Framing an Undergraduate Minor through the Civic Agriculture and Food Systems Curriculum [1,2]

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Abstract

Society is facing new agricultural and food supply dilemmas that require visionary leaders and critical thinkers to solve them. Emerging interest in sustainable agriculture education among college-bound students continues to grow, giving institutions of higher education the opportunity to strengthen students' understanding of the connections among food, agriculture and community systems through interdisciplinary, experiential-based curriculums. This paper provides the backdrop to how the interdisciplinary, experiential-based minor in Civic Agriculture and Food Systems (CAFS) evolved within the College of Agriculture and Life Science at Virginia Tech. We specifically illustrate how the CAFS task force utilized the theory of civic agriculture and Heifer International's values-based model as the conceptual underpinnings to support the minor's academic focus. Funding was obtained incrementally, first through college support and then by a USDA Higher Education Challenge (HEC) grant. Collaborative processes, including an interdisciplinary curriculum task force and teaching teams informed the development and implementation of the curriculum. Pedagogical strategies unique to the CAFS minor include collaborative teaching, fieldwork, learning circles, project-based activities and electronic assessment portfolios. Learning experiences that intertwine research and pedagogy and student accomplishments are illustrated. Interdisciplinary, values-based, and experiential curriculums focused on solving relevant agricultural problems are necessary for advancing post-secondary agricultural education.

Introduction

The 21st century presents a number of agricultural challenges that are transforming the way we produce food, fiber and fuel. According to National Research Council (2010, p. 1), "agriculture is at a pivotal stage in terms of meeting societal demands for products while improving sustainability." Population growth, climate change, globalization and diet-related chronic diseases are some of the most imposing conditions that will affect our agricultural systems and the health of human populations worldwide. Society needs critical thinkers to find solutions to these unprecedented dilemmas. How will the world's growing population impact food supply (Godfray et al., 2010)? How will we balance environmental, economic and social demands placed upon our food systems (Foley et al., 2005)? Can we create viable policies and practices that genuinely promote viable systems? Finding answers to such complex questions can be viewed as imposing, or can be seen as opportunities to affect change in how we educate the next generation of college students. Thus, it is paramount that students have a solid understanding of the vast complexities of agricultural sustainability (Calder and

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[2]For more information about the CAFS minor, visit http://www.cals.vt.edu/prospective/majors/civic-ag-minor/index.html.

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Clugston 2005). Equally important are opportunities to learn how to critique and solve agricultural and food-based issues that are relevant to our communities. Institutions of higher education need to be prepared to lead the way through new program offerings and pedagogy that integrate interdisciplinary perspectives, experiential learning and community engagement. Such academic learning environments strengthen student capacity for civic engagement and ability to critically think about how to develop a more sustainable food system (Niewolny et.al. 2012; Rojas 2003).

According to Fischer and Glenn (2009), agricultural-food system sustainability with multidisciplinary teaching and hands-on experience is among the five emerging areas of study in higher education. According to the Association for the Advancement of Sustainability in Higher Education (AASHE) some 70 colleges and universities in the United States have a curriculum in sustainable agriculture education (AASHE 2012). The National Academy of Sciences (NAS) released a report pivotal to transforming agricultural and life science education in higher education to better address the nation's rapidly changing landscape of agricultural and food system needs (NRC 2009). A commonality across each of the nine recommendations in the NAS (2009) report is the need to improve or adapt agriculture education so that the teaching methodology is interdisciplinary, student-centered and contextualized. Specifically, these recommendations advocate connecting students with authentic learning experiences that emphasize real world issues and professional practice to address those issues.

Another report, AASHE's Sustainability Curriculum in Higher Education Call to Action, endorses developing a sustainability curriculum that enables students to learn and actually practice systems thinking by applying such thinking to actual world issues (AASHE 2010). By definition, systems thinking is a holistic approach that focuses on understanding the constituent parts of complex real-world situations (Meadows 2008). It is a way of understanding complexities that emphasizes the relationships among a system's parts such as those often encountered in sustainable food and farming systems (Meadows 2008). Coupled with these relevant reports, the Association of Public and Land-grant Universities also proposes the need for more experiential learning in agricultural programs that invests in the development of human capacity via civic engagement (APLU 2009; Schmidt 2009). Academies that embrace civic engagement do so by forging partnerships among academic institutions, students and community. Civic engagement facilitates a collaborative educational environment that empowers students, faculty and communities to collectively address the economic, environmental and social challenges emergent today (Simon, 2010). The most common civic engagement pedagogy is service-learning where academic study is purposefully and critically embedded within service aims identified by a community or community partner (Colby et al. 2003). When higher education assimilates a civically engaged mission through service learning, it exemplifies the land-grant university's historical traditions, values, and mission (Colby et al., 2003).

