Learning Through Collaborative and Interdisciplinary Teaching: A Case Study of Faculty Work as Learning in Sustainable Agriculture Education

Jennifer H. Culhane[1], Kim Niewolny[2], Susan Clark[3], Kate McConnell[4] and Curt Friedel[5]
Virginia Tech
Blacksburg, VA

Abstract

The National Academy of Sciences called for a dynamic approach to teaching and learning in colleges of agriculture. In response, faculty at colleges and universities are implementing innovative frameworks for undergraduate education in the agricultural sciences. This study explored the collaborative and interdisciplinary teaching and learning practices of faculty in sustainable agriculture education curricula at a land grant university as an illustration of this innovation. Drawing upon a sociocultural learning framework, this study specifically emphasizes faculty work as a social practice and the inherently relational learning that occurs with other faculty, their students and community partners. Using an in-depth, qualitative research approach, a single embedded case study design was implemented to illustrate the teaching and learning experiences of an interdisciplinary group of faculty collaborating within an undergraduate minor that fosters community engagement through service-learning and sustainable agriculture curricula. The collaborative teaching structure that is explored is comprised of an instructor of record, collaborating faculty, community-partner and graduate teaching assistant. Faculty teaching in this program of study experience learning in the areas of disciplinary knowledge and pedagogical practice and navigate organizational challenges and barriers to collaborative work.

Introduction

Background of the Case: Sustainable Agriculture Education

Sustainable agriculture education (SAE) represents an educational approach to agriculture education that addresses many complex social and environmental problems, where educators are blending theory and practice to develop experiential learning environments that view students as the focal point of the process (Parr et al., 2007). High-impact practices identified by Kuh (2010), such as first-year seminars, learning communities, service-learning, undergraduate research and capstone courses and projects, are frequently implemented in SAE programs (Clark et al., 2012; Parr et al., 2007; Parr and Van Horn, 2006). The of SAE programs has experienced remarkable growth in the past two decades (Jacobsen et al., 2012). Not surprisingly, SAE programs vary in content, structure and focus depending on regional needs, administrative support, financial resources and student interests. Educational stakeholders involved in the design of SAE curricula at land grant universities are increasingly seeking to promote community-based dialogue fostered through community-university partnerships (Niewolny et al., 2012). Understanding faculty learning while participating in collaborative and interdisciplinary teaching is critical if we are to understand how agriculture education is best positioned to meet the needs of a changing paradigm in higher education.

Faculty Work as Learning in Sustainable Agriculture Curricula

How faculty consider their teaching as learning is critical in regards to the changes occurring in the academy. For institutions of higher education to fully engage, understanding faculty's learning process as well as the factors and contexts that promote and sustain faculty learning is imperative. This involves the development of a framework in higher education for understanding the schol-

[1]Director of First Year Academic Initiatives, Virginia Tech, jculhane@vt.edu
[2]Associate Professor Agricultural, Leadership & Community Education, Virginia Tech, niewolny@vt.edu
[3]Associate Professor Horticulture, Virginia Tech, sfclark@vt.edu
[4]Director of Undergraduate Assessment, Virginia Tech, kmdrezek@vt.edu
[5]Assistant Professor, Agricultural, Leadership & Community Education, Virginia Tech, cfriedel@vt.edu

