

Using School Gardening as a Vehicle for Critical and Creative Thinking in Health Education

Judith A. Ausherman, Valerie A. Ubbes, and Jacqueline Kowalski

Abstract

This strategy is to provide health education teacher candidates with critical and creative thinking tools to explore gardening as a vehicle to integrate health education content with other subjects. According to the Competency-Based Framework for the Health Education Specialist (2010a), entry-level health educators should have skills and competencies needed to make connections between learning content and skills, as well as develop a process for integrating health education into other programs. The objectives of this strategy will enable health education teacher candidates to: (1) develop an integrative approach to teaching health education through school gardening, (2) explore the use of picture books for understanding the integrative nature of health education topics, and (3) analyze the relationship between health education and other subject areas taught in a preK-12 curriculum.

Introduction

School gardening programs have become increasingly popular as a vehicle for integrative approaches to teaching. However, the idea of having a garden connected with the school curriculum is not new. In 1903, H.D. Hemenway, the director of the Hartford School of Horticulture, wrote "How to Make School Gardens: A Manual for Teachers and Pupils" to assist teachers who did not have agricultural training to better understand how to implement gardening as an integral part of the teaching and learning process. In 1907, the Bureau of Education promoted activities such as gardening by stating that children who participated in school gardening programs achieved greater development in a given time and accomplished more than students who were not provided this opportunity. The results of other studies indicate a need for curriculum materials and teacher training for gardening and

nutrition (Graham, Beall, Lussier, McLaughlin, & Zindenberg-Cherr, 2005). Research shows that gardening helps children build essential skills they need to fulfill their potential in a rapidly changing world (Blair, 2009).

Richard Louv, the author of the *Last Child in the Woods* (2008) and chairman of the Children & Nature Network, has compelling insight regarding the future of our nation's children. He suggests that "In the United States we see growing concern among parents, educators, physicians and others that children aren't playing outside much anymore—not even in the back yard or the neighborhood park. This change in our relationship with nature has profound implications for the mental, physical and spiritual health of future generations—and for the health of the natural world. Young people need opportunities to experience and learn from nature during their growing years in order to become citizens and future decision makers who will take responsibility for the stewardship of the Earth" (p. 14). Louv (2008) described the negative impacts of children's alienation from nature and suggested that our increasingly high-tech, indoor society is "teaching young children to avoid direct experience in nature." Research also suggests that when children spend less time in natural surroundings "their senses narrow, physiologically and psychologically, and this reduces the richness of human experience" (p. 17).

Garden-based educational programs can provide a myriad of opportunities to improve student knowledge and skills in health education. Gardening in schools encourages children to become active learners capable of thinking independently; to gain a more resilient, confident, and responsible approach to life so they can achieve their goals and play a positive role in society; to embrace a healthier, more active lifestyle; and to develop the ability to work and communicate with people of all ages and backgrounds (Passy, Morris, & Reed, 2010). In order for pre-service health educators to learn how to establish the connections between school gardening and health education, they must be able to apply critical and creative thinking skills (Ubbes, Black, Ausherman, 1999) and the skills of decision making, goal setting, and communication outlined by the National Health Education Standards (NHES Committee, 2007).

School gardening is a helpful vehicle for understanding the complex nature of critical and creative thinking. For example, gardening environments are constantly adapting to changes in weather and soil conditions, so human plans for gardening are continually changing. Gardening also challenges pre-service teachers to analyze and synthesize information in new ways depending upon the age, ability, and background knowledge of the students involved. An integrated curriculum recognizes that the academic subjects within the curriculum are interconnected. Blair (2009) suggests that the most established subject connections to school gardening are science, math, history, art, language arts, social science, and physical education. Nutrition is also listed, but in the field of health education, nutrition education is considered to be a content area

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and not a stand alone discipline.