In response to and in alignment with these reports, undergraduate programs that prepare graduates for meaningful action around the rapidly changing agrifood landscape are beginning to surface across the continents (AASHE 2012; Colasanti 2009; Feenstra 2002; Fortuin 2010; Galt et al. 2012; Hammer 2010; Harmon et al. 2011; Ibanez-Carrasco and Riane-Alcala 2009; Jacobsen et al. 2012; Keating et al. 2010; Kolodinsky et al. 2012; NAL 2012; Rojas et al. 2007; SAEA 2012). In particular, land grant universities and colleges stand out as unique contributors towards this effort as their mission is to disseminate new research for citizens in agricultural practice. In this article, we describe how Virginia Tech (VT), a land grant university, developed the Civic Agriculture and Food Systems (CAFS) minor to fill growing student interest in sustainable agriculture education. In doing so, we illustrate two key frameworks used to develop the CAFS minor by referring to Heifer International's (HI) "values based" model of community development and Lyson's (2004) model of civic agriculture. Both approaches support sustainable community development. First, civic agriculture refers to a locally based agriculture and food production system that is linked to a community's social and economic development. This system of agriculture has been termed "civic" because it embodies a commitment to developing an economically, environmentally and socially sustainable system of agriculture that relies on local and regional resources, markets and community connections. Similar to Lyson's civic agricultural model, HI promotes a "values based" approach to development through the use of local resources and community assets for sustainable outcomes. From this perspective, we provide an overview of the funding, taskforce development and curriculum design that is grounded in core values and mirrors civic agriculture and HI's model of community development. Further, we describe how the student's educational journey engenders a community of learners through coursework, fieldwork, group activities and community-based projects. Lastly, we provide illustrations of student community-based projects and the approach used to guide students in envisioning their future and achieving mutual project goals with a community partner.

Table 1. Acronym Reference

AASHE	Association for the Advancement of Sustainability in Higher Education
AI	Appreciative Inquiry
ALS	Agriculture and Life Sciences
ASB	Alternative Spring Break
CAFS	Civic Agriculture and Food Systems
CALS	College of Agriculture and Life Sciences
CAP	Community-based Action Project
CBO	Community Based Organizations
CSA	Community Supported Agriculture
CT	Collaborative Teaching
ePortfolio	Electronic Portfolio
HEC	Higher Education Challenge
HI	Heifer International
LC	Learning Circles
NAS	National Academy of Sciences
USDA	United States Department of Agriculture
VT	Virginia Tech

Methods

An acronym table was developed for readership reference (Table 1).

Funding Development

Following an emerging call for transformation in undergraduate agricultural and life science education, VT's Climate and Action Commitment and Sustainability Plan directed the academy to incorporate sustainability concepts and issues across research, academics and outreach, helping to pave the way for pursuing new curricular efforts. The College of Agriculture and Life Sciences (CALS) administrative leadership supported a shift in the traditional educational paradigm through an internal funding call that aligned with its mission to provide an interdisciplinary approach to learning, discovery and citizen engagement in the fields of science and agriculture that make a positive difference in society. In response, the author applied for the CALS internal grant to facilitate an alternative spring break (ASB) to the HI Ranch in Perryville, Arkansas in 2008.

The ASB was used as an opportunity to teach students about HI, a non-profit humanitarian organization that provides training and education and livestock to limited-resource communities worldwide. Heifer's sustainable development model is values-based and gifts communities in need with a "living loan" in the form of livestock (Aaker 2007). The animal produces milk, money, meat, manure, muscle, materials and motivation to promote community development. Everyone receiving assistance promises to repay their living loan by donating one or more of their animal's offspring to another family in need. This ritual of "Passing on the Gift" ensures project sustainability and strengthens community. The HI values-based model is founded in appreciative inquiry (AI), which is a question-based visioning process that draws upon group strengths and lays out a holistic approach to community development (Aaker 2007; Cooperrider and Whitney 2005). The model promotes just and sustainable development, revolving around twelve values or cornerstones that spell the acronym of "Passing [on the] Gifts." Accountability, Sharing and caring, Sustainability and self-reliance, Improved animal management, Nutrition and income, Gender and family focus, Genuine need and justice, Improving the environment, Full participation, Training and education and Spirituality. Individually, each cornerstone represents a concept yet when each value is brought together it conveys self-perpetuating community development (Aaker 2007).

After the first ASB, students inquired about designing an experiential, interdisciplinary curriculum based upon HI's "values-based" model that focused on AI and agricultural community development. This student-driven interest also cultivated reciprocity between HI and VT concerning the development of ASB learning activities for college-aged students grounded in educational theory and research (Byker et al. 2012). Virginia Tech is one of the first universities to partner with HI to plan curriculum at the college level. Through additional engagement with VT and HI stakeholders, HI's model became the initial framework for planning and designing a new agricultural and food systems curriculum in CALS.

