Using a Systematic Approach and Theoretical Framework to Design a Curriculum for the Shaping Healthy Choices Program

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ABSTRACT

Objective: To examine the use of a systematic approach and theoretical framework to develop an inquiry-based, garden-enhanced nutrition curriculum for the Shaping Healthy Choices Program.

Methods: Curriculum development occurred in 3 steps: identification of learning objectives, determination of evidence of learning, and activity development. Curriculum activities were further refined through pilot-testing, which was conducted in 2 phases. Formative data collected during pilot-testing resulted in improvements to activities.

Results: Using a systematic, iterative process resulted in a curriculum called Discovering Healthy Choices, which has a strong foundation in Social Cognitive Theory and constructivist learning theory. Furthermore, the Backward Design method provided the design team with a systematic approach to ensure activities addressed targeted learning objectives and overall Shaping Healthy Choices Program goals.

Conclusions and Implications: The process by which a nutrition curriculum is developed may have a direct effect on student outcomes. Processes by which nutrition curricula are designed and learning objectives are selected, and how theory and pedagogy are applied should be further investigated so that effective approaches to developing garden-enhanced nutrition interventions can be determined and replicated.

Key Words: nutrition education, curriculum development, garden enhanced, inquiry based, school based (J Nutr Educ Behav. 2016;48:60-69.)

INTRODUCTION

Dietary behaviors among children in the US represent a major public health concern. Recent data show that a high percentage of children are consuming inadequate amounts of nutrient-rich foods such as fruits and vegetables and many do not meet the recommended amounts of some nutrients, including calcium, vitamin D, fiber, and potassium. Another area of concern is the continuing high prevalence of obesity among children and adolescents.

To maximize the potential to improve children's dietary behaviors, experts recommend that school-based nutrition education interventions use multi-component strategies that address several levels of social organization concomitantly (eg, individual, school, family, community). Nutrition interventions are thought to be most effective in preventing childhood obesity when they combine classroom education with environmental changes, incorporate nutrition and physical activity, and promote parental and community involvement. Greater improvements in nutrition- and health-related behaviors are demonstrated in programs that integrate theoretical models of dietary behavior. In addition, controlled trials in school-based programs using nutrition curricula enhanced by garden activities have demonstrated greater improvements in nutrition knowledge, consumption of vegetables, preferences for vegetables, and willingness to taste vegetables, compared with those without.

The Shaping Healthy Choices Program (SHCP) was developed to investigate the effectiveness of a multi-component, school-based nutrition intervention. The objectives were to increase upper elementary-aged children's...
nutrition knowledge and use of reasoning skills; promote availability, consumption, and enjoyment of fruits and vegetables; improve dietary patterns; encourage physical activity; foster positive changes in the school environment; and facilitate development of an infrastructure to sustain the program.12 These objectives were to be accomplished through nutrition education in the classroom, increased access to fresh fruits and vegetables in the school cafeteria, dissemination of family newsletters, expanding community partnerships, and the formation of school-site wellness committees.

A prerequisite to meeting these objectives was the development of a curriculum for upper elementary-aged students that integrated behavior theory and included garden-enhanced activities. Although several publications have cited positive nutrition-related outcomes of garden-enhanced nutrition interventions among upper-elementary children, the specific processes by which curricula used in these programs were developed have not been described in detail.7,9,13-15 Illustrative of this, descriptions of the curricula typically include a summary of main topics, duration, frequency and quantity of activities, objectives, behavior theory, gardening activities (i.e., maintenance and harvest), and vegetables grown, but there is minimal discussion concerning specific approaches used to develop the curricula; without understanding such processes used, replication is difficult.16

In support of the need for research literature describing specific curriculum development approaches, a review of garden-based nutrition education interventions concluded that future publications should provide more information about the intervention development and implementation to fully understand variations in student outcomes between programs.16 The purpose of the current article is to address this gap in the literature and describe the systematic, intentional processes used in the development of the curriculum for SHCP.

