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ABSTRACT

A statewide assessment was made of specific nutrition education and training needs in Maryland public schools. The approach used allowed an examination of both needs and possible solutions, examined needs which required multiple solutions, and identified resources which could address multiple needs. This multimethodological approach included site visits, interviews, document reviews, administration of tests and questionnaires, and evaluation of project applications, ongoing projects, and programs. Eight procedures were used: (1) administration of nutrition tests to students, teachers, and food service personnel; (2) administration of questionnaires to teachers, food service personnel, and building principals; (3) site visits to selected nutrition education and training projects; (4) review of materials developed or used in nutrition education and training projects; (5) review of historical documents at the Department of Health and Mental Hygiene; (6) review of course materials and evaluation forms of the Quantity Food Preparation Course; (7) interviews with local project staffs; and (8) search for exemplary programs. (JD)

STATEWIDE NEEDS ASSESSMENT: A MULTIMETHODOLOGICAL APPROACH

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The Child Nutrition Act of 1966, as amended by Public Law 95-166 authorizes the federal government to formulate and carry out a nutrition information and education program through a system of grants to state education agencies. The goal of the Nutrition Education and Training Program (NETP) is to provide children with better opportunities to learn about food and nutrition and the relationship of food and nutrition to good health. In addition, the program is designed to provide opportunities for children, teachers, and food service personnel to use this knowledge to develop attitudes and practices fundamental to their health and well-being throughout life.

Each state receiving funds under this act is required to develop a plan for implementing the Nutrition Education and Training Program. Critical in the design of each state plan is the identification of specific nutrition education and training needs within the state. Specifically, states are required to assess the needs of students, teachers, and food service personnel and to determine the availability of curriculum materials or components. The needs assessment process attempts to identify discrepancies between an ideal and actual state of affairs. Furthermore, states are required to establish priorities or to rank order the needs identified. Development of a state plan goes beyond an assessment of the needs of students, teachers, and food service personnel or even a rank ordering of the needs, however. It requires the identification of possible means of meeting those needs, evidence of the effectiveness

of each vehicle so identified, and an assessment of the likelihood of success of specific projects. The development of a state plan further involves the identification of populations to be served and the matching of resources to populations.

The needs assessment described in this report was conducted by the authors under contract to the Maryland State Department of Education Food and Nutrition Branch. Given the interactive nature of needs, resources, and procedures, the authors and contracting agency officials agreed that a simple delineation of needs on one list and an enumeration of resources on another was not desirable. Rather, an approach was sought which would allow the agency to examine needs and possible solutions simultaneously, to examine needs which required multiple solutions, and to identify resources which could address multiple needs.

The specific objectives of the needs assessment were to:

1. Identify the nutrition-related knowledge, attitudes, and behaviors of students, teachers, and food service personnel
2. Document nutrition education and training needs
3. Identify major nutrition-related health problems
4. Identify dietary problems which might be changed through nutrition education
5. Document nutrition education competencies of food service personnel and teachers
6. Document problems encountered by teachers and food service personnel in providing nutrition education
7. Document local education agency mandates pertaining to nutrition education
8. Identify offices and agencies locally responsible for nutrition education either fiscally or technically
9. Examine funding patterns and sources
10. Identify exemplary nutrition education programs and projects

In order to meet these objectives and to provide comprehensive information to the funding agency, the authors adopted a multimethodological approach. This approach included site visits, interviews, document reviews, administration of tests and questionnaires, and evaluation of project applications as well as ongoing projects and programs. The intent of the multimethodological approach was to discover as many needs as possible with objective measures (for example, tests and questionnaires) and to document and comprehend the greatest needs by obtaining more detailed information (for example, interviews, project evaluations). The details of the design are provided below.

Design of the Needs Assessment

A preliminary needs assessment, conducted in 1977, revealed that nutrition education in the State of Maryland would have to be conducted within the context of other subject matter areas such as health, social studies, reading, science, and mathematics. Few local school superintendents were willing to fund full-time nutrition education positions. One major additional constraint was thus placed on the needs assessment: not only must we identify solutions to existing needs, but we must narrow our search to those solutions that can be implemented by teachers and others not necessarily trained in nutrition. Armed with this information, we were able to design a needs assessment that would yield extremely useful information.