Initially, faculty from each CALS department, Dining Services, and YMCA staff were contacted to gauge interest in collaborating and building food system community capacity through this curriculum. Participation from the YMCA offered opportunities at their Community Gardens, as did Dining Services through their interest in a garden at the CALS-Kentland Farm. A central feature included paralleling HI's model (i.e., incorporating values and "Passing on the Gift") through didactic elements and experiential components around building community capacity, animal care/production, agroecology, nutritional and economic benefits. After recruiting interested stakeholders, Clark applied for a USDA Higher Education Challenge (HEC) grant in 2009 to develop a minor integrating HI's model.

The HEC grant program entitled "Restoring Community Foodsheds: A Multidisciplinary Curriculum Translating Science into Practical, Innovative and Sustainable Solutions for Economic Viability, Food Security and Health" was awarded (USDA HEC under Award No. 2009-38411-19770); its primary objective was to develop, implement and evaluate an interdisciplinary, experiential-based curriculum in sustainable agriculture and food systems.

Taskforce Development

Next, we formalized a curriculum taskforce comprised of diverse collaborators: interdisciplinary faculty, staff

Table 2. Virginia Tech (VT) Civic Agriculture and Food Systems (CAFS) Interdisciplinary Curriculum Taskforce Members and Activities

Taskforce Members	Curriculum Design	Collaborative Teaching
Faculty Departments, Other Units, Students		
Agricultural Education and Extension	✓	✓
Animal and Poultry Sciences	✓	✓
Biological Systems Engineering	✓	
Crops, Soils and Environmental Sciences	✓	✓
Dairy Science		Guest lecturer
Entomology		Guest lecturer
Food Science and Technology	✓	
Horticulture	✓	✓
Human Nutrition, Foods and Exercise	✓	✓
Plant Pathology, Physiology and Weed Science		✓
Center for Student Engagement and Community Partnership Staff	✓	
University Honors Staff	✓	✓
Undergraduate and Graduate Students	✓	✓
Principle Community Partners		
YMCA of Blacksburg	✓	✓
VT Dining Services	✓	✓
Heifer International		✓
College Kentland Farm	✓	✓

and undergraduate and graduate students from VT, academic and non-academic units and community partners (Table 2). Taskforce members were included in the process based upon interest, divergent perspectives and disciplinary expertise. Together these entities met bi-monthly to conceptualize the interdisciplinary, experiential-based undergraduate minor.

Curriculum Design

As previously discussed, the design of the CAFS curriculum was first influenced by HI's value-based model (Aaker 2007) through the ASB. The curriculum was further developed and refined by reviewing the current status of post-secondary sustainable agriculture education. With a social science orientation, the faculty agreed to draw upon the concept of "civic agriculture" (Lyson, 2004) to develop our sustainability-focused curriculum. Civic agriculture is a development model that provides a blueprint for creating and strengthening resilient, local and regional food systems. According to Hinrichs (2007), civic agriculture is often presented as a community development strategy that allows communities to gain greater control of their socioeconomic future while, at the same time, increasing their capacity for civic engagement and community problem-solving. It is this focus on community (or civic) engagement that positions the civic agricultural model as a sustainable alternative to the current industrialized agri-food system.

Instead of vertical integration, mass production, and transnational economic policies, civic agriculture refers to the "embedding of local agricultural and food production in the community" to engender socially just, ecologically sound and economically viable outcomes (Lyson, 2004, p. 62). Civic agriculture is best illustrated through a range of community-based initiatives, including community supported agriculture (CSA), farmers markets, community gardens, grower cooperatives, community-kitchens and farm-to-institution arrangements (e.g., farm-to-school and farm-to hospital). While civic agriculture has been applied in communities, nationally, as development paradigm, it has also supported sustainability-based curriculum in higher education to strengthen students' understanding of the complex connections among food, agriculture and community (Hinrichs, 2007; Niewolny et al. 2012; Wright 2006).

Together, Lyson's (2004) framework of civic agriculture and HI's value-based model (Aaker 2007) informed the conceptual process and collaborative ethic, ultimately shaping the curriculum and its formal name. We also scanned civic agriculture related job descriptions and requested input from potential employers in the field of food and agriculture to ascertain what skills and knowledge were most valued from prospective employers. Therefore, we approached the curriculum development using an interdisciplinary perspective that would prepare student to navigate a wide range of contemporary issues facing society today (Lattuca 2002). Shifting the program focus from single-discipline to interdisciplinary studies and integrating theoretical and experiential modes of learning lays the foundation to keenly educate students to learn about the critical social, political, economic, environmental and public health issues intertwined with today's food and agriculture system (NRC 2009). The taskforce thus embraced the concept of civic agriculture, HI's values-based model and began designing a curriculum with the capacity to engage students in integrative and experiential learning, community problem solving and systems thinking. Consequently, the taskforce deemed it logical to name the minor Civic Agriculture and Food Systems (CAFS).

Results and Discussion

The overarching curriculum goal was to provide students with foundational knowledge and skills to identify, examine, apply and incorporate agriculture and food system sustainability philosophies and activities into personal and professional practice. Therefore, CAFS is a minor that embodies a commitment to developing and strengthening an economically, environmentally

and socially sustainable agriculture and food systems through curriculum that builds community capacity, uses local resources and serves local and regional markets and citizens.