METHODS

The goal of the curriculum development process for SHCP was to design a sequence of learning experiences for upper elementary-aged children to gain nutrition knowledge and advance their reasoning skills so they could make evidence-based decisions about their diets. To accomplish this, 4 researchers with expertise in the areas of nutrition science, nutrition education, inquiry-based education, curriculum development, and garden-based learning formed a curriculum design team. In addition, 8 undergraduate students majoring in nutrition science and clinical nutrition were recruited as volunteer interns. Researchers and undergraduate students worked together to develop and pilot-test activities with upper elementary-aged students.

The undergraduate students were each assigned the development of 1 curriculum module. Specifically, they were to develop 2 activities within each module: 1 classroom activity and a second activity designed for implementation in an instructional garden. The role of the researchers was to work closely with the undergraduate students in the development process by providing guidance, recommendations, and edits to curriculum activities. The contributions of the researchers ensured that activities met curriculum objectives, addressed educational standards, supported theoretical constructs, and were sequenced to build knowledge and skills over time.

The curriculum design team met weekly for 9 months. These 1-hour meetings were facilitated by the researcher with expertise in curriculum development and were structured so that team members participated in reflective practice. Specifically, team members presented current iterations of activities and engaged in discussions on challenges and successes experienced during curriculum development, pilot-testing, and revisions of activities.17

Before the curriculum development process began, researchers identified Social Cognitive Theory (SCT) and constructivism as the theoretical underpinnings for the curriculum activities.18,19 The primary SCT constructs chosen for the curriculum were behavioral capability, reciprocal determinism, and self-efficacy.18 Inquiry-based education and experiential learning, educational approaches rooted in constructivism, were the pedagogical strategies selected.20,21

Curriculum Development Using Backward Design

The approach used to develop the curriculum was Backward Design.22 This 3-step process involves identifying learning objectives, determining acceptable evidence of learning, and designing activities to align directly with learning objectives and selected evidence of learning.

Applying the first step of Backward Design, specific learning objectives for the curriculum were selected within 3 key domains: dietary recommendations, nutrition concepts, and critical thinking skills. In addition, 3 overarching content areas were identified: introducing agricultural practices, supporting health through diet and physical activity, and using reliable resources to make dietary choices. Dietary recommendations identified for inclusion were based on the Dietary Guidelines for Americans 2010 (DGA) and MyPlate.23,24 Specific nutrition concepts were identified from Nutrition to Grow On, an existing evidence-based, garden-enhanced nutrition curriculum that has been used by other researchers when developing nutrition education interventions.7,9,25 Specific grade-level standards for the curriculum were identified to integrate relevant standards-based learning objectives. Standards addressed included California Nutrition Education Competencies, Common Core State Standards for Mathematics and English Language Arts, and Next Generation Science Standards.26–28

The design team then organized the learning objectives into activity modules based on nutrition concepts identified. Emphasis was placed on vertical organization, sequencing modules to provide opportunities to build knowledge and skills over time, and horizontal organization, connecting activities to real-world situations and the broader goals of SHCP.29

Following the second step of Backward Design, curriculum design team members identified acceptable evidence of learning through the use of authentic assessment strategies. Authentic assessment involves real-world tasks that allow students to exhibit their understanding of knowledge and skills while engaged in an activity (e.g., performance of a task; response
to a prompt) as opposed to a test or quiz at the end of a lesson.

In the third step of Backward Design, activities were designed so that they were directly aligned with identified learning objectives and provided opportunities for predetermined evidence of learning. Curriculum activities were developed using guided inquiry organized explicitly around a 5-step experiential learning cycle with the following phases: Experience, Share, Process, Generalize, and Apply. In addition, activities were designed to help students advance metacognitive abilities through the use of open-ended prompts to describe their thinking processes during the Share, Process, and Generalize phases of the learning cycle. Each module included 1 classroom activity, 1 garden-based activity, at least 1 take-home activity, and a goal-setting activity. Each undergraduate student was responsible for developing activities within 1 module with guidance from the research team members. Classroom activities were developed first, followed by the development of garden, take-home, and goal-setting activities.

