Effective online food safety education for school gardens and university farms

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Acknowledgements

• Project Team
  – Linda Naeve, MS, Value Added Agriculture Extension and Outreach
  – Johnny Dzubak, Master’s Level Graduate Student

• Led by Dr. Shaw – major advisor for Johnny
Supported By

• Project funded by Leopold Center for Sustainable Agriculture
• Continuation of work by ISU On Farm Food Safety Team and Food Safety Project
Objectives for Today

• Participants will be aware of research-based online food safety modules for school garden and university farm workers.

• Participants can consider how online materials could be used in their outreach and education efforts.
Is there a need for these materials?

- Greater awareness/emerging research of risks from fresh produce
- Appreciation of local foods
- Interest in new and heirloom varieties of produce
- Integration of education efforts with school gardens
- Efforts to address hunger with community gardens
- Contribution of university farms to food supply
- Changing demographics in the country
2013 report: Foodborne Outbreaks by Food Product Category 1998 - 2008

*Painter et al*

- Produce/nuts: 46%
- Meat: 12.2%
- Poultry: 9.7%
- Eggs: 6%
- Dairy: 13.7%
- Fish: 6.1%
- Shellfish: 3.4%
- Grains/Beans: 4.5%
- Oils/Sugar: 1%
School and Community Gardens

- Current status\(^2\)
  - 4,322 Districts - 40,328 Schools - 23,513,237 Children
- Educate about “where/how” food production
- Occurrence of safety training unknown
- Critical need to develop training to reduce risks

\(^2\) The Farm to School Census: Bringing the Farm to School, 2014, United States Department of Agriculture Food and Nutrition Service.
Benefits of Online Education

- No travel requirements
- Convenient
- Cost effective
- Enrollment barriers in higher education
- Learning Style of the Student


Objectives of the Project

1) Form a steering committee representing school, university, and community partners

2) Create a website for developed materials
   - Two 1-hour online modules for those working in school gardens and university farms
   - Instructor guides for school teachers and managers of the university farms

3) Conduct pilot test to assess impacts of created online trainings and instructor guides.
Audiences

• Schools and Community Gardens
  o Facilitators
  o Instructors
  o Volunteers
  o Students

• University Farms
  o Researchers
  o Managers
  o Workers
Module Audiences

• School gardens
  – Elementary level for 4th/5th graders
  – Instructor/facilitator

• University farms
  – Farm workers/staff (12th grade and post)
  – Instructor/facilitator
Each Module

- Stand alone sections
  - Elementary (youth focus) = 4 sections
  - University (adult focus) = 5 sections
- Each section 1 to 9 minutes in length
- 1 to 10 item multiple choice quiz at end each section
Elementary Module Sections

1. Importance of fruits and vegetables
2. Biological, Chemical, and Physical Hazards
3. Hazard Prevention
   - Good handling practices
   - Proper produce storage
   - Safe personal hygiene
4. Post-harvest and regulations
Handwashing

Microorganisms from unwashed hands after using the restroom

STOP! DID YOU WASH YOUR HANDS?

CONJUNCTIVITIS (PINK EYE)
E.COLI O157:H7
INFLUENZA
SALMONELLA
COMMON COLD
NOVOVIRUS
STAPHYLOCOCCUS AUREUS
REPTITIS A
DIARRHEA

HANDWASHING with SOAP and WARM WATER is the best way to PREVENT ILLNESS

IOWA STATE UNIVERSITY
Extension and Outreach
Healthy People. Environments. Economies.
Online website

Safe Produce - Elementary

Introduction
Potential Hazards
Hazard Prevention
Post-Harvest Safety

Summary

Welcome to the online food safety for school gardens training. School gardens can be important elements of student learning about the food they eat. Food safety with fresh produce has been an increasing concern in recent years. This online training is meant to educate students and their instructors on safe food production handling through the identification of biological, physical, and chemical hazards within the garden.

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Online website

Activities
- "What would you do?" - Brian PDF
- "What would you do?" - Susie PDF
- Identify the garden hazards PDF

Download Videos
Right-Click and Save Link As...
- Section 1 MP4
- Section 2 MP4
- Section 3 MP4
- Section 4 MP4
- All Sections ZIP

Download Quiz
- All Sections PDF

Instructor Resources PDF

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Instructor Manuals Both Modules

- Format same for both elementary and university instructor manuals
- Resources provided after each section
- Quiz/quiz answers provided after each section
Table of Contents for Elementary Instructor Manual

- Vocabulary Glossary
- State Educational Requirements
- Outcomes
- Script
- Comprehensive references
Elementary Quiz #1

1. What is the most common and harmful type of virus related to produce?
   A. Influenza virus.
   B. Norovirus.
   C. Tobacco Mosaic Virus.
   D. West Nile Virus.