Subjects. All students in grades K-12 as well as children in specific preschool programs were the target population of this needs assessment. All teachers, administrators, and food service personnel who come into contact with these students constituted a second target population. Because testing all Maryland students (approximately one million students) was

unfeasible, sampling procedures were used. The contracting agency had identified grades 4, 8, and 11 as target grades representative of elementary, junior high, and senior high school grades. Further, we identified a sample size of 1,000 students per grade as sufficient to yield stable test results. Assuming that approximately two-thirds of the students sampled would actually participate, we increased our sample size to 1,500 students per grade in order to get information from 1,000.

The sampling unit was the classroom. Previous experience had shown that testing whole classrooms was less disruptive than testing an equal number of students drawn from two or more classrooms. Thus, approximately 60 classrooms per grade were identified. This sampling procedure also allowed us to identify 60 teachers per grade, one administrator per sample school, and one or more food service managers and workers in each school sampled. Finally, districts were stratified by enrollment and socioeconomic status. Socioeconomic status was operationally defined in terms of per-pupil expenditure on free and reduced-price breakfast, lunch, and special milk programs. Four categories were thus defined: high enrollment/high expenditure, high enrollment/low expenditure, low enrollment/high expenditure, and low enrollment/low expenditure. Table 1 below summarizes the distribution of students across districts, schools, and classrooms.

Table 1
Distribution of Student Sample Across Districts, Schools, and Classrooms

Grade	Districts Sampled	Schools Sampled	Classrooms Sampled	Students Sampled
4	11	39	62	1,500
8	11	22	60	1,500
11	10	16	60	1,498

This sampling procedure yielded, in addition to the number of students shown in Table 1, responses from 182 classroom teachers, 71 building principals, 71 food service managers, and 115 food service workers. Principals received questionnaires only, while teachers and food service personnel received questionnaires and tests.

Instruments. Two formal sets of instruments were developed for this project. One was a set of nutrition tests assessing knowledge, attitudes, and behaviors. Four different versions were created, one for each grade level and a common version for teachers and food service personnel. Four versions of a questionnaire were also developed, one for teachers, one for principals, one for food service workers, and one for food service managers. The questionnaires were designed to elicit information about the respondent's typical duties as well as level of awareness and understanding about nutrition and level of involvement in nutrition education activities.

Additional informal instruments were also devised. These included interview schedules, project evaluation checklists, and on-site visit report forms. These forms were created by the authors to guide them in conducting interviews, evaluations, and on-site visits and to enable them to obtain comparable information across projects.

Procedures. Eight different procedures were used. These are enumerated as follows:

1. Administration of the nutrition tests to students, teachers, food service managers, and food service workers.
2. Administration of questionnaires to teachers, food service personnel, and building principals
3. Visits by needs assessment project staff to the sites of selected nutrition education and training projects

4. Review of materials developed by or used by staff of the individual nutrition education and training projects

5. Review of historical documents at the Department of Health and Mental Hygiene

6. Review of course materials and evaluation forms for the Quantity Food Preparation course

7. Interviews with staff of the Food and Nutrition Branch as well as with local project staff and others

8. Search for exemplary programs

Each activity was designed to elicit a specific type of information. The intent of the contractor was to combine all of the information in order to make recommendations about the future conduct of the nutrition education and training program. Each of the eight activities is described in some detail below.

Administration of nutrition tests. Nutrition tests were given to students by teachers. These teachers had been given administration manuals and other training materials approximately two weeks prior to testing. Teachers were asked to take their own version of the test at a convenient time. As the tests were not timed, this departure from standardized conditions was not seen as damaging to results. Food service workers and managers took the tests under similar conditions.

Administration of questionnaires. Questionnaires were all self-administered. Although no names were included on questionnaires, the questionnaires were coded by district. This process enabled us to contact testing coordinators in districts where participants had not yet returned questionnaires. Thus, we were able to obtain a relatively high response rate without compromising confidentiality.

Site visits. Early in the needs assessment, a list of projects to visit was developed by the authors and approved by the contracting agency.

This list contained eight project sites. Projects were selected for site visits on the basis of level of funding, level of development, and type of project. An attempt was made to include not only projects that were operated through local education agencies, but projects that were operated through other agencies and institutions as well. The primary objectives of the site visits were to gather information about the day-to-day activities of the project and to determine the level of interaction between project staff and parallel staff either in other departments or in other speciality fields. This last point was especially critical in projects operated through local education agencies. Each site visitor made a special note of the level of interaction between local project staff and school district-level curriculum specialists, as well as with teachers and others at the building level. Finally, an objective of the site visits was to elicit from the project staff their concerns about the future direction of the program and to determine their needs for the coming years.