Curriculum Refinement Through Pilot-Testing

The curriculum was pilot-tested with upper elementary-aged school children (grades 4–6) and occurred in 2 phases. During phase 1, individual activities were implemented with 30 children enrolled at 2 Child Development Center (CDC) sites in Davis, CA. The purposes of this phase of pilot-testing were to conduct a trial of individual activities among learners in the intended age group and to ascertain whether children would be capable of understanding the intended concepts, as demonstrated by the predetermined evidence of learning (Table 1). Observational data were collected for formative purposes and were recorded using a plus/delta sheet, a tool designed to help identify what is going well and what needs to be changed. The observation sheet had prompts representing the themes of data to record: effectiveness of procedures, developmental appropriateness, suitability of student groupings, level of student interest and engagement, efficacy of the materials, and activity duration to guide data collection.

Table 1. Learning Objectives and Evidence of Learning Identified

<table>
<thead>
<tr>
<th>Concept</th>
<th>Evidence of Learning (Students Will be Able to . . .)</th>
<th>Module Sequence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Food grown around the world varies due to agricultural practices and climate</td>
<td>Describe that there are similarities of foods grown where there are similar climates</td>
<td>1</td>
</tr>
<tr>
<td>Foods people eat vary due to cultural traditions</td>
<td>Describe different cultural foods and traditions from various countries</td>
<td>1</td>
</tr>
<tr>
<td>Function of lungs and heart</td>
<td>Explain that the heart pumps blood around the body and the lungs are the point of gas exchange between oxygen and carbon dioxide</td>
<td>2</td>
</tr>
<tr>
<td>Physical activities differ by intensity</td>
<td>Draw a graph of the heart and breathing rates at different intensities and observe the differences</td>
<td>2</td>
</tr>
<tr>
<td>Different food groups have similar types of nutrients</td>
<td>Discuss similar characteristics between foods with similar nutrients after categorizing them</td>
<td>3</td>
</tr>
<tr>
<td>Biological roles of nutrients</td>
<td>Describe the specific biological function of selected macronutrients and micronutrients</td>
<td>3</td>
</tr>
<tr>
<td>Foods are measured using cups, tablespoons, teaspoons, ounces, and grams</td>
<td>Demonstrate use of appropriate measuring tools for different foods (ie, tablespoons for small amounts, cups for large amounts)</td>
<td>4</td>
</tr>
<tr>
<td>Serving size is a standardized reference amount</td>
<td>Solve a mathematical problem to demonstrate the number of servings within 1 portion</td>
<td>4</td>
</tr>
<tr>
<td>MyPlate recommendations provide information about daily dietary needs</td>
<td>Construct a daily meal plan based on MyPlate recommendations</td>
<td>5</td>
</tr>
<tr>
<td>Nutritional requirements vary by life stage, gender, and physical activity</td>
<td>Describe differences between daily meal plans for people with a variety of ages, genders, and physical activity levels</td>
<td>5</td>
</tr>
<tr>
<td>Nutrition Facts Labels is a source of information about nutrient content in food items</td>
<td>Discuss the information on a food label that helped them make a healthy choice</td>
<td>6</td>
</tr>
<tr>
<td>Food companies use strategies such as catchy jingles, free toys, sale prices, and celebrity spokespeople to influence food choices</td>
<td>Act out a commercial that employs strategies that food companies use</td>
<td>7</td>
</tr>
<tr>
<td>Reliable information can be used to choose healthy snacks</td>
<td>Demonstrate the use of Nutrition Facts Labels and MyPlate recommendations in the assembly of a healthy snack</td>
<td>8</td>
</tr>
</tbody>
</table>
A researcher on the design team and the individual facilitating the activity completed the observation sheet and compared observations to achieve agreement. Subsequently, curriculum design team members met and discussed formative data collected and potential revisions to address problematic procedures and materials. Subsequently, activities were amended as necessary. If a majority of children exhibited evidence of learning, the procedures were not revised.

