Building a Model Experiential-Based Agricultural Food Safety Program

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Introduction

An essential component of the agricultural system is food safety and Carroll County, Virginia, seeks to position itself as a regional leader in this burgeoning industry.

- Educational opportunities in this growing field are lagging behind industry interest in the region.
- Rigorous preparation in the STEM disciplines is crucial for the next generation of farmers, ranchers and agricultural leaders to be prepared for the changing face of agriculture (National Research Council, 2009)

- Virginia Tech, Carroll County High School and Wytheville Community College are developing a model program for enhancing community viability through connecting STEM education in agriculture with opportunities for employment at multiple levels of educational attainment.

Program Model

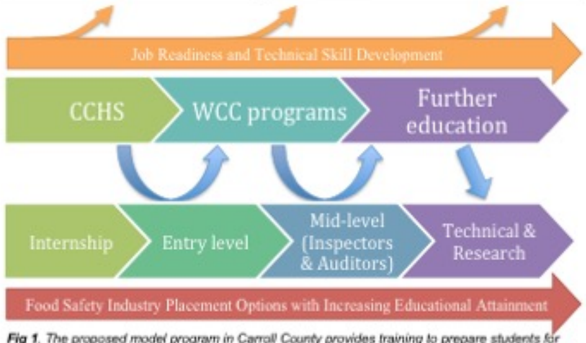

Fig 1. The proposed model program in Carroll County provides training to prepare students for multiple entry points into the agricultural food safety industry and beyond. Arrows indicate possible pathways for students. CCHS = Carroll County High School, WCC = Wytheville Community College.

Project Partners

Virginia Tech — Invent the Future

Department of Agricultural, Leadership, and Community Education

The human side of the agricultural equation

Wytheville Community College

Acknowledgements

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Conceptual Framework

In 'situated learning' the context of the learning experience is critical to a learner's construct of new knowledge (Brown, Collins, & Duguid, 1989; Lave & Wenger, 1991) Learning environments provide students opportunities to engage in legitimate activities of increasing complexity that allow them to "move toward full participation" (Lave & Wenger, 1991).

Project Objectives

1. Develop an Agriculture and Food Safety internship program with capstone experience for students at Carroll County High school

2. Revise Biotechnology course sequence at Carroll County High school to utilize the STEM lab for agriculture, having emphasis on aligning the new Agricultural Food Safety program at Wytheville Community College.

3. Establish an Agricultural Food Safety program at Wytheville Community College.

4. Strengthen cooperative linkages between partner institutions, existing food science programs and businesses to create multiple pathways into the agricultural food safety industry

Anticipated Results

Table 3. Products, results and impacts.

	Products/Results	Impacts
Objective 1: Internship Program at CCHS	Internship program model developed and disseminated at NAAE. 1st year: students complete three rotations for career exploration. 2nd year: students complete an independent capstone project during a focused internship with an industry partner. *6 students/ year = 18 total interns*	1st year interns: *increased student awareness of and interest in the growing field of food safety, options for higher education, and new employment opportunities in the local economy* 2nd year interns: *students develop communication, research, and problem solving skills*
Objective 2: Agricultural biotechnology course revisions	Three revised courses with new unit and lesson plans: • Biotechnology Foundations • Biotechnology Applications in Agriculture • Biological Applications in Agriculture Food safety components and use food safety as a context for teaching laboratory procedures.	New course materials will • *engage students in inquiry-based activities* • *prepare students for jobs and/or higher education in the growing food safety sector,* • *lead to gains in student scientific process skills and attitudes toward science.*
Objective 3: Agricultural Food Safety Programs at WCC	New agriculture and food safety programs established: • 1-year certificate program • associate's degree programs	Targets for enrollment are: • *PI2: 15 students enrolled in the 1-year certificate program* • *PI3: 20 students enrolled in the 1-year certificate program* • *PI3: 25 students enrolled in the associate's degree program*
Objective 4: Cooperative Linkages	Establishment of the Carroll County Food Safety Advisory Board Articulation agreement between WCC and CCHS established for new programs.	*Increased cooperative linkages among educational institutions, local government, and agricultural industry partners that are focused around student success and community viability in Carroll County.*

Agriculture and Food Safety Internship Program

Employment and STEM Skill Development Through Experiential Learning

The internship program will allow for career exploration, soft skill development, and STEM research skills. Crawford, Lang, Fink, Dalton, & Fielitz (2011) conducted a survey to investigate soft skills valued by employers and developed this ranked list of soft skill clusters:

(1) communication, (2) decision making/problem solving,
(3) self-management, (4) teamwork,
(5) professionalism, (6) experiences, and (7) Leadership.