One of the reasons health education is not integrated with other subjects is because teachers in schools face time constraints in the current educational system, which is focused on academic achievement and meeting a variety of academic standards. However, teachers may be more likely to teach nutrition in their classrooms if they are shown how to incorporate nutrition in their existing science, language arts, math, and/or social studies curricula (Graham & Zidenberg-Cherr, 2005). Health educators in schools could use this opportunity to provide a more comprehensive understanding of how nutrition is linked to broader concepts and skills that promote and protect human health. For example, the broader macroconcepts of energy, adaptation, change, time, boundaries, cycles, structure, and balance have been outlined by Ubbes (2008, p. 109), who encourages “teaching these abstract concepts in concrete ways, with hands-on props and models, through repetition and bridging activities to interdisciplinary units in schools that promote inquiry-based investigations” (p. 108). School gardening is an excellent bridging activity to interdisciplinary units in schools because students can draw upon critical and creative thinking as they plan, implement, and evaluate their gardening results that produce food for improved nutrition while expending physical activity to do gardening across an extended planting season.

The premise of the “integrated” and “interdisciplinary” approach to teaching is popular in theme-based units and project-based learning. However, Drake & Burns (2004) suggest that teachers are not usually trained or encouraged to make connections between subject areas or topics as part of their educational preparation programs at colleges and universities. Familiarity with integrative teaching strategies during health education teacher preparation will provide a seamless transition from pre-service to practice.

A concern of many health educators is the inability for students to transfer concepts and procedures learned in school to real-work experiences. How do health educators learn to make connections across subjects and topics if they are not taught these curricular strategies? How do you unpack not only the subjects and content within each area of study, but across core academic subjects and standards? In order to unpack and understand standards and curricula, health educators must learn to use inquiry-based curriculum and instruction that can build on what learners know and extend to what they want to know (Ubbes, Black, & Ausherman, 1999).

With sufficient training, health educators should be able to apply gardening experiences across different topics, concepts, and skills of health education and not just teach nutrition education and healthy eating which are important but insufficient aspects of an integrative curriculum. This teaching strategy will position health educators as facilitators in promoting effective skill-based programs in gardening and in showing integrative connections between health education and the broader academic curriculum.

Objectives

A key responsibility of preK-12 professional preparation programs is to help health education candidates develop an integrative approach to teaching children and youth so they can apply topics, concepts, and skills to their lives. The

health status of individuals is influenced by many social and behavioral determinants of health (Healthy People 2020) so health education candidates should learn to promote a more sophisticated approach to curriculum and instruction. The Competency-Based Framework for the Health Education Specialist (2010a) advocates for entry-level health educators to demonstrate skills and competencies needed to make connections between learning content and skills, as well as develop a process for integrating health education into other programs.

Based on this rationale, the objectives of this teaching strategy will enable health education candidates to:

1. Develop an integrative approach to teaching health education through school gardening;
2. Explore the use of picture books for understanding the integrative nature of health education topics; and
3. Analyze the relationship between health education and other subject areas taught in a preK-12 curriculum.

Materials

- (a) Copies of *The Tale of Peter Rabbit* (Potter, 1986) published by Scholastic Inc. for each student.
- (b) Provide copies of **The Tale of Peter Rabbit Activity** (Figure 1).
- (c) Provide copies of “Critical and Creative Thinking Questions and Possible Responses” (Figure 2).
- (d) Supply rubric for assessing students’ critical and creative thinking skills (Figure 3).

Target audience

The target audience for this teaching strategy is pre-service candidates enrolled in professional preparation programs in health education. Usually a novice health educator will determine different units of instruction to teach and progress through the weeks of student teaching by covering concepts and skills outlined by the National Health Education Standards and the Health Education Curriculum Analysis Tool (HECAT) accessed at www.cdc.gov/healthyyouth/HECAT/index.htm. As such, they rarely make connections across topics. Teaching single compartmentalized instruction does not facilitate integrative approaches or critical and creative thinking skills across the curriculum. Pre-service teachers should be guided to integrate health-related content with critical and creative thinking skills.