Values-Based Curriculum

Early in the conceptual process the taskforce mirrored HI's values-based model by identifying six core values that represent the definition of civic agriculture as related to local-regional food systems: 1) food security-sovereignty, 2) civic engagement and democratic participation, 3) strong local economies, 4) ecological stewardship, 5) healthy people and communities and 6) collaborative teaching and experiential learning (Table 3). These core values steered the formation of programmatic goals, student learning outcomes, course descriptions and pedagogical and evaluation strategies. The taskforce drafted a comprehensive assessment plan to ensure that high education standards are maintained. Although the CAFS design process preceded the NAS (2009) recommendations, the curriculum strongly aligns with eight of the nine recommendations for transforming agricultural education for the 21st century. Furthermore, engaging values across the curriculum life-cycle helps students recognize and act responsibly towards the educational community and to the wider society (APLU 2009; Galt et.al. 2012).

Table 3. Civic Agriculture and Food Systems Core Values

1. **Food Security/ Sovereignty**
   - Protects local community integrity, traditions, and well-being
   - Increases equal access to healthy, nourishing food to improve individuals and communities health and nutrition
   - Links local food to local populations, regardless of race, gender, and class
2. **Civic Engagement and Democratic Participation**
   - Supports local leadership
   - Enhances community problem-solving
   - Builds trust, relationships, and collaborative networks among a diversity of people
3. **Strong Local Economies**
   - Provides economically profitable opportunities for farmers and agricultural workers
   - Builds and maintains local wealth
   - Strengthens economic vitality within the food system while improving community and environmental well-being
4. **Ecological Stewardship (and Praxis)**
   - Preserves and enhances environmental quality
   - Promotes a multidisciplinary, systems-oriented approach to agricultural and natural resource management
   - Values locally adapted production systems that conserve ecological resources
   - Fosters the development of capabilities that allow students to learn, appreciate, and apply place-based knowledge and skills in their lives and work
5. **Healthy People and Communities**
   - Ensures health and well-being of all people
   - Links people and communities with the food system
   - Provide healthy and culturally appropriate food produced through ecologically sound and sustainable methods
6. **Collaborative Teaching and Experiential Learning**
   - Improves learning and development of communities of co-learners
   - Fosters critical reflection and social change
   - Values local knowledge and experience

Civic Agriculture and Food Systems Courses

To graduate in the CAFS minor, students complete 18 credits that include four required courses, each three credit: 1) 2204 Introduction to Civic Agriculture, 2) 3404 Ecological Agriculture: Theory and Practice, 3) 4204 Concepts in Community Food Systems and 4) 4214 Capstone in Civic Agriculture and Food Systems. Course objectives, descriptions and select assignments are found in Table 4. Students select the remaining six credits from a list of cross-disciplinary CALS departmental courses that complement the minor are tailored to their area of interest. The required courses are structured in a step-wise fashion to prepare for the experiential capstone course where students implement community-based action project (CAP) originally drafted in 2204. To date, three ALS courses (2204, 3404, and 4204) have been taught twice and the ALS 4214 capstone course once. Through grant support and the HI–VT partnership, students participated in value added experiential study opportunities (domestic and international) that have deepened students understanding about sustainable community development as it relates to the minor (Byker et al., 2012).

Experiential-Based Education

The minor is designed to promote academic enhancement, personal growth, and civic engagement through experiential-based education (Baxter Magolda 2002; AACU and CFAT 2004). In the historical tradition of John Dewey (1916), the curriculum is academically grounded in experiential learning theory, which fosters an engaged teaching and learning environment for both learners and educators. Dewey maintained that all learning must be put into context of prior knowledge and experience and that the key for an enhanced education was for students to "learn by doing." For half of a century, his educational theories have been employed widely in colleges of agriculture (Roberts, 2006). Experiential-based education helps students improve their academic performance, build leadership skills, strengthen their sense of community, gain professional and career advantages, foster personal development and cultivate a lifelong civic and service ethic (Eaton 2003; Enos 1996).

More recently, VT and other land grant institutions have advocated for an experiential learning approach that takes student learning beyond institutional walls by way of developing service-based fieldwork experiences through community-university partnerships (Galt et al., 2012; Niewolny et al., 2012; Wright 2006). Specifically drawing upon this educational perspective, the CAFS minor creates space where students are able to: connect skills and knowledge from personal experiences both