Materials review. Prior to site visits, we requested that each project director send descriptions of projects as well as other pertinent materials such as workshop agendas, curriculum guides, evaluations, and other information describing the project. This information was requested not only from sites to be visited but from other project sites as well. The purpose of this request was to obtain as much information as possible about the various projects. From this information we gained an understanding of how each project worked, the goals and objectives of the various projects, whether or not innovative or unique curriculum approaches had been taken by the various projects, and finally whether or not there had been an attempt to create a program of instruction that could easily be absorbed by the larger system. This final point was deemed critical in light of future program funding.

Subsequently, we contacted several project directors and district-level staff by telephone. The purpose of the phone calls was to follow up on earlier requests for materials, to get clarification concerning project goals and objectives, to get progress reports on various projects, and to keep local project staff apprised of the progress of the needs assessment.

Document review. Shortly after the needs assessment contract was awarded, we began a literature search for documents pertaining specifically to nutrition or nutrition education needs of the State of Maryland. This search was followed up by a visit to the Maryland Department of Health and Mental Hygiene library, a survey of state and regional health and medical journals, and a review of annual reports of the Department as well as a number of special studies. Annual reports included county-by-county statistics on birth weight, teenage pregnancies, and a host of other major health concerns. Most information, however, proved to be of limited value to the contracting agency because it pertained to needs beyond the immediate control of the Food and Nutrition Branch or was several years old and possibly no longer valid. For example, one study cited in the Maryland State Medical Journal found that 75% of infants in Baltimore had iron poor blood, that 12-15% had retarded physical development, and that the premature birth rate was 16%.[1] This study illustrates both limitations; namely, the FNB cannot have a direct effect on infant nutrition, and the study was conducted very shortly after federal food subsidy programs began. The search did, however, confirm the Branch's suspicion that no other agency had conducted a comprehensive survey of nutrition education needs.

Review of course materials. We arranged with the specialist in charge of the quantity food preparation course to allow us to review the materials

[1]Robert E. Farber, Malnutrition in Baltimore's children. Maryland State Medical Journal, 1969, 18, 89-90.

for that course. The course is designed by the United States Department of Agriculture and modified for use at various local community colleges for the purpose of instructing district and building level food service managers in quantity food preparation. The primary purpose of the review was to compare the materials developed for this course with the background characteristics of local food service personnel. It was our objective to determine whether or not the quantity food preparation course in its existing state satisfactorily met the needs of local food service personnel.

Interviews. Interviews with various members of the Food and Nutrition Branch were conducted. These interviews were conducted on-site in Baltimore and over the phone with other aides. These interviews had a variety of topics and purposes. The primary purpose of all interviews was to obtain a more thorough understanding of the structure and operation of the Food and Nutrition Branch and of the relationship between that office and other programs and departments within the State Department of Education. In light of the preliminary needs assessment, it was our impression that not only would local project staff be required to integrate their activities with those in several departments and divisions at the local level, but that the Food and Nutrition Branch itself would need to develop and nurture positive interactions with staff at parallel levels in other branches of the State Department of Education.

Search for exemplary programs. Finally, the needs assessment project staff were asked to look for nutrition education and training projects that could be considered exemplary. An exemplary program was defined as one which had innovative materials and procedures, which was well received by students as well as teachers and food service workers, and which had consistently positive impact on students, teachers and food service personnel.

Each project funded through the Food and Nutrition Branch was considered for nomination as an exemplary project. The review of material at the outset of the needs assessment had as one of its objectives the discovery of exemplary programs. One of the objectives of the site visits and interviews was also to discover exemplary projects. The criteria established by the Joint Dissemination Review Panel of the U.S. Department of Education were employed as guidelines in selecting exemplary projects.[2]

Results

Presentation of all the results of the needs assessment is beyond the scope of this paper on methods. Rather, a sampling of the results is presented in order to illustrate the effects of combining strategies. The interested reader is directed to a two-volume publication by the second author for complete details of the results of the needs assessment.[3]

The only information obtained from students came from nutrition tests. Results of these tests are summarized in Tables 2-4.

[2]G.K. Tallmadge, The Joint Dissemination Review Panel Ideabook. Washington, D.C.: U.S. Government Printing Office, 1977.

[3]M.B. Bunch, Nutrition Education Needs Assessment Final Report 1980. Durham, N.C.: NTS Research Corporation, 1980, and M.B. Bunch, Nutrition Education Needs Assessment Final Report 1980: Supplements. Durham, N.C.: NTS Research Corporation, 1980 may be obtained from Dr. Bunch at Measurement Incorporated, 907 Broad Street, Suite B, Durham, N.C. 27705.