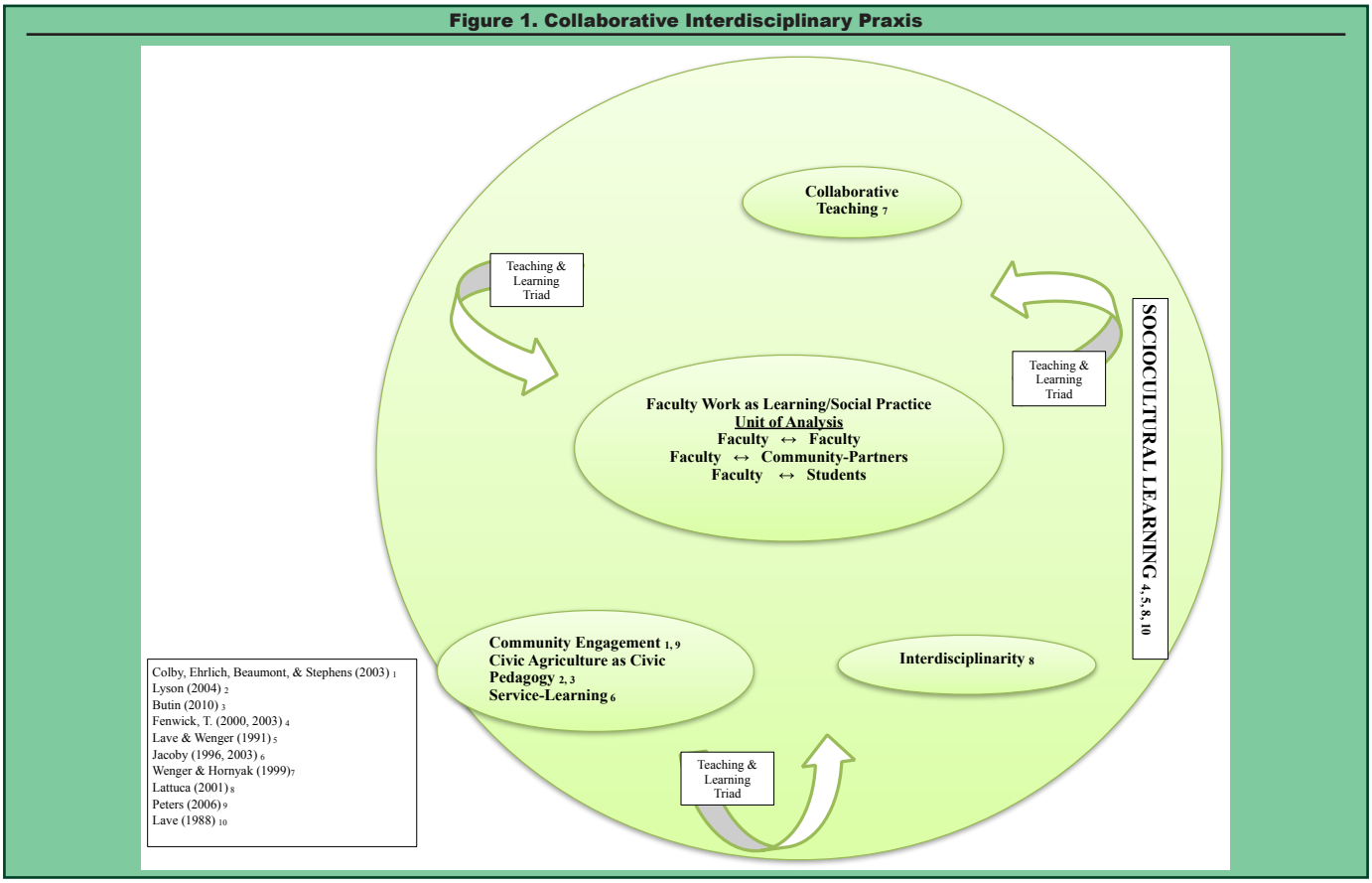
arship of teaching and learning as a learning process. This framework emphasizes a triad approach to teaching and learning that integrates experiential learning, interdisciplinarity and community engagement (Clark et al., 2013; Hammer, 2004; Niewolny et al., 2012; Parr and VanHorn, 2006; Parr et al., 2007). The first concept in the triad approach, experiential learning, is an overarching philosophy, epistemology and pedagogy that views experience as central to the process of teaching and learning; it considers experience as an embodied process of learning whereby the learner interacts in both the cognitive and physical sense through reflective practice (Fenwick, 2003). Interdisciplinarity, as the second component of the triad, is viewed as the blending of multiple disciplines inclusive of new knowledge structures and theoretical and methodological approaches (Godemann, 2006, p. 52).