Traditionally, health education instruction has been taught around instructional units that address specific health topics. According to the Health Education Curriculum Analysis Tool (HECAT) guidelines (<http://www.cdc.gov/HealthyYouth/HECAT/index.htm>), health topic areas that are included in a comprehensive curriculum include: Promoting an Alcohol and Other Drug-Free Lifestyle; Promoting Healthy Eating; Promoting Mental and Emotional Health; Promoting Personal Health and Wellness; Promoting Physical Activity; Promoting Safety; Promoting Sexual Health; Promoting a Tobacco-Free Lifestyle Use; and Preventing Violence (Centers for Disease

Control and Prevention (2014).

Guidelines

The purpose of this teaching strategy is to provide pre-service health educators an opportunity to practice making connections across health education content as well as other subject areas that are usually taught in a preK-12 curriculum. This teaching strategy uses a picture book as a tool to enhance pre-service teachers' own understanding of connections between health education and other cross-curricular subjects. It also provides a framework to connect and apply other background knowledge they have learned about health education with school gardening.

There are many ways to use picture books for classroom pedagogy. The purpose for using *The Tale of Peter Rabbit* (originally written and illustrated in 1901 by Beatrix Potter) is because around the turn of the 20th century civic value of gardens became more officially appreciated. Gardens helped homeowners as well as their neighbors enjoy their surroundings through the use of paths and vistas. Furthermore, vegetables, flowers, and fruits were to be shared with others as a way of spiritually refreshing the community. This era, marked by a growing number of gardening manuals and books, included the origin of the Gardening Club of America, a highly influential social and political organization that promoted a broad range of grassroots efforts to protect the environment. Beatrix Potter was proud to admit that her own garden included plantings from almost everyone in the village. Through gardening and an appreciation of gardening, writers explained how one could seek the simpler life that many are now craving, especially in schools – one of imagining and nurturing (Linder, 1971). In the case of *The Tale of Peter Rabbit*, the world includes the out-of-doors and the environment of the garden.

During the same time period that *The Tale of Peter Rabbit* was written, another effort that provided meaningful outdoor opportunities for youth and adults was the formation of 4-H clubs. In 1902, a school principal sought assistance from the Ohio Agricultural Experiment Station and The Ohio State University to create a model that promoted healthy living and positive well-being for individuals and the community in which they lived (USDA, 2014). Since its inception, 4-H has emphasized the importance of connecting healthy living experiences including nutrition, fitness, social and emotional health, prevention of injuries and prevention of tobacco, alcohol and other drug use (USDA, 2014). For the past 100 years, the 4-H has promoted integrative approaches to life-long learning about health.

Procedure

Health educators should begin the lesson by reviewing the Health Education Curriculum Analysis Tool (HECAT) guidelines and health modules (<http://www.cdc.gov/HealthyYouth/HECAT/index.htm>). Health educators should be guided to understand the connections across content and health-related skills. Explain that novice health educators will need practice connecting health topics and subjects across a preK-12 curriculum. Emphasize that teaching single compartmentalized units may not facilitate integrative approaches or the use of critical and creative thinking skills.

Provide everyone with a copy of *The Tale of Peter Rabbit* (Potter, 1986). Instruct each student to read *The Tale of Peter Rabbit* individually. After they read the tale for the first time, have the candidates write ideas of what they gained from the story. Provide them with the integration activity (Figure 1) and have them read the story again. Instruct them to look at each of the pages and think of how the story relates to health education. Look at the movement of the characters, how they dialog, and how the characters express their emotions. Have each student write down ideas during this brainstorming session.