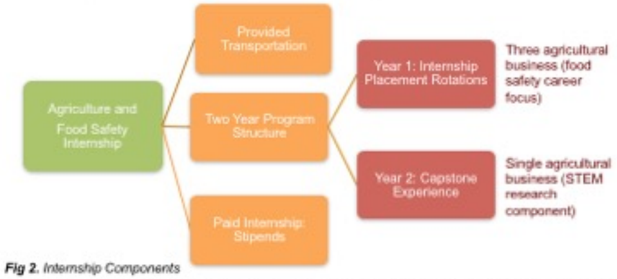


Fig 2. Internship Components

Authentic science experiences can lead to development of core skills, such as "problem-solving, communication and interpersonal skills," improved attitudes towards STEM, and interest in STEM careers (Woolnough, 2000).

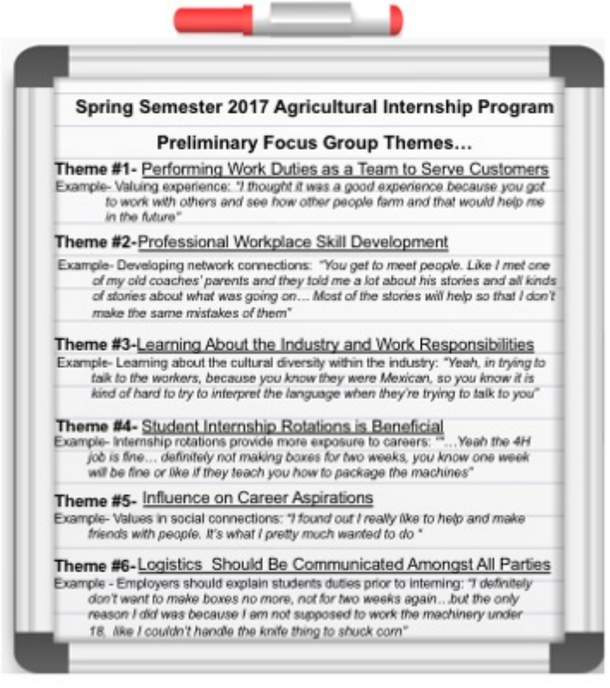
Activities to Date

Internship Program:
- Assembled a best practice guide for high school internship implementations

2017 Spring Semester's Internship Program
- Selected two students to participate in springs 2017 internship
  - One rotated between two job placements
  - One continuously worked with one employer

Structured the internship application process
- Designed a flyer and poster to promote the internship program
- Structured applications for interested students
- Outlined orientation week's objectives and itinerary

Obtained Employers
- Created a list of potential employers



Spring Semester 2017 Agricultural Internship Program

Preliminary Focus Group Themes…

Theme #1- Performing Work Duties as a Team to Serve Customers

Example- Valuing experience: *"I thought it was a good experience because you got to work with others and see how other people farm and that would help me in the future"*

Theme #2- Professional Workplace Skill Development

Example- Developing network connections: *"You get to meet people. Like I met one of my old coaches' parents and they told me a lot about his stories and all kinds of stories about what was going on… Most of the stories will help so that I don't make the same mistakes of them"*

Theme #3- Learning About the Industry and Work Responsibilities

Example- Learning about the cultural diversity within the industry: *"Yeah, in trying to talk to the workers, because you know they were Mexican, so you know it is kind of hard to try to interpret the language when they're trying to talk to you"*

Theme #4- Student Internship Rotations is Beneficial

Example- Internship rotations provide more exposure to careers: *"…Yeah the 4H job is fine… definitely not making boxes for two weeks, you know one week will be fine or like if they teach you how to package the machines"*