In phase 2 of pilot-testing, the amended activities were implemented fully in sequence. Implementation occurred 4 d/wk over a 4-week period with 10 upper elementary–aged children at 1 CDC site. The CDC site chosen approximated a formal classroom setting; a container garden was established to allow pilot-testing of the garden-enhanced activities. Observational data collected during this phase placed an emphasis on vertical and horizontal organization of the curriculum.25 The structured observation process described in phase 1 was also used in phase 2. Curriculum design team members discussed data collected; further modifications to activities were made as needed. A diagram of the curriculum development and pilot-testing processes is depicted in the Figure. The cost for phases I and II of pilot-testing was approximately $400, which included copies of activity handouts and supplies, and garden materials.

In discussions with the University of California, Davis, Human Subjects Institutional Review Board it was concluded that the development and pilot-testing of the curriculum did not qualify as human subjects research, and thus was exempt from review.

RESULTS
Outcomes from this investigation included learning objectives, evidence of learning, activities, and data-driven revisions of the curriculum based on pilot-test data. The resulting curriculum is titled Discovering Healthy Choices.

Identification of Learning Objectives
Table 1 presents specific nutrition concepts identified as learning objectives in the first step of Backward Design. These objectives included agriculture and geography, physical activity and the human circulatory system, physiological roles of nutrients, measurements and serving size, MyPlate recommendations, Nutrition Facts Labels, consumerism, and choosing healthy foods.

The curriculum design team then determined the sequence in which the nutrition concepts would be organized (Table 1). Additional learning objectives included dietary recommendations and critical thinking skills. Dietary recommendations chosen were composed of key consumer messages from DGA and focused on foods suggested for increased consumption (eg, whole grains, fruits, vegetables, and low-fat and nonfat dairy products). Reasoning skills identified for Discovering Healthy Choices included observing, classifying, ordering, measuring, making inferences, and predicting.30

Determination of Evidence of Learning
Table 1 shows acceptable evidence of learning identified as part of the curriculum development process. Specifically, curriculum design team members determined ways in which students would demonstrate understanding using authentic assessment strategies: students will construct a daily meal plan that follows MyPlate recommendations; students will demonstrate a number of servings within a portion; and students will identify consumer advertising strategies.

Development of Activities
Table 2 describes activities developed by the curriculum design team in the third and final step of Backward Design. Classroom activities were designed for students to develop behavioral capability by building foundational knowledge and skills, to promote self-efficacy through opportunities to apply the knowledge and skills in garden activities, and to influence reciprocal determination by having students engage with their families through take-home activities in the home environment. The