After everyone has completed the reading-writing activity, reread the story as a group. Have them compare and contrast their initial thoughts and what they discovered after completing the activity. Provide an opportunity to discuss the disciplinary connections they made. Some of the more obvious connections will be made to nutrition and gardening because throughout the story many of these examples are explicit. However, some health-related content may not be as obvious. For example, in the beginning of the story, Mrs. Rabbit warns Flopsy, Mopsy, Cottontail and Peter not to go to Mr. McGregor's garden (Promoting Safety: Following Rules) because their "father had an accident there and was put in a pie by Mrs. McGregor". This would suggest that Mrs. Rabbit is a single mother raising four children (Promoting Sexual Health: Family and Relationships) because Mr. McGregor killed Mr. Rabbit (Violence Prevention). The illustration on the page also has one of the characters standing with one foot on the coffee table and one foot on the armchair. This could be used as an example of Safety: Preventing Unintentional Injuries. At the end of the story, Peter's mother provides him with chamomile tea for his upset stomach. This is an example of how substances can provide healthy natural remedies to ailments. Ask students what other herb did Peter eat when he had an upset stomach from eating too much? Continue to provide an opportunity for candidates to explore other connections they made in the story. Discover how many varieties of fresh fruits and vegetables were mentioned? Share the history of *The Tale of Peter Rabbit* and the 4-H clubs that are provided in this article. Discuss the relationship this time period had on the health of individuals compared to the contemporary times. These social studies experiences are an example of how concepts in one area of health education can facilitate the learning of concepts in other areas.

After making connections to health education content, provide an opportunity to examine the relationship that health education has with other subject areas in a preK-12 curriculum. For example, one of the illustrations has a character playing with a ball. Students should be able to see the connection to "manipulatives" in physical education since many students may have a dual license in that subject area. Describe the types of physical activity the characters in the story are doing and the progression of locomotor skills (e.g., over and under fences, crawling, skipping, hopping, running). Ask the students what types of critical and creative skills are needed to plan, plant, and harvest a variety of fresh fruits and vegetables? (Earth and Environmental Science, Geography). What is the difference between fruits and vegetables? (Botany, Biology). When was the tomato categorized as a vegetable and not as a fruit? (History). What season of the year, region, or temperatures make it optimal for different plants to thrive? (Science, Geography). Explore ideas of why Mr. McGregor may have

Figure 1: Integrating *Tale of Peter Rabbit* Activity

Potter, B. (1986). *The Tale of Peter Rabbit*. New York: Scholastic Inc.

Directions: Read the story again. This time look at the characters movement, how they dialog, and express emotions. Jot down **words** or what **illustrations** cued you. How could this story relate to health education topics and other subjects that are typically taught in a preK-12 curriculum?

Topic Area	Pages	Word Cues	Illustrations
Promoting an Alcohol and Other Drug-Free Lifestyle			
Promoting Healthy Eating			
Promoting Mental and Emotional Health			
Promoting Personal Health and Wellness			
Promoting Physical Activity			
Promoting Safety			
Promoting Sexual Health			
Preventing Violence			
Managing, Death, Dying, & Grief			
Other Subjects			
Math			
Science			
Language Arts			
Physical Education			

Designed by Ausherman, J.A. (2014). Integrating health education with health topics and other subjects.

had to build a cucumber frame rather than plant the seeds directly in the ground. One possible reason the frame was built is because it may have not been conducive for planting because of high levels of lead in the soil (which is common in urban areas). Also, since raised beds provide a warmer temperature earlier in the season, he may have wanted to get a head start on planting. Ask who in the class have planted a garden or lived on a farm? Perhaps these individuals could add ideas to other people's line of reasoning.

Closure

After reviewing the relationships between health and other subjects, discuss how nutrition and healthy eating could be used to explore other concepts and skills related to health. For example, how do people feel when they do not have

enough to eat or are malnourished? You could explore how gardening programs have reduced neighborhood violence in communities. How have schools and communities advocated for healthier school meals? What influences the eating behaviors of children and youth? How are the Victory Gardens that were created in World War II related to our current food stamp program? Encourage students to develop other questions that address the connections between nutrition, healthy eating, growing, harvesting, and preparing fresh fruits and vegetables. To complete this activity, conclude by encouraging the students to reflect on how they can transfer health concepts, skills and procedures to real world experiences. Reinforce how health education must be more than a series of simplistic lessons or isolated units of instruction; it must incorporate sophisticated analysis and synthesis of content and skills that can be used to influence behavior change that evolves over an individual's lifetime.