Theme #5- Influence on Career Aspirations

Example- Values in social connections: *"I found out I really like to help and make friends with people. It's what I pretty much wanted to do "*

Theme #6- Logistics Should Be Communicated Amongst All Parties

Example - Employers should explain students duties prior to interning: *"I definitely don't want to make boxes no more, not for two weeks again…but the only reason I did was because I am not supposed to work the machinery under 18, like I couldn't handle the knife thing to shuck corn"*

Biotechnology Course Revisions

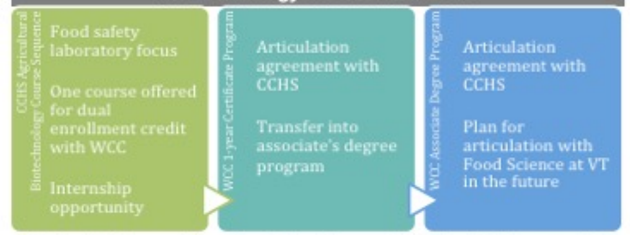


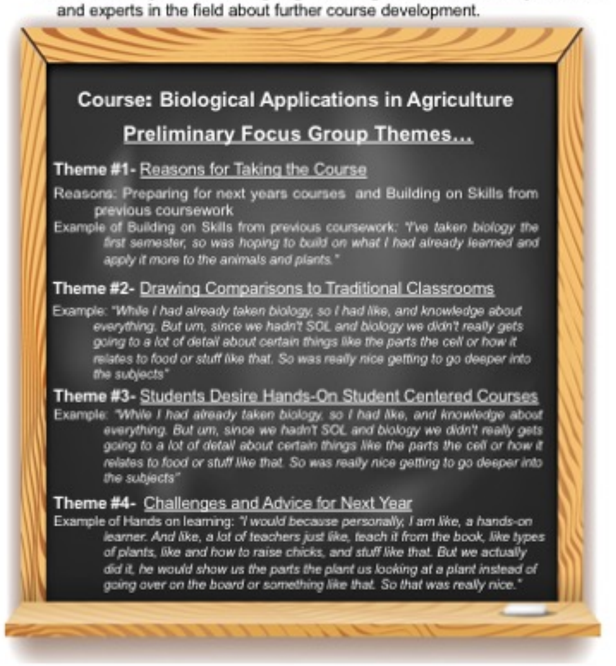
Fig 3. Coordinated course revision and curriculum development will lead to articulated programs that enhance agricultural food safety education in the region. CCHS = Carroll County High School, WCC = Wytheville Community College

Activities to Date:

Biotechnology sequence:
- Alignment of State required course competencies between the three course sequence

Biological Applications in Agriculture:
- Designed and implemented 7 biotechnology lessons into spring 2017 Biological Applications in Agriculture course at Carroll County High School

Advisory Board meeting
- Held Advisory Board meeting to garner insight from local industry members and experts in the field about further course development.



Course: Biological Applications in Agriculture

Preliminary Focus Group Themes…

Theme #1- Reasons for Taking the Course

Reasons: Preparing for next years courses and Building on Skills from previous coursework

Example of Building on Skills from previous coursework: *"I've taken biology the first semester, so was hoping to build on what I had already learned and apply it more to the animals and plants."*

Theme #2- Drawing Comparisons to Traditional Classrooms

Example: *"While I had already taken biology, so I had like, and knowledge about everything. But um, since we hadn't SOL and biology we didn't really gets going to a lot of detail about certain things like the parts the cell or how it relates to food or stuff like that. So was really nice getting to go deeper into the subjects"*

Theme #3- Students Desire Hands-On Student Centered Courses

Example: *"While I had already taken biology, so I had like, and knowledge about everything. But um, since we hadn't SOL and biology we didn't really gets going to a lot of detail about certain things like the parts the cell or how it relates to food or stuff like that. So was really nice getting to go deeper into the subjects"*

Theme #4- Challenges and Advice for Next Year

Example of Hands on learning: *"I would because personally, I am like, a hands-on learner. And like, a lot of teachers just like, teach it from the book, like types of plants, like and how to raise chicks, and stuff like that. But we actually did it, he would show us the parts the plant us looking at a plant instead of going over on the board or something like that. So that was really nice."*