Lattuca (2001) describes collaborative interdisciplinary teaching as a sociocultural practice where faculty gain new teaching strategies and insights, are intellectually stimulated and are more reflective on both their own learning and their students learning (Lattuca, 2001; Thorburn, 1985). Third is the phenomenon of community engagement in higher education. Drawing upon the National Academies of Science (2009), we see an emergence for increasing the scholarship of civic or community engagement, wherein academic knowledge and community service connect, thereby contributing to community well-being. Civic engagement, measures of civic embeddedness, relational ties among institutions, social capital and trust are qualities exemplified by engaged communities (Tolbert et al., 2002). In keeping with Colby et al. (2003), land grant universities (LGU) are to reengaging with their local communities in more meaningful ways by connecting the social with academic goals, knowledge competencies with personal commitment and the university with the larger world. Figure one illustrates the praxis of collaborative, interdisciplinary teaching and learning as embedded within community engaged framework (Figure 1).

The Case: Civic Agriculture and Food Systems Minor

This paper is part of a study on the Civic Agriculture and Food Systems (CAFS) minor within the College of Agriculture and Life Sciences at a southern land-grant university (Helms, 2014). The CAFS minor is an ideal case to observe collaborative and interdisciplinary teaching in practice. A combination of a values-based model of community development espoused by Heifer International (Aakers, 2008) and Lyson's (2004) framework for civic agriculture informed the development of the minor. Through collaborative agreement on the program's core values and philosophical goals, the CAFS taskforce—a decision-making body of faculty, community-partners, institution administration and graduate students—developed programmatic goals and student learning outcomes. Undergraduates intending to minor in CAFS are required to take four courses: 1) ALS 2204, Introduction to Civic Agriculture; 2) ALS 3404, Ecological Agriculture; 3) ALS 4204, Concepts in Community Food Systems; and 4) ALS 4214, Capstone in Civic Agricul-

Figure 1. Collaborative Interdisciplinary Praxis



ture and Food Systems. The core courses are taught by collaborative teaching teams comprised of faculty from multiple disciplines and include community-partner stakeholders (Clark et al., 2013). Wenger and Hornyak (1999) recommend a more integrated approach to teaching and learning where multiple perspectives, even competing viewpoints, can be shared and discussion can occur to address the complexity of issues. Grossman et al. (2012) suggest that the incorporation of community-based learning experiences can enhance student learning outcomes in the areas of social and environmental issues in tandem with reflection on those experiences while maintaining reciprocity with the local community. Specifically, the following community partners support the Civic Agriculture and Food Systems minor: University Dining Services; an international values-based community development organization, Heifer International; a small intensive urban farm; and a community garden. The student population enrolled in the minor is comprised of all 8 colleges at the university (Clark et al., 2013).

Methods

A qualitative research methodology was employed via a single embedded case study design informed by Yin (1997, 2012) to explore a minor at this LGU. The methods of data collection included semi-structured interviews, participant/observer field notes and secondary data analysis. Purposeful sampling was implemented for the selection of participants based on membership in the CAFS Taskforce and/or a collaborative teaching team (CTT) role in one of the four core courses in the minor. The Institutional Review Board approved the study protocol and all participants provided written informed consent prior to participation in the study. Faculty and a community-partner participated in semi-structured interviews. Participant identity was concealed by assigning pseudonyms. One of the researchers also acted as participant-observer throughout the Fall 2013 during the ALS 2204, Introduction to Civic Agriculture weekly classes and CTT meetings and the CAFS Curriculum Taskforce monthly meetings, to enhance data collection by observing practice. Secondary data collected through use of written documents created in the CAFS Curriculum Taskforce Assessment workshop and core course syllabi informed the overall process.

The primary researcher conducted field observations during the Fall 2013 semester— principally during (1) CAFS introductory core course sessions involving the collaborative teaching team, (2) weekly planning meetings and (3) CAFS Curriculum Taskforce monthly planning meetings. The observed collaborative teaching team was comprised of two faculty members in the College of Agriculture and Life Sciences, one community partner and one graduate teaching assistant (GTA)—namely the researcher for this study who acted as participant-observer. The CAFS Curriculum Taskforce meetings included faculty collaboratively teaching in one of the four core courses, community partners, institutional partners, college administration and graduate students. It should be noted that not every member attended each monthly meeting.