Table 4. Civic Agriculture and Food Systems Courses

Required Courses and Descriptions (3 credits each)	**Pedagogical Examples**
ALS 2204 Introduction to Civic Agriculture: Introduction to the economic, social, and ecological foundations of civic agriculture. Topics include industrialization, localized food systems, and citizen participation in civic agriculture. Emphasis will be given to a range of civic agriculture models, strategies, and hands-on approaches to establish, retain and strengthen community-based food and agriculture systems	*Activities and Assignments* ▪ Critical Reflections on Readings ▪ Group Dialogue and Discourse ▪ Foot Roots ▪ Community Needs Assessment ▪ Community Project Proposal ▪ Electronic Portfolio – Fieldwork log – Course reflection ▪ Fieldtrips: Farm tours, Dining Services
ALS 3404 Ecological Agriculture: Theory and Practice: This course examines the ecological foundations of sustainable agriculture practice. It surveys the principles of ecology and biology in the context of civic agriculture and food systems. It includes an overview of sustainable agriculture practices both historic and modern	*Activities and Assignments* ▪ Whole Farm Plan Project ▪ Weekly reading reflection ▪ Electronic Portfolio – Fieldwork log – Course reflection ▪ Fieldtrips: Farm tours ▪ Soil sampling and analysis
ALS 4204 Concepts in Community Food Systems: Examination of the economic, political, social, and cultural issues related to community food systems and agricultural practices. Topics include local and regional food systems development, food production and biotechnology, food sovereignty and security, and population and environmental health. Analyze models, strategies, and policies of national food systems	*Activities and Assignments* ▪ Learning Circles ▪ Case study analysis ▪ Policy Brief ▪ Personal Manifesto ▪ Electronic Portfolio – Fieldwork log – Course reflection
ALS 4214 Capstone: Civic Agriculture and Food Systems: Multidisciplinary, experiential community-based course focusing on civic agriculture-food systems. Working in partnership with community stakeholders, students propose viable solutions to real world issues revolving around civic agriculture and food systems. Students will connect with communities locally, regionally or globally	*Community Action Projects* ▪ Grape CSA[a,b] ▪ Tea Garden: Production & Marketing[b] ▪ Farmscaping[c] ▪ 16 Plot Garden Plot[c] ▪ Edible Demonstration Garden[c] ▪ Children's Wonder Garden[d] ▪ Student Campus Garden[e] *Other* Final Electronic Portfolio

[a]CSA: Community supported agriculture
[b]Stone Crop Farm
[c]Hale-Y Community Gardens
[d]Floyd Elementary and Plenty!
[e]Smithfield Plantation

formally and informally; apply theory to practice via service-based fieldwork or community projects; critically reflect upon agrifood issues and arguments; and apply newly learned concepts and practices to other problems and social settings. It is this rich foundation of experiential-based education that provides students with vital knowledge, skills and practical know-how about emerging agriculture and food system concepts and professional practice.

To complement the experiential-based approaches, the minor promotes a learning partnership between students, faculty and the community creating mutually beneficial outcomes (Jacoby 2003). Course lessons are designed to actively engage students with educators and community members in group dialogue and problem-based inquiry. This approach enables students to develop critical thinking by way of problem solving and question-posing with a range of stakeholders—all of whom obtain valuable knowledge and experience. When students learn to ask better questions it allows for deeper thinking and provides faculty with significant insight into the degree and depth of student understanding (Brooks and Brooks, 2001). The CAFS pedagogical approaches that illustrate this participatory philosophy include collaborative teaching, fieldwork, learning circles, project-based assignments, and electronic portfolios. These key instructional approaches used in the minor are described next.

Collaborative Teaching Teams

Collaborative teaching (CT) is one of the six core values embraced in the minor that has also produced research scholarship. Each of the four main courses of the CAFS minor are collaboratively taught through a unique grouping of CALS faculty, staff, students and a community partner liaison who coordinates the Hale-YMCA Community Garden. While each teaching team looks and operates differently from each other, the common theme across all four courses is the focus on interdisciplinary CT. Specifically, each course team integrates unique disciplinary perspectives to guide curricular and student learning aims through an approach that consists of team teaching planning, instruction and student learning assessment. The CAFS minor approach to CT involves building relationships between and within different CALS departments and the students who participate in the courses. Drawing upon Jacoby's (2003) partnership framework, the CAFS teams construct their teaching teams as actual partnerships focusing on five main occurrences: (1) shared vision, values, and trust, (2) identification of clear benefits to each partner as critical, (3) integration of unified philosophy and mission, (4) mutual learning occurs and (5) fresh perspectives are gained.

As a result of this teaching innovation, members of the CAFS taskforce collaborated with VT educational researchers to conduct a campus wide, mixed-methods study of CT at VT that was funded through a CALS integrated internal competitive grant program (Bryant et al., 2012). This study explored how CT is currently utilized across the campus by faculty to characterize a "best practice" model for implementing CT more

successfully for both instructor and student outcomes. Many opportunities and obstacles were observed through collection of survey and focus group data. Faculty gaining new interdisciplinary knowledge and an increase in student engagement through successful models of collaboration were reported.