![Figure](image-url)
<table>
<thead>
<tr>
<th>Module</th>
<th>Application of Social Cognitive Theory</th>
<th>Classroom Activity</th>
<th>Garden-Enhanced Activity</th>
<th>Take-Home Activities</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1</strong></td>
<td>Introduction to Nutrition, Agriculture, and Garden</td>
<td>Behavioral capability: Generate interest in foods from around the world to encourage cooking and eating new foods</td>
<td>Explore agricultural practices from around the world</td>
<td>Grow vegetables from countries investigated</td>
</tr>
<tr>
<td><strong>2</strong></td>
<td>Getting Physically Active</td>
<td>Behavioral capability: Develop understanding of the importance of physical activity to support a healthy circulatory system and increase physical activity</td>
<td>Explore the circulatory system including gas exchange at the lungs and function of the heart</td>
<td>Observe differences in heart rate and breathing rate during resting and physical activity while gardening to understand differences between intensity levels</td>
</tr>
<tr>
<td><strong>3</strong></td>
<td>Nutrients We Need</td>
<td>Behavioral capability: Acquire knowledge about nutrients present in different foods to encourage consumption of a variety of foods</td>
<td>Investigate foods that provide different nutrients and roles that nutrients have in maintaining health</td>
<td>Investigate different nutrients provided by vegetables in the garden</td>
</tr>
<tr>
<td><strong>4</strong></td>
<td>Food Math</td>
<td>Behavioral capability: Develop knowledge and skills in using volumetric measurements so that food labels and MyPlate recommendations can be understood and used</td>
<td>Examine instruments used to measure food and calculate the servings in a portion</td>
<td>Estimate number of servings in different vegetables</td>
</tr>
<tr>
<td><strong>5</strong></td>
<td>MyPlate</td>
<td>Behavioral capability: Acquire knowledge to understand and apply recommendations to meal planning</td>
<td>Explore how MyPlate recommendations vary by age, gender, and physical activity level</td>
<td>Explore MyPlate vegetable subcategories using the 5 senses</td>
</tr>
<tr>
<td><strong>6</strong></td>
<td>Food Labels</td>
<td>Behavioral capability: Develop skill of comparison and use knowledge of nutrients to make</td>
<td>Inspect Nutrition Facts Labels and use the information determine which are the healthiest choices</td>
<td>Construct Nutrition Facts Labels for vegetables growing in the garden by collecting information</td>
</tr>
</tbody>
</table>

(continued)
garden activities developed for Discovering Healthy Choices placed an emphasis on learning experiences in which students work in teams to select, plant, maintain, and harvest their own herbs and vegetables.

Activities were designed to align directly with SHCP objectives. To increase knowledge and reasoning skills, activities were developed using Backward Design, used experiential and inquiry-based learning strategies, and were organized sequentially so that understanding could be developed over time. To increase the likelihood of increased consumption and enjoyment of vegetables, garden activities and opportunities to taste vegetables were included. To encourage physical activity, a module was designed around this objective and was addressed in the module that focuses on MyPlate recommendations.

Curriculum Revisions Through Pilot-Testing

The researchers used formative data collected during pilot-testing of Discovering Healthy Choices to improve activity design. Analysis of observations resulted in clarification of instructions, revisions in wording needed for developmental appropriateness, and the creation or modification of handouts and worksheets. Table 3 presents specific examples of observations and subsequent revisions in phases 1 and 2.

Data from pilot-testing also provided the curriculum design team with information on student misconceptions that interfered with learning intended concepts and signaled the need for activity modifications. For example, in pilot-testing of module 4, students misunderstood that serving size and recommended amount were conceptually equivalent. This could result in misunderstanding of MyPlate recommendations and the Nutrition Facts Label in subsequent activities; the activity was revised to clarify that serving sizes are standardized reference amounts.

The result of the development effort was the Discovering Healthy Choices curriculum, which includes 15 1-hour classroom and garden activities and 19 take-home and goal-setting activities. Formal evaluation of the effects of Discovering Healthy Choices on student learning and dietary behaviors as part of SHCP was conducted in a randomized controlled intervention during the 2012–2013 academic year among fourth-grade children. The results of this evaluation will be provided in a subsequent report. The methods used for this evaluation have been reported elsewhere.

DISCUSSION

The Backward Design method provided researchers with a systematic approach to develop curriculum activities that were grounded in a theoretical framework, included focused learning objectives, and provided opportunities for educators to observe learning outcomes using authentic assessment strategies. The authors chose the Backward Design approach because it is logical and pragmatic, and provides a design template that is easy to follow. In addition, it was developed for designing experiential learning opportunities, which was
consistent with education strategy identified for the curriculum.

Backward Design is a curriculum development strategy that is structured to identify learning objectives and assessment strategies before developing activities. This method provided the researchers with a process and structure to develop a comprehensive, garden-enhanced nutrition curriculum. This approach also allowed the curriculum design team to develop a sequence of modules that built knowledge and skills over time, helping to ensure that the SCT construct of behavioral capability was well supported. By identifying learning objectives and ascertaining the sequence of nutrition concepts in the first step of Backward Design, design team members were able to determine what conceptual understanding students would need to develop before subsequent, more complex material could be introduced. For example, to understand MyPlate recommendations in cup and ounce equivalents, students would need to be able to understand volumetric and weight measurements. As a result, the design team integrated the learning objective of using measurement tools into module 4, which precedes MyPlate in module 5.