Table 2

Nutrition Education Needs of Maryland Fourth Graders

Category		Response
GROWTH & DEVELOPMENT	25%	Know that a child's development is affected by diet
BALANCED DIET	39%	Could correctly identify a balanced meal
	16%	Know that the school lunch provides 1/3 of all nutrient needs
	34%	Know why breakfast is important
	28%	Can tell how many servings of milk are needed each day
	31%	Seldom or never eat fruit or drink juice
	28%	Seldom or never eat the school lunch
NUTRIENTS	50-75%	Think vitamins give energy (3 different questions)
	11%	Can tell where we get energy
PSYCHOSOCIAL ASPECTS OF FOODS	26%	Know that first ingredient on food label is highest content
	45%	Believe too many bad things are put into our food
	36%	Believe that raw foods are better than canned or frozen

Table 3

Nutrition Education Needs of Maryland Eighth Graders

Category		Response
GROWTH & DEVELOPMENT	22%	Know that the greatest need for nutrients is from birth to two years
BALANCED DIET	32%	Know how many servings of fruits or vegetables are needed each day
	30%	Know that the school lunch provides 1/3 of all nutrients
	35%	Seldom or never eat breakfast
	60%	Seldom or never eat a Type A school lunch
	43%	Spend more money on junk food than on other kinds of food
NUTRIENTS	31%	Know what fruits and vegetables are good for them
	11%	Know where we get fiber
	12%	Know which foods are high in fat
	17%	Know the function of Vitamin C
	30%	Know that people need fat
	42%	Think vitamins give energy
	19%	Can identify fat soluble vitamins
	14%	Know which foods contain sugar
	40%	Think counting calories is a waste of time
PSYCHOSOCIAL ASPECTS OF FOODS	24%	Know what is on a food label
	85%	Seldom or never read a food label
	62%	Think additives are harmful
	57%	Are concerned about world hunger
FOOD SOURCES, PROCESSING, & HANDLING	67%	Seldom or never help prepare meals at home
	42%	Think cafeteria workers are not concerned about food waste
	37%	Can define vegetarianism
	17%	Believe nutrition information on labels is useless

Table 4

Nutrition Education Needs of Maryland Eleventh Graders

Category		Response
GROWTH & DEVELOPMENT	36%	Know the relationship between activity and caloric intake
BALANCED DIET	22%	Can identify the food group to which nuts and dried beans belong
	22%	Skip meals often
	22%	Skip meals sometimes
	48%	Seldom or never eat breakfast
	54%	Seldom or never eat a school lunch
	65%	Do not believe lunch is important
	50%	Believe school lunches are nutritious
	52%	Believe school lunches are not a bargain
NUTRIENTS	88%	Seldom or never count calories
	25%	Know about complex carbohydrates
	11%	Can identify a food that does not contain sugar
	12%	Can identify a food low in fat
	30%	Can identify a food high in protein
	14%	Can identify foods high in Vitamins A and B
	31%	Know that people need fat in their diets
	29%	Can identify foods low in protein
	19%	Can identify fat soluble vitamins
PSYCHOSOCIAL ASPECTS OF FOOD	7%	Can identify the federal agency responsible for regulation of food quality
	37%	Can define vegetarianism
	88%	Seldom or never read food labels
	17%	Believe nutrition information on labels is useless
FOOD SOURCES, PROCESSING & HANDLING	64%	Believe that modern food processing has destroyed most of the nutrients in our food
	63%	Believe that additives are harmful

Based on the results presented in Tables 2-4, we made the following recommendations pertaining to students:

- Because students at all grade levels are deficient in their knowledge of nutrients, specifically, knowledge about vitamins, their sources, and their functions, there should be a heavy emphasis in the development and/or selection of nutrient-related materials in classroom instruction particularly at the early elementary grades. (ESSENTIAL)
- Because knowledge attained by junior high and senior high school students does not translate into positive attitudes and behaviors, steps should be taken to motivate older students to eat breakfast and lunch more frequently and to eat more balanced meals. (ESSENTIAL) Attention should also be given to the fact that these students eat more and more irregularly as they get older, skip more meals, and seem less likely to get a well balanced diet as they get older. It should be noted that instructional materials and methods for the inculcation of behavior and attitudes will differ markedly from those which have as their objective the dispensing of knowledge.
- Because students at all levels appear to be naive with respect to food consumerism, instructional emphasis should be placed on advertising, food preparation and distribution, and food labelling. (VERY DESIRABLE)
- Because many students at all levels are unable to distinguish between nutrition facts and popular misconceptions, there should be an instructional emphasis on the relative mertis of organic vs. artificial fertilizers, food processing methods, pills and dietary supplements and food fads. (DESIRABLE)

As we examine these recommendations, it becomes clear that additional information is required. For example, we noted that older students seemed to know certain basic facts about balanced diet but failed to eat properly. Instruction must therefore be oriented toward motivation rather than knowledge. How well equipped were school personnel to provide such instruction? A review of results relevant to teachers should be helpful.