The potential benefits of CT were evident; however, challenges faced by those engaged in CT are also apparent. Some obstacles to CT were time and resource intensiveness, work load delegation and institutional challenges associated with teaching credit and recognition (Bryant et al., 2012). Additionally, it was learned that different models and definitions of CT exist, which can lead to misunderstandings about what is CT and its impacts on learning. Therefore, it is important to define CT in a manner that reflects the way both teaching responsibility and interdisciplinarity are involved. According to Lattuca (2002), viewing interdisciplinarity as a discourse community is helpful for complex teaching and learning arrangements. Here people explicitly discuss and share values, beliefs and existing knowledge schema to create both a social and cognitive learning experience within and among disciplines, which, in turn, influences the culture of the CT team.

Building on this mixed-methods research, an additional qualitative study was conducted at VT specifically inquiring about the teaching experiences of the CAFS minor teaching faculty (Helms et al., 2012). This research consisted of two focus groups of faculty and one community partner engaged in teaching and scholarship in the minor. The primary purpose was to identify intellectual outcomes of the CT team involved in the CAFS interdisciplinary, collaborative group. Faculty knowledge gains in the fields of agriculture and life science were an emergent theme. Faculty also reported that this knowledge gain reflected a paradigm shift from a reductionist view of science to "systems level" thinking of agricultural and food system issues. Furthermore, reciprocity between faculty learning and course curriculum development was identified as a productive process with mutual benefits to faculty, community partners, and students. The role of the community partner liaison in curriculum development was also identified as benefiting the collaborative teaching process by way of linking learning objectives through a service-learning framework that was grounded in authentic learning experiences.

Community Partnerships

Service-learning through fieldwork is incorporated across the CAFS curriculum. This service learning experience is based upon the development of community partnerships with several CAFS community stakeholders. In all CAFS courses, students are required to fulfill a minimum of 10 hours of fieldwork experience with a CAFS community partner. During scheduled fieldwork students follow a best practices protocol for community engagement created by the CT team. Guiding principles include: 1) identify, acknowledge and engage with stakeholder(s), 2) proceed with mutual respect and cultural understanding, 3) emphasize relationship building, 4) build community capacity for greater problem-solving and 5) work toward reciprocity. When students are asked to describe what components of the CAFS program they find most beneficial, fieldwork is consistently listed at the top of their responses.

In ALS 2204 Introduction to Civic Agriculture scaffolding of community engagement begins with five principle community partners: VT Dining Garden at Kentland Farm, Hale-YMCA Community Gardens, Smithfield Student Garden, Glade Road Growing Farm and VT Dining Services Farm to Fields option. In addition to the principal partners, the current community partner database includes thirty other community based organizations (CBOs). As the CAFS program builds community capacity through mutually beneficial service-learning opportunities it generates interest from other CBOs. Overall, fieldwork provides a platform for the development of student capstone projects, creates space for public dialogue, enhances students' problem-solving capacities and creates mutually beneficial learning opportunities for students, community partners and faculty involved in the minor.

Learning Circles

Learning Circles (LC) are one form of knowledge generation used in the CAFS 4204 Concepts in Community Food Systems course that promoted student engagement and accountability. By definition, a LC is a group of individuals with a common interest who meet regularly to learn from each other and others about a topic (Aksim 2005). Built upon the idea that every member has something to contribute and that every member has something to learn, they are intended to lead to action and change (Ravensbergen and VanderPlaat 2010). Common LC strategies include establishing and defining quality work together; identifying norm behaviors for classroom culture; and determining criteria for success. Ultimately, LC activities generate in-depth inquiry around the complex and value-laden issues confronting food and agricultural issues which fosters a community of learners.

In ALS 4204 Concepts in Community Food Systems, LC's are assembled with three to four students per grouping. Each LC is responsible for working as a team on a variety of assignments and activities such

as community food system case studies, fieldwork synopses and policy briefs. We found that the LC assignments engendered a camaraderie that produces creative quality work that enriched learning within the classroom. Course evaluations report positive attitudes towards LC and other group methodologies. In fact, last year this was reaffirmed when five students presented a roundtable discussion about their learning experience in ALS 4204 LC at the 4th National Sustainable Agriculture Education Association Conference (Rich et al., 2011).

Project-Based Assignments

All course assignments/activities (in and outside class) are purposely designed to examine community-based agrifood systems to meet respective CAFS course objectives, demonstrate interdisciplinary knowledge and perspectives, improve oral and written communication and practice community-based participation. Following this further, the CAFS's principles of community facilitate open/affirming communication, full participation, inclusion, relationship building, productive and accountable process and capacity building (Emery et al., 2006; Aakers 2007). Project-based activities are designed to exemplify these principles and foster a learner-centered environment in the classroom via experiential modes of learning. Although examples of course assignments are found in Table 4, a more in-depth explanation of the culminating final capstone project is warranted.