Figure 2. Formulating Critical and Creative Thinking Questions and Possible Answers

Subject	Story Cues	Critical and Creative Questions	Possible Answer and Relationship to NHES or HECAT
Example: Science	Rabbit Pie & Netting over the gooseberries	Are there other safe and humane ways to keep animals and pests away from gardens besides killing them?	Use barriers such as fences or netting. Practice companion gardening. Attract beneficial insects. (Communication & Decision Making)
Science			
Technology			
Engineering			
Math			
Arts			
Physical Education			
Health Education			
History	Tomato	When did the tomato become a vegetable?	The U.S. Supreme Court decided that the tomato was a vegetable for the purpose of some tariff in 1893. (Analyze Influences & Advocacy)
Language Arts			

Designed by Ausherman J.A (2014). Formulating critical and creative questions and answers.

Figure 3: Rubric for critical and creative thinking related to gardening concepts and themes in *The Tale of Peter Rabbit*.

Evidence Criteria Ability to make connections to:	Sophisticated Demonstration	Proficient Demonstration	Partial Demonstration	Attempted Demonstration
<p>Gardening concepts and themes presented in <i>The Tale of Peter Rabbit</i></p> <p>(Based on Figure 1)</p> <p>*Gardening may include concepts related to nutrition, fruits or vegetables</p>	<p>Provided 7- 9 insightful connections to health education topics and 2 connections to other subjects. Examples were fully supported with word cues and illustrations; goes well beyond the obvious. Demonstrates deep and broad relationships in understanding complex concepts related to health education and gardening*.</p>	<p>Provided 4 – 6 thoughtful connection to health education topics and 1 connection to other subjects. Examples were often supported with some word cues and/or illustrations. Demonstrates some understanding of complex concepts related to health education and gardening*.</p>	<p>Provided 2 - 3 connections to health education topics and 0 connections to other subjects. Examples were often obvious and superficial with some word cues and/or illustrations. Demonstrates limited understanding of complex concepts related to health education and gardening*.</p>	<p>Provided 1 connection to health education topics. Examples show little or no word cues and/or illustrations. Demonstrates little understanding of complex concepts related to health education and gardening*.</p>
<p>Gardening concepts and themes presented in <i>The Tale of Peter Rabbit</i> with the Health Education Analysis Tool (HECAT)</p> <p>(Based on Figure 2)</p>	<p>Provided insightful connections to 8-10 HECAT topics. Examples were fully supported with story cues. Critical and creative questions with possible answers related to gardening. Goes well beyond the obvious. Demonstrates deep and broad relationships and understanding of gardening*.</p>	<p>Provided thoughtful connections to 5- 7 HECAT topics. Examples were often supported with story cues. Critical and creative questions with some answers related to gardening. Some examples were obvious. Demonstrates some broad relationships and understanding of gardening*.</p>	<p>Provided superficial connections to 2-4 HECAT topics. Examples were often obvious and superficially supported story cues. Few critical and creative questions with no possible answers related to gardening. Demonstrates limited understanding of relationships to gardening*.</p>	<p>Provided limited connections to 1 of the HECAT topics. Example attempted to connect to story cues. Attempts critical and creative questions with possible answers related to gardening. Lacks understanding of concepts of gardening*.</p>
<p>Gardening concepts and themes presented in <i>The Tale of Peter Rabbit</i> with National Health Education Standards (NHES)</p> <p>(Based on Figure 2)</p>	<p>Provided 7-8 NHES connections using story cues. Insightful examples of health-related concepts and skills.</p>	<p>Provided 5-6 NHES connections to story cues. Some examples of health- related concepts and skills.</p>	<p>Provided 3-4 NHES connections using story cues. Few examples of health-related concepts or skills.</p>	<p>Provided 1-2 NHES connections using story cues. Limited or no examples of health-related concepts or skills.</p>
<p>Gardening concepts and themes presented in <i>The Tale of Peter Rabbit</i> with other subjects: Science, Technology, Engineering, Math, Arts, History, Language Arts).</p> <p>(Based on Figure 2)</p>	<p>Provided 7-9 connections to different subjects. Examples were fully supported with story cues; goes well beyond the obvious. Demonstrates deep and broad relationships and understanding of complex concepts related to gardening, nutrition, fruits and vegetables.</p>	<p>Provided 4 -6 connections to different subjects. Examples were somewhat supported with story cues. Demonstrates some relationships and understanding of complex concepts related to gardening, nutrition, fruits and/or vegetables.</p>	<p>Provided 2 - 3 connections to the same subjects. Examples were often obvious and superficially supported with story cues; Demonstrates limited understanding related to complex concepts related to gardening, nutrition, fruits or vegetables.</p>	<p>Provided 1 connection to a subject beyond health education. Examples lacked understanding of complex concepts related to gardening, nutrition, fruits or vegetables.</p>