Answer: The most common type of virus related to produce contamination is Norovirus. It can be transferred from infected people, contaminated water, or from touching contaminated surfaces.
Case Study Example

Little Susie rinsed her hands thoroughly with soap and water before going out to the garden to pick fruits and vegetables. Susie entered the garden wearing her sandals and began picking produce that was ready. As she was harvesting, Susie saw a broken glass bottle in the garden....
Case Study Discussion

1. What did Susie do wrong?
   - Susie entered the garden wearing sandals. Sandals should not be worn because of physical hazards that could be present in the garden.
   - Susie only stepped over the broken glass that was in the garden. Susie should not pick it up because of potential harm, but she should also not completely ignore it.
Additional Activities

Find the Food Safety Hazards
Additional Activities: Answer Key
University Module Sections

1. Introduction/Overview
2. Pre Harvest
3. Post Harvest
4. Chemical and Physical Hazards Post Harvest
5. Best Practices and Regulations
Table of Contents for University Instructor Manual

• Glossary/Vocabulary Terms
• State Educational Requirements
• Tools Needed, Getting Started
• Outcomes and Benefits
• Overall Outline of Modules
• Script of Online Modules with Quizzes
• Additional Exercise Answers
• Risk Management Tool
• References
University Quiz #1

1. How many days prior to harvest must raw manure be applied according to the National Organic Standards?
   A. At least 90 days
   B. At least 120 days
   C. At least 180 days
   D. At least 365 days

Answer: Research has found that pathogens can survive in organic manure for up to 120 days.
University Module Case Study

Josh woke up feeling very well and ready to work this Thursday. After getting ready, he went to work and ready to pick some fruits and vegetables from the field. As he arrived, Josh walked into the field in his sandals and started picking the produce. Josh left his harvesting bin on the ground because he didn’t have a vehicle or bench to put it on....
Case Study Discussion

1. What did Josh do wrong?

Josh wore sandals in the field. Wearing sandals will increase the risk of a physical hazard to occur. Josh left harvest container on the ground in contact with soil.
Pilot Study

Pilot both online module and user manuals at two K-12 schools and two land grant universities

– Pre and post- knowledge assessments of the content
  • Based on quizzes given before and after completion of viewing the online material

– Feedback for improvement
  • Completed by Facilitators/Instructors
  • Survey based feedback form
  • Online modules and User Guides
Survey for Module Improvement

The Extension Food Science and Human Nutrition at Iowa State University would appreciate feedback from you on a series of videos that are being developed on produce food safety for your students. We want your input to determine if the topics, delivery format, layout, and readability of each video is satisfactory.

Please review the online module at http://www.safeproduce.cais.iastate.edu/elementary/ and the supporting items (Activities, Quizzes, and Instructors Resource Guide). This should take at least 2 hours to review (video is 35 minutes in length). Then proceed to this survey. The survey should take 45 minutes to complete. You may skip questions you are not comfortable with answering and stop at any time. All responses will be kept anonymous. Your responses will not be linked directly to you by name as all data will be combined. If results of the survey are used for reporting, they will be aggregated and your identity will remain anonymous. There is no risk in responding to this survey. We have an IRB Approval through Iowa State University Office for Responsible Research (#13-598).

Sincerely,
Angela M. Shaw, PhD (515-294-0868)

Please circle the number which best answers the following statements.

<table>
<thead>
<tr>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Neither Agree nor Disagree</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
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</thead>
<tbody>
<tr>
<td>1. The volume of the speaker was easily understandable</td>
<td></td>
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<td>2. The speed of the speaker improved my learning</td>
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<td>3. The speaker's</td>
<td></td>
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Survey for Module Improvement

• The volume/speed of the speaker was appropriate
• The images/video footage was appropriate for module content
• Resources and Navigation Features
• Difficulty of the Quizzes
• Which images did you think were least effective?
• Are there any images that can be added to help your understanding of the material?
## Results of Quizzes

Percent correct responses

*Significant Difference of $P<0.05$

<table>
<thead>
<tr>
<th>Section</th>
<th>Elementary (n=2)</th>
<th>University Farms (n=2)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Before</td>
<td>After</td>
</tr>
<tr>
<td><strong>Section 1: Introduction</strong></td>
<td>98%</td>
<td>99%</td>
</tr>
<tr>
<td><strong>Section 2: Hazard/Pre-Harvest</strong></td>
<td>89%</td>
<td>100%*</td>
</tr>
<tr>
<td><strong>Section 3: Pre-Harvest/Post-Harvest</strong></td>
<td>92.5%</td>
<td>100%*</td>
</tr>
<tr>
<td><strong>Section 4: Post-Harvest/Regulations</strong></td>
<td>95%</td>
<td>100%*</td>
</tr>
<tr>
<td><strong>Section 5: Regulations</strong></td>
<td>N/A</td>
<td>N/A</td>
</tr>
</tbody>
</table>

43 Students in K through 8th grade
25 Students/Workers in University
Feedback from Survey:

• Need to update pictures for increased clarity
• Modify vocabulary use between two age groups
  – *Too easy for university; too complex for elementary*
• Add more activities appropriate each group
• Provide More Guidance for Managers, not just instructors and facilitators
Results showed...

- Significant improvements instructor and student/worker knowledge after viewing the developed material in both modules ($P<0.05$)
  - 3 of 4 elementary modules
  - 1 of 5 university farm modules
- Developed material was mostly appropriate for target populations
- Support material (i.e. activities and guides) was useful
More Feedback ...

• Quiz questions
  – Vocabulary Appropriate
  – Detail oriented
  – Too easy - Increase difficulty
• Format Instructor manual for convenience
• Plan to continue use
Post Pilot Steps

- Updating images to reflect regional areas
- Updating script to include more topics
- Updating quiz questions to increase rigor
- Updating instructor modules
- Adding new activities and case studies
- Exploring translating script into Spanish
- Opportunities larger piloting with updated materials
Dissemination of Modules

- FFA
- 4-H educators
- Farm to School Programs/Child Nutrition Programs/Related Agencies
- Higher education institutions’ farm managers
Website Links to Each Module

• Elementary and local garden online module
  http://www.safeproduce.cals.iastate.edu/elementary/

• University farm online module
  http://www.safeproduce.cals.iastate.edu/university/

• Summaries on each webpage
• Additional activities and quizzes available
Questions?

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- Catherine Strohbehn  
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