In the ALS 4214 Capstone in CAFS course, students apply the knowledge gained from their previous coursework and experiences to design and refine, implement, co-manage and evaluate a mutually agreed upon CAP in partnership with a community member or organization. They build upon the first drafts generated in the Introduction to Civic Agriculture (ALS 2204) course. These drafts are specifically modeled after a typical grant proposal. Refinements continue to be made in subsequent CAFS courses until the final proposal is implemented in capstone course. After revisions are made, students begin planning the project's methodology in detail. Due to the dynamic and iterative nature of the projects implementation spans a minimum of one semester. Throughout the process, students reflect and report out how the CAP complements the HI "values-based" model, both based upon AI framework (Aaker 2007; Cooperrider and Whitney 2005). Basing the CAP in AI requires students to practice asking questions that capture, anticipate, and heighten positive potential regarding the CAP project. During class, students collectively pose, ask and share responses to "positively framed questions" about the CAP progress. This gives way to innovation and reciprocal discovery, shared knowledge and ultimately, enables students to envision the future success of the project (Cooperrider and Whitney 2005; Galt et al., 2012; Rojas 2007). Intentional dialogue between students and the community about past and present capacities, i.e., achievements, assets, unexplored potentials, innovations, strengths, opportunities, benchmarks, high point moments, lived values, traditions, strategic competencies, stories and visions of the future builds and solidifies authentic partnerships.

In ALS 4214, students uphold the CAFS principles of community for all CAP assignments as well. Over the CAP life cycle, students periodically reveal personal and professional attributes that contribute to a quality product. In other words, this activity invites students to appreciate each other's collective history regarding project experiences and simultaneously gain constructive feedback from peers and community partners. To simulate real-world practice, project budget justifications are presented, ranked and then prioritized for funding. At the beginning of the semester, students creatively illustrate (visually and orally) a 'positive core' presentation that envisions what the project will look like at the end of the semester. Periodically, students use voice and photographs to depict CAP progress to describe how the project strengthens community capacity (built, financial, natural, cultural, political, social and human) and share CAP positive experiences and best practices (Emery et al., 2006; Wang and Burris 1997). Progress reports are also submitted at strategic intervals during the semester for project accountability. These include a detailed CAP plan with objectives/goals, timeline, evaluation and dissemination plan, budget justification if requested, potential impacts, community capitals/CAFS core values addressed and actions to date describing major changes in approach and reason(s) for the changes. The final progress report includes an abstract summary of the CAP and a dissemination plan. Similarly to HI, students are "passing on the gift" by sharing the CAP with internal and external community constituents. Fall semester 2011 was the first time the ALS 4214 was offered and six individual projects and one joint CAP were successfully completed. Specific CAP projects are listed in Table 4 under ALS 4214.

Electronic Portfolios and Assessment of Student Learning

Within the minor electronic portfolios (ePortfolio) serve a role for assessment of student learning and showcasing examples of student work. They are a purposeful collection of work that exhibits a student's efforts, progress and achievements in one or more areas (academic, experiential and professional) (Paulson

et.al.,1991). Students collect work over time; reflect on accomplishments; select work that highlights strengths; and connect by sharing work with a variety of internal (i.e., faculty writing recommendations) and external audiences (i.e., prospective employers, community partners, etc.).

Electronic-portfolio assignments are dispersed throughout each CAFS course and upon one another. In the Introduction to Civic Agriculture (ALS 2204) course students begin to construct the ePortfolios adding specific artifacts from each subsequent CAFS course. All current CAFS students have successfully completed ePortfolios.

The CAFS taskforce uses assessment data archived in ePortfolios to measure learning over time, recognize successes and make necessary improvements in teaching and curriculum. Furthermore, ePortfolios are an efficient and effective mechanism for showcasing a student's multidimensional academic progress and metacognitive growth. To date, the CAFS ePortfolio provides insight into student's perspective, knowledge, written reflective thinking skills and multimedia and technology skills regarding civic agriculture and food systems. Analysis of assessment data is yet another opportunity for CAFS taskforce scholarship.

In alignment with university requirements, a comprehensive program assessment plan was concurrently generated with the curriculum to ensure that high educational standards are maintained using ePortfolio technology. It encompasses classroom, course assessment, program assessment and institutional level assessment. The intent of the assessment plan is to inform the CAFS taskforce about what students know, what they can do with this knowledge and what they value as a result of this knowledge (Palomba and Banta 1999; Black 2003).

The instructional practices previously described in this article provide an avenue for gathering and analyzing information on student learning that faculty apply in a formative way. Examples of data collected to assess student learning include criteria and goal setting for projects, reflective journaling, self and group assessment, archiving assignments, course evaluations and student and faculty focus groups. The CT teams seriously review and discuss these sources to determine whether changes to the curriculum and instruction are necessary. To date, the CT teams have made minor modifications in course content and delivery strategies based on assessment data of the first program graduates.

Student Enrollment, Outreach Opportunities and Outcomes

University governance approved the two-year CAFS minor over a one-year timeframe and the first group of eighteen students representing majors from four colleges enrolled the following fall 2010 semester. The current student enrollment (n=52) now reflects all eight colleges within the university making it truly interdisciplinary (Table 5).