It was also important to examine current nutrition recommendations and education standards to identify those that were relevant to the goals of SHCP. Integrating recommendations from DGA 2010 and MyPlate ensured that the nutrition messages were consistent with federal nutritional guidance. It was critical to review education standards to develop activities that were appropriate for grade level. For example, according to Next Generation Science Standards, fourth-grade students are expected to understand macrostructures in the body such as organs and systems. As a result, nutrients were described as having functions that could be understood at an organ or system level (eg, calcium supports bone health and vitamin A supports vision). In addition, the integration of education standards and current nutrition recommendations helps teachers address the challenges involved in meeting mandated subject area requirements while integrating nutrition into their classrooms. The curriculum design team identified these education standards as intended learning objectives in the first step of Backward Design to ensure that the standards would be fully integrated within the activities.

To help support the SCT construct of behavioral capability specifically, reasoning skills were addressed that are relevant to the goals of SHCP and nutrition education more broadly. Critical thinking skills enhance individuals’ abilities to analyze and evaluate dietary information to make healthful food choices; for instance, understanding how to classify foods into different groups helps students understand MyPlate recommendations, using measurement tools such as measuring cups and tablespoons allows for comprehension of serving amounts listed on food labels, and observing and comparing are required to make healthy food choices based on nutrients listed on food labels. In addition, activities that include prompts for metacognition may

| Table 3. Selected Examples of Observations and Revisions Made to Discovering Healthy Choices as a Result of Pilot-Testing Phases 1 and 2 |
|---|---|---|---|---|---|
| **Module** | **Observation** | **Subsequent Revision** | **Observation** | **Subsequent Revision** |
| 1 | Learning about agriculture around the world sparked student interest in cultural foods and traditions | Activities were added to allow investigation of cultural foods | There were not enough unique countries for each group of 3–4 students to explore | Additional resources were added |
| 2 | Students appeared confused about what they were expected to do | Prompt was added to the procedure to provide additional information | Locating students’ pulse was difficult | An illustration was created |
| 4 | Students needed to convert between measurements but did not have a reference of unit conversions | Resource for unit conversions was added | Measuring foods required extra cleanup | Garbage bags were added as a required material |
| 5 | Students had difficulty understanding that MyPlate recommendations were for the entire day and not just 1 meal | Handout and instructions were amended | Students found it difficult to complete the activity owing to lack of reference to MyPlate | The MyPlate icon was added as a handout |
| 8 | Student groups were tested with 4–5 in each group; groups with 5 students were not suitable for effective implementation | Student groups were set to 3–4 students | Students used prior knowledge gained in module 6 about food labels to determine what ingredients to put in their salads | Prompt was included to encourage educators to provide examples of food packaging to encourage investigation |
strengthens children’s dietary decision-making skills by encouraging them to consider how they approach solving nutrition-related problems and apply dietary recommendations.35

The determination of evidence of learning in the second step of Backward Design helped the design team maintain focus on developing activities that targeted intended learning objectives and included authentic assessment opportunities to ensure those objectives could be met. Authentic assessments allow educators to monitor the acquisition of knowledge and skills through students’ performance during an activity, as opposed to using a quiz or test after the completion of a lesson.22 This provides educators with opportunities to make necessary adjustments in facilitating an activity to help students who may be having difficulty understanding intended concepts and to avoid developing misconceptions.

Weekly meetings by the curriculum design team to engage in discussion and reflective practice were valuable to the development process. Meetings provided a forum for team members to work collaboratively to design and revise activities.17 In addition, these meetings provided an opportunity to identify potential connections between activities to reinforce vertical organization.36 The curriculum design team recognized this iterative process as critical to the resulting Discovering Healthy Choices curriculum and recommend this approach for use in future curriculum development efforts.

