of an item, as served, had to be determined and compared to the weight of that portion of the item that remained on the plate when it was returned to the waste station. It was essentially impossible to completely separate the items remaining on the returned plates. Moreover, in the lunch rooms where we worked, it was not possible to collect the individual waste of each student nor even those of a selected sample of students. Our best alternative was to pool the waste of a class and use the mean consumption of students served in each class, within a grade, as the replicates for that grade. This greatly reduced our number of observations (3 to 4 per grade) and also made it impossible to correlate consumption with nutrition knowledge and attitude scores.

These are the kinds of realities that must be dealt with in the school setting. The lunch period is short and there is resistance to extending it over into class time just to accommodate a research study. Our experience has led us to conclude that for most situations a better approach to measuring consumption of school lunch items would be visual inspection of individual plates and estimation of the wastes on some type of rating scale. Head, Giesbrecht, and Johnson (1977) found that their results using this visual approach were reasonably comparable to those obtained when they weighed the wastes. We have done some preliminary work that supports the findings of Head, et al.

In grades 7-12 we have attempted to assess food patterns with a self-report method. Students were asked to indicate how often they ate foods from a number of categories on a scale of "three or more times per day" to "hardly ever."

We are not pleased with the instrument we have used because we do not think it is sensitive enough to pick up the effects of nutrition education on food selection. We are currently working with two other self report instruments that we hope will better meet our needs. There is great need for research that will ultimately provide more sensitive, reliable and valid ways of assessing food behavior.

Clinical/Laboratory Assessment

There are three general types of clinical/laboratory procedures. These include:

- 1) anthropometric measurements
- 2) physical signs
- 3) laboratory or behavioral tests.

Anthropometric measurements properly taken and evaluated can be useful nutrition assessment tools. The most common measurements are weight, height, skinfold thickness and upper arm circumference. All of these are subject to many sources of error. Equipment used may be inappropriate and collection techniques are often not sufficiently well standardized for the data to be as reliable as desired. Several manuals providing step-by-step instructions for data collection are available (U.S. Dept. of Health and Human Services, 1981).

Physical signs other than anthropometric data may be used to assess nutrition status. These involve examination of the skin, eyes, oral and nasal cavities, hair, nails, etc. Considerable experience is needed to recognize and interpret physical signs since they have quite varied degrees of reliability. Indeed, many of the physical signs that can be indicative of malnutrition may also occur for reasons not at all associated with the diet.

Laboratory or biochemical tests are often believed to be more precise, objective measures of status than dietary data or physical signs. Iron status measures are the most common laboratory tests although biochemical methods for assessing many other

nutrients are available. One of the drawbacks is that biochemical data does not always correlate with dietary and anthropometric data or physical signs.

The decision to obtain various clinical/laboratory measures is, in part, a pragmatic one based on cost, personnel and facilities. Beyond these considerations investigators need also to ask more basic questions about program impact in relation to specific groups of children and the likelihood of observing changes in moderately well nourished children. Many of the laboratory/clinical indicators are likely to be more appropriate for children who are poorly nourished and show more obvious nutritional deficiencies. Many other children who are not so blatantly malnourished may have dietary patterns which are more likely to predispose them to longterm and delayed chronic illnesses than to produce clinical/laboratory symptoms of classical nutritional deficiencies.

To date we have not included a clinical/laboratory assessment in our studies evaluating nutrition education programs. Two major reasons why are: first, we did not have adequate resources for such assessment and second, most of the children with whom we worked were reasonably well-nourished. Thus our short term nutrition education programs likely would not have had a measurable effect on clinical/laboratory indices.

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The Impact of Nutrition Education

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Schools offer a choice setting in which to introduce and practice preventive health concepts. School children certainly do represent a convenient population for health and nutrition intervention. But the reasons for promoting school health and

nutrition education are much more than pragmatic. There are also strong educational reasons for school health programs. For example, children are presumed to be more flexible than adults in acquiring new knowledge, attitudes and behaviors (Hochbaum, 1981).

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Behavior is an important consideration in nutrition education. The purpose of teaching health and

nutrition is not only to create knowledgeable children and adults but to create healthy and well-nourished ones. This goal is accomplished "only by changing the present and future behavior of our children so that it becomes compatible with the demands of good health" (Hochbaum, 1978).

How realistic is it to expect nutrition education to influence behavior change? Recently, Hochbaum spoke to this question when he wrote:

In a sense education can do little more than create cognitive and affective conditions that are favorable to the adoption and maintenance of desirable nutritional habits and hope that these will assert themselves behaviorally against present and future counterinfluences (Hochbaum, 1981).

This statement recognizes the potential of nutrition education as well as its limitations. Formal nutrition education is only one of many factors influencing food behavior. Some factors may be consonant with that of nutrition education and enhance its power. Other factors may weaken the impact of nutrition education.

For example, children receive many food-related messages at school. The most obvious messages are the foods available at school lunches, breakfasts or snacks.

The National School Lunch Program, created in 1946, has recently come under a barrage of criticism. Nutritional inadequacy, tasteless meals, food waste and poor luncheon conditions are major criticisms of the program.

Soggy vegetables, mushy pasta, mealy hamburgers, warm milk, frozen TV dinner-type lunches burned on the outside and icy on the inside are common (Brenton, 1978).