Picture books are a rewarding way to make connections to health and other subjects. Pre-service teachers should read and explore other picture books that have related topics, concepts, and themes to health education lessons that they will prepare in their professional preparation program. Direct them to the Children's Picture Book Database at Miami University (<http://dlp.lib.miamioh.edu>) and have them include at least three picture books related to every health topic they plan to teach.

Assessment

A pre-/post-evaluation can be used to assess how students were able to integrate concepts in health education with other subjects. After reading *The Tale of Peter Rabbit* the first time, have the students discuss how their ability to make connections was prompted based on completing the integrative activity (Figure 1). In addition, students can keep a journal to examine connections they make while taking the class. For independent practice have the students come up with their own critical and creative questions and possible connections they may have made to the HECAT (Figure 2). They should also describe how they plan to use integrative teaching strategies when preparing their health education lesson plans in the future. The learning initiatives that help pre-service teachers to transfer knowledge, concepts, and skills take practice. Therefore, instructors should challenge pre-service health educators to give multiple examples of how they are integrating their ideas and concepts at the beginning of each class period. Using the rubric (Figure 3) the instructor can evaluate how well students are making connections to gardening concepts presented in *The Tale of Peter Rabbit* to health education concepts and other subject areas.

For more ideas on how to make connections to gardening, nutrition, and other subjects, they could go to the United States Department of Agriculture (USDA) website (<http://collaboratingclassrooms.ath.cx/?garden=/nutrition§ion=curriculum>) and use the school gardening lesson plans as way to formulate critical and creative questions related to other subject areas.

From the USDA school garden curriculum website, students can design an advocacy campaign to challenge the logic for only including the health topic area of nutrition. Have them write a compelling argument for supporting the inclusion of health education as a subject area like language arts, math, science, and social studies.

Conclusion

Teaching is a matter of creating opportunities to make meaning and not transmitting simplistic ready-made knowledge (Garrison, 1992). It is essential for pre-service teachers in health education to know how to make connections across subjects and topics as well as how to formulate critical and creative thinking questions with accurate responses. Interdisciplinary teaching is authentic to real life. Having the ability to transfer concepts adds perspective, understanding, context, and relevance to learning. Health educators should help learners understand how to combine content and skills used in one situation and transfer it to different situations and context (Ubbes, 2007). The hopeful outcome is both critical and creative thinking in health education (Ubbes, Black, &

Ausherman, 1999) leading to metacognition which is "how problem solvers are able to self-regulate the strategies they will use" (Dixon, 2012) to become healthy. Having these sets of skills, health educators could be uniquely positioned to be leaders in facilitating health-related concepts and skills with any school gardening program. Health education tells the story of the human condition and our connections to a multi-dimensional world.

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