Constant comparative methodology (Charmaz, 2006) was implemented with the assistance of Atlas.ti (Dowling, 2008), the qualitative analysis software. Open coding of field notes, memos and interview transcripts were conducted simultaneously with data collection. Embedded memos (brief reflective memos) were included in the open coding process to inform future analytic memos (detailed memos that connect across embedded memos). Preliminary analytic notes in the form of memos serve as a level of analysis. Focused coding, the process of synthesizing initial open codes to the level of categories, was then conducted. These categories are included in an intensity matrix. Code matrix tables are utilized to show the frequency of code occurrence within each primary document. Primary documents are: interview transcripts, field notes and secondary data sources. Coding, using the constant comparative method, involved attaching labels to observations, interactions and collected materials that were sorted and synthesized forming tentative categories. Analytic memos synthesized data creating a logic trail that can be traced to the individual primary documents and field notes that informed the process through a labeling structure. Table 1 illustrates an example of a code matrix table that serves as an audit trail for the code Roles and Participation in Collaborative Teaching (Table 1).

Table 1. Code Matrix: Roles and Participation in Collaborative Teaching

Data Type	Interview (Primary Document # P1-P8)	CAFS Course Field Note (Primary Document # P9-P20)	CAFS Collaborative Teaching Team Meeting Field Note (Primary Document # (P21-34)	CAFS Curriculum Taskforce Field Note (Primary Document # P35-38)	CAFS Secondary Data (Primary Document # P39-P45)
Theme: Collaborative Teaching in Higher Education	* Number of Occurrences in Primary Document Shown in Parenthesis ex: P1(3)				
Category: Roles and Participation in Collaborative Teaching	P1(3)	P9(2)	P21(4)	P35(1)	P39(1)
	P2(2)	P11(2)	P22(1)	P37(2)	
	P4(6)	P12(6)	P31(5)		
	P5(1)	P13(4)	P32(1)		
	P6(6)	P14(6)	P23(2)		
	P7(4)	P15(3)	P34(2)		
	P8(4)	P16(2)	P24(1)		
		P17(5)	P25(4)		
		P18(2)	P26(2)		
		P19(2)	P27(2)		
			P28(3)		
			P29(2)		
			P30(2)		

This study was guided by an inquiry into the experience of faculty teaching and learning in sustainable agriculture education through a sociocultural lens. Following Fenwick's (2003) explanation of learning as a sociocultural experience and Lattuca's (2001; 2002) orientation to sociocultural learning theory, the primary researcher explored faculty work as learning to emphasize the importance of embedded social activity in diverse contexts, inclusive of interactions with other faculty, students and community partners and tools of various communities of practice (Lattuca, 2002). Specifically, the lead researcher drew upon Lattuca (2002) as a way to highlight how disciplinary positions frame faculty assumptions, practices, processes, values and relations to other disciplinary perspectives in their everyday work. Therefore, in this case of faculty teaching and learning, the unit of analysis was informed by faculty work as a sociocultural practice, drawing on the understanding of Lave (1988) that "the deep experience of whole-persons acting" (p.190) illustrates the nature of experience coupled with person, activity and setting as conditions for learning. The unit of analysis included faculty teaching and learning in the CAFS minor embedded with collaborative and interdisciplinary partnerships with CAFS faculty (faculty-faculty), community partners (faculty-community-partners) and student learners (faculty-student).

Results and Discussion

Faculty Learning: Designing and Implementing a Collaborative Teaching Team

This study found that faculty learn from working together; developing new ways of understanding disciplinary context and the environment. The collaborative teaching team structure for the CAFS minor has undergone modifications during the four iterations across its four core courses. The teaching teams implemented in the CAFS minor consisted of the following key members: instructor of record, collaborating faculty, community partner and graduate teaching assistant. The individual roles and responsibilities of the collaborative teaching team members enhanced the teaching and learning process and was communicated to university administration when requesting funding and time to work in this manner. Code mapping that revealed three iterations of analysis is illustrated in Table 2.