Phase 1 pilot-testing was necessary to collect formative data on individual activities. It provided an opportunity to assess whether students could achieve intended learning objectives and ensure that activity procedures were written clearly and accurately so they could be carried out as intended before SHCP could be formally evaluated. Phase 2 pilot-testing allowed the design team to observe the continuity of activities when implemented sequentially. Observational data helped the curriculum design team examine whether activities were connected conceptually and linked with other components of SHCP.

The SCT construct of behavioral capability was integrated within all activities so that learners could engage actively developing knowledge about nutrition concepts and dietary recommendations, advance their reasoning skills by making observations, record data, and draw inferences based on information they collected. Reciprocal determinism was addressed through activities intended to be carried out at home in real-world contexts. Take-home activities included goal setting and self-monitoring tasks to promote self-efficacy in using new knowledge and skills to make healthy choices.

Through the use of constructivist learning strategies, Discovering Healthy Choices activities were designed so that students engage in hands-on, inquiry-based activities in which they could develop new knowledge and challenge existing understanding of nutrition-related concepts. These learning strategies help advance metacognition through direct experiences that build on one another over extended periods of time, including opportunities for dialogue with other learners and promoting problem-solving skills and self-reflection.15,30,32 Subsequently, new knowledge and skills are applied in authentic contexts through garden and take-home activities that provide opportunities for learners to develop a deeper understanding of subject matter.

IMPLICATIONS FOR RESEARCH AND PRACTICE

Using a systematic approach to curriculum development provided the design team with a structure that allowed for thoughtful, intentional curriculum design. Specifically, this method resulted in curriculum activities with focused learning objectives and opportunities to determine evidence of student understanding. Furthermore, activities were grounded in a theoretical framework and were well-connected to overall SHCP goals. The importance of using a research-based approach to develop nutrition curricula was demonstrated during this investigation. The use of qualitative methods to assess curriculum procedures and materials among children in the intended age group provided information to inform curriculum development and revision processes that would not have been otherwise ascertained. Randomized controlled trials are the reference standard for testing nutrition curricula, but they are costly and time-consuming. Before a curriculum can be tested in a randomized controlled intervention, researchers must be able to recognize whether the curriculum has the potential to effect change. Key components in this curriculum development process include an iterative approach, reflective practice, and weekly team meetings. In addition, curriculum development requires using effective pedagogical strategies, understanding the intended learners, and knowing the context in which the curriculum will be used. Finally, pilot-testing before implementing a curriculum in a randomized controlled intervention provides validation that activity procedures are understandable and that students are able to learn the curriculum concepts and skills as intended.

The process used in curriculum development may be central to developing curricula that can help reduce the risk of obesity and improve consumption of nutrient-rich foods such as fruits and vegetables. Within the broader context of school-based nutrition programs, a recent meta-analysis concluded that such interventions have not been effective in reducing obesity; it further states that identification of successful strategies was difficult because of limited published information about how programs were developed and implemented.38 Differences between curriculum design approaches may be an underlying factor affecting student outcomes. Consequently, thorough descriptions of the processes by which nutrition curricula are designed and how theory and pedagogy are applied should be presented in publications so that effective approaches to program development can be determined. Without this, the development of effective programs may be difficult to replicate and student outcomes may not be fully understood.

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REFERENCES


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With the recently expanded scope of Journal of Nutrition Education and Behavior (JNEB), we are planning a special issue devoted to nutrition economics. Dr. Joanne Guthrie will author the opening Perspective, and we are hoping for many excellent articles to progress through our peer review.

Topics include but are not limited to behavioral economics, consumer food behavior as it relates to economics, cost benefits of programs, food budgeting and related areas, or how economic status of individuals or communities affects food access or intake.

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The authors have not stated any conflicts of interest.