How could such meals do anything but undermine the impact of nutrition education? There is surely no more

self-defeating message than the serving of unpalatable food that bears the claim, "This school lunch is good for you."

It is equally reasonable to assume that appetizing foods bolster nutrition education lessons. In many schools, students, educators and parents have worked with food service personnel to create nutritionally excellent and well-received meal programs. Students have become involved in menu planning, food taste-testing, and menu evaluation. With such participation, nutrition education and school lunch acceptability can go hand in hand, increasing the acceptance of new foods and lowering plate waste. Good school lunches can serve as an example of the message that food which is "good for you" can be delicious.

The School Breakfast Program, begun in 1966, was intended primarily for low-income children but later, it was made available to all schools. Breakfast menus for the program may be creative, presenting a variety of foods and introducing new food items. Too often, however, the same menus are served day after day. Fortified pastries, fruits in heavy syrup, presweetened cereals and other common breakfast items may be staples. Such foods contain low amounts of fiber, high amounts of sugar and fat and are certainly a contradiction to current dietary guidelines.

Many nutritionists have been concerned that snacks served in schools may also be of limited nutritional value. The United States Department of Agriculture responded to concerns about snacks and issued the 1980 Competitive Food Rule. Competitive foods, as defined by the rule, are those sold in competition with meals served under the National School Lunch and School Breakfast Program. Unfortunately, the rule has created considerable confusion. Some people believe that the rule prohibits the sale of all snacks. In actuality, it only restricts the sale of several categories of food of minimal nutritional value only until after the final lunch period. Carbonated beverages, water ices—except those

containing fruit or fruit juices, chewing gum and certain candies are restricted. Many snacks such as chips, nuts, crackers, pastries, fruits, milk and yogurt are not affected by the rule. Surely, the rule does help to minimize the dissonance between the nutrition educator's message and the choices available to children. Yet the rule has not gone unchallenged. Schools have complained about the loss of revenue from vending machine sales and food manufacturers have been unhappy about the regulations. At present, there is every indication that the rule will be rescinded by the current administration.

Food itself is not the only form in which nutrition information is conveyed. Food is used for illustrative purposes in lessons and textbooks quite unrelated to nutrition. Foods chosen as examples in mathematics and reading texts, for example, have often been highly-sugared products. More nutritious foods are now often used in such contexts as publishers are alerted to nutritionists' concerns.

Finally, educators themselves serve as models for children. Glover (1978) remarked that a passive observer at an annual meeting of the American School Health Association might have seen a contradiction between the health concepts promoted by some individuals and their actual behaviors. Glover went on to say that many educators do not like to assume the responsibility of serving as a model but this is not a responsibility lightly dismissed. For better or for worse, we as educators are models and our behavior may greatly enhance or diminish our verbal health education messages. Glover concluded that although the role of health educators as models is often overlooked, it may be our most powerful change agent.

Children are also exposed to a variety of nutritional influences outside of the schools. In many cases, outside influences make it difficult for children to benefit in the short-term from nutrition education in the schools.

Hochbaum considered the problem:

Similarly we may teach the rules of healthful nutrition in the classroom. What about the child who becomes sold on our message, but goes home where his mother disregards these rules out of ignorance, by choice or in the face of financial pressure? How can what this child has learned in school survive against the influence of his experiences at home unless the teacher is aware of the conflict, helps the child understand it and enables him to maintain his belief in sound nutrition until he can use it, perhaps years later? (Hochbaum, 1978)

Parents and children both receive nutrition messages from a variety of sources. Television is a potentially powerful influence on the food practices of families. In 1977, Action for Children's Television (ACT) and Center for Science in the Public Interest (CSPIP) called in the Federal Trade Commission (FTC) to ban advertisements for highly-sugared foods which are marketed mainly for children. In 1981, FTC brought to a halt what had become known as the "Kid-Vid" investigation and moved to close its case against television advertising aimed at children. The intervening years were a fierce battle. One group maintained that such advertising was unfair, deceptive and a danger to health and welfare of children. The other group vehemently opposed regulations that would limit advertising privileges.

The closure of the "Kid-Vid" case should not lull us into assuming that television is an innocuous medium. Several recent studies suggest that television programs as well as commercials carry a strong nutrition message. Unfortunately, the message is seldom in accord with sound nutritional principles. Kaufman (1980) analyzed prime-time television programs and commercials. Most references to beverages, especially alcohol, occurred in the programs themselves. Food was

never explicitly used to satisfy hunger. It was used mainly for social and emotional purposes such as to bribe others and bring about social introductions.

Both the Kaufman and Gerbner et al. (1981) studies indicate that television provides us with a skewed impression of obesity. Many Americans may be obese but not television characters. Gerbner et al. (1981) summarized television depictions by saying that despite all of the mayhem and all of the eating and drinking, prime-time characters are relatively sober, safe from accidents and are slim. These are hardly depictions that will reinforce health education messages advising sobriety and self-control.

Recognizing the many forces that counter their messages, nutrition educators might be expected to throw their hands up in despair and groan collectively, "What's the use?" Yet accepting the fact that nutrition education alone may have little impact is by no means a call for abandonment. Nutrition in the schools can indeed prepare children to eat a more nutritious diet. Whether they do so, however, depends only in part on factors within their control. Nutrition education is likely to be most effective when it combines education and advocacy. As nutrition advocates, we must try to

bring about changes and create conditions that will help children make the best possible food choices.

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