In May 2012, the first group of 8 CAFS students graduated. Prior to graduation five of these students were recognized for significant community outreach done as a result of the minor by either the University or a national organization. Specifically, one student was the recipient of the Aspire "Ut Prosim" (That I May Serve) Award, the University's most prestigious student honor. During the awards ceremony, it was explicitly acknowledged that this student's affiliation with the minor had provided the platform to civically engage and subsequently enhance both the campus and surrounding community's food systems. Another CAFS student majoring in landscape architecture was awarded the "Certificate of Honor" by the American Society of Landscape Architects Excellence in Landscape Architecture Studies. They

Table 5. Student Enrollment, Demographics, and Job Placement

Colleges	Number	Department / Major
Agriculture and Life Sciences	31	Agricultural and Extension Education (2) Agricultural and Applied Economics (4) Animal and Poultry Sciences (3) Biochemistry (1) Biological Systems Engineering (1) Crops, Soils and Environmental Sciences (7) Human Nutrition, Foods and Exercise (6) Food Science Technology (2 minors) Horticulture (5)
Architecture & Urban Studies	6	Environmental Policy and Planning (4) Landscape Architecture (2)
Engineering	1	Chemical Engineering (1)
Natural Resources Environment	2	Natural Resources (1) Geography (1)
Liberal Arts & Human Sciences	11	History (1) Humanities, Science, & Environ (3) Interdisciplinary Studies (1) Theater Arts (1) Science & Technology in Society (4) Sociology (1)
Business	(1)	Double Major with HIST
Total Enrolled	**52**	

2012 First Graduates Job Placement (n=8)
2 CAFS farm internships 1 Rodale Institute Internship (upon completion plans to attend graduate school) 1 University Campus Garden Coordinate 1 VA Tech Dining Sustainability Coordinator 1 Virginia Cooperative Extension Agent in Community Food Systems 1 Vista Volunteer for Food Security NGO 1 Seeking Landscape Architecture Internship around food systems

were acknowledged for how the student's CAP project favorably influenced their senior landscape design project.

The minor's commitment to advancing agricultural education has been exemplified through student involvement in multiple outreach opportunities that have resulted in leadership positions for them within the community. To date, students have successfully organized, managed and led the following events: National Food Day campus festivities, the first annual Appalachian Agriculture and Food Summit Conference, the CAFS Elective for the annual CALS Governors School for High School juniors and seniors and the Sustainable FoodCorps, a student organization that sponsors monthly community meals and facilitates student volunteers for local area fieldwork experiences.

Similarly to enrollment in the CAFS minor, the job market around civic agriculture and food continues to grow. According to the Labor Department, at least 3.1 million Americans are employed in green jobs, a sector that now accounts for about 2.4 percent of the nation's total employment (BLS 2012). Furthermore, the Green for All Report (2011) projects new job opportunities for 'greening' the food system across all sectors (production, processing, distribution, retail and waste). All eight students who have graduated from the CAFS program are engaged in a variety of post-baccalaureate jobs or related ventures (Table 5).

Summary

The CAFS minor continues to cross disciplinary boundaries through its community engagement focus as it cultivates the next generation of critical problem solvers who will become leaders in resolving the complex issues facing agrifood systems in the 21st century. The CAFS program contributes to the University's mission through the scholarship of learning, discovery and community engagement within the Commonwealth of Virginia, the nation and the world. It fosters interdisciplinary teaching and research collaboration among faculty that translate into interdisciplinary learning opportunities that augments students' understanding of the social, political, economic, environmental and public health concerns related to contemporary agriculture, food and sustainable practices. The minor holistically prepares students to critically examine the complex challenges facing agricultural systems from an interdisciplinary perspective. Simultaneously, it builds university-community capacity as students engage in authentic partnerships resulting in transformation for everyone (faculty, students and community partners). Students learn how to find practical, innovative and sustainable agrifood solutions that promote economic viability, food security and community and ecological health through community engagement. In turn, students acquire unique expertise in sustainable agricultural-food systems, which translates into a competitive edge within the growing green agrifood system career market.

What better way to conclude than paraphrasing a recent CAFS graduate's final ePortfolio reflection about the minor. *"The CAFS minor is not just an academic program—it's a community. Throughout my time in the minor, I've made connections with a community of passionate learners and crusaders that have included professionals, faculty, community members and students. This exposure to different paradigms, disciplines and pathways has helped me form a robust academic, personal and professional foundation in regards to agrifood systems and community development. I feel confident in my ability to synthesize information in order to make knowledgeable—and more importantly—feasible recommendations and synopses"* (Shultz 2012). This critical self-reflection reveals the three levels of cognitive processing, i.e., cognition, metacognition and epistemic cognition. Other student reflections are similar and reaffirm an "esprit de corps" within the CAFS community of learners. The undergraduate CAFS minor is a response to the NAS's (2009) call for transformation in agricultural education. It is relevant and prepares society ready graduates who are equipped to take responsible, meaningful action to improve civic agriculture and food systems. Future endeavors include conducting research that explores how a values-based, interdisciplinary, experiential-based curriculum and its pedagogical methods impacts student, faculty and community partner learning.

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