Most teachers had received no special training in nutrition (72 out of 120, or 60%). The primary reason given for not having received training was that nutrition was not perceived as relevant to the subject matter area taught by the teacher. The second most frequently cited reason was the fact that no training was available. Among teachers who indicated that they had received training, most had taken a basic nutrition course in college. National Dairy Council workshops were also cited by 28 teachers as a source of training. A majority (55%) indicated that they would not be willing to be trained to provide nutrition education and act as a resource person in their schools.

Teachers were asked whether or not they had worked with parents in helping students acquire good nutrition habits. A great majority (76%) indicated that they had not worked with parents. This group essentially felt that it was not their responsibility and that parents were not interested in nutrition education. Of the group who had attempted to work with parents, the majority had taken a very low level or noncommital approach. That is, 23 out of the 28 teachers responding had simply sent information home with the children. Approximately half (13 out of 28) had discussed nutrition with parents at conferences.

The majority of teachers supported nutrition principles, at least in theory. Seventy-nine teachers indicated support for policies that limit the selling of candies and soft drinks in schools, and 75 reported

that they try to set a good example by practicing good eating habits. The translation of theory into practice, however, seemed to be rather minimal. Five teachers indicated that they were working to implement a nutrition policy in their schools. Similarly, the statements "I am working to get a breakfast program in my school," and "I coordinate nutrition activities with food service personnel" were each checked by one teacher.

The reader should bear in mind the fact that a preliminary needs assessment revealed that most nutrition education would have to come from teachers other than full-time nutrition educators. Therefore, the lack of training and practical commitment to nutrition education among a sample of teachers was seen as potentially devestating to the nutrition education program of the state.

The questionnaire responses of principals were helpful in our understanding of the situation. For example, 62% of all principals responding believed that students in their schools had poor snacking habits; 55% believed there was excessive plate waste in their schools. Yet, only 7% reported that they had instituted any kind of nutrition policy. In general, statements beginning with "I support" or "I believe" were endorsed by many principals, while statements indicating specific action were checked by few. Principals, like teachers, supported nutrition education in theory but not in practice.

An analysis of a sample of schools and nutrition programs shed additional light on the theory/practice dichotomy. In a majority of instances district-level nutrition specialists had developed nutrition education materials that could be integrated into a variety of subjects. Activities included food weighing in conventional and metric systems for mathematics classes, food choices of diverse cultures for social studies classes, the relationship of nutrition to health for health classes, and the nutrient composition of foods for science classes. Although there were encouraging exceptions, the

majority of district-level nutrition specialists had done little to enlist the assistance of their counterparts in science, mathematics, or other curriculum areas. In some instances, such interaction was actively avoided. A similar pattern emerged at the state level. While state nutrition specialists encouraged cooperation among local nutrition specialists and their counterparts in other disciplines, state-level nutritionists were themselves reticent to spend much time with nonnutritionists. This fact became apparent in a series of interviews with contracting agency staff.

Conclusions and Recommendations

Primary goals of nutrition education are to make students aware of basic nutrition facts and to promote positive attitudes and behavior with respect to nutrition. In order to determine what steps are necessary to reach such goals, it is first necessary to determine the existing knowledge, attitudes, and behavior of students. Once these are known, one has a basis for specifying student needs.

Addressing the needs of students is invariably a task shared by parents, teachers, principals, and district and state-level educators. Finding out what each of these individuals and groups is willing and able to do is crucial in establishing a plan for meeting the needs of students. A procedure which surveys a wide variety of abilities and attitudes will provide much information but at a relatively shallow level. A case study approach yields much more detailed information but is limited in scope. An approach which combines survey and case study procedures allows one to identify a variety of needs, to target the most pressing ones, and to examine those in depth. The needs assessment reported here is an example of such an approach. We believe that the recommendations based on the multimethodological needs assessment will continue to be both relevant and instructive for many years.