When explaining the minor's collaborative teaching team structure one faculty shared that some of the frustration experienced was working within the *"hierarchy of the education infrastructure...and how they assign credit to faculty for their teaching load."* The faculty member further explained that there was "no [organizational] model currently for doing what it is we are doing." As a partial solution, they stressed the importance of communicating with department heads for support, while at the same time cautioning the band-aid nature of this approach. Additional stated: *"Moving forward if we don't get more support mandating [collaborative interdisciplinary work] at the upper administration level, at our college and our department heads...it will not succeed."* Clear roles and outcomes for participation in collaborative teaching communicate the value/need for funding to administration. Establishment of a model for collaborative teaching that can be shared to navigate administrative structures can enhance the ability of the institution to learn outside of the existing structure. Also, clear structure for collaborative teaching based on programmatic goals and learning outcomes allows for seamless reporting to accreditation organizational structures.

The four C's were found to be essential for successful collaborative teaching: communication, continuity, clarity and capacity. One faculty spoke of communication: *"What made it work was that everybody communicated fairly well...but we were not in the same classroom at the same time at all times."* Another faculty noted the importance of the instructor of record in maintaining continuity: *"There's this connectivity and that would be the person that's the instructor of record maintaining that."* Clarity in the roles of teaching team members was mentioned: *"We're pretty clear about roles and responsibilities for the most part."* The size of a collaborative teaching team can also impact clarity and therefore performance as described by one faculty*: "[The collaborative teaching team has] definitely changed... [it's become] a smaller team since the beginning which I am personally happy with...it's better for a lot of reasons, it's tidier...the moving parts can be confusing."* The notion of capacity as a limiting factor to efficiency and successful collaboration was further questioned by another faculty member: "How many faculty can you have involved in three classes? And what is their role?"

While there is significant collaborative learning potential for faculty and students alike, the model is not without its challenges. Faculty in this study voiced concerns in the following themes: understanding clear roles and responsibilities of teaching team members; managing time commitments (which tend to be highly variable during a semester); communicating the model to students; maintaining equity; and understanding common pedagogical practice. Faculty described the potential hazards of not clearly understanding the role of each member of the teaching team. They indicated that "not fully understanding...the delineation of roles and responsibilities" affects participation and understanding of the collaborative teaching model. Also added was that time management is a challenge to collaborative teaching in the minor where it "seems like you're juggling a lot of balls...and if there's a better way of doing it I have yet to figure it out." A faculty member explained the challenge and difficulty in communicating the model to students, as follows:

I think one of the challenges is how do you best communicate this collaborative teaching concept to the students you're teaching...and we really need to continually remind the students that this is a collaborative team it's not just one individual... [it's] a different paradigm to what they are often exposed to on this

Table 2. Code Mapping: Three Iterations of Analysis

Code Mapping For Civic Agriculture and Food Systems Minor (Research Questions 1, 2, 3 and 4)			
RQ1. How do faculty understand and participate in collaborative teaching?	RQ2. How do faculty understand and participate in interdisciplinary teaching?	RQ3. How do faculty understand and participate in service-learning as a pedagogical practice?	RQ4. What sociocultural outcomes might result from faculty learning within this sustainable agriculture education program?
Third Iteration: Emergent Themes/Application to Data Set			
RQ1. Collaborative Teaching in Higher Education	RQ2. Interdisciplinary Teaching in Practice	RQ3. Service-Learning as Reflective/ Critical Practice	RQ4. Participation in Sustainable Agriculture Education Program
Second Iteration: Focused Coding/Constant Comparative Analysis			
RQ1. Roles and Participation in Collaborative Teaching ***Sub Categories-*** *Role of Instructor of Record* Role of Collaborating Faculty Role of Community Partner Liaison Understanding the Collaborative Teaching Model Feelings toward Collaborative Teaching	RQ1. Learning Pedagogical Practices Navigating Administrative Structure Navigating Collaborative Work Outcomes of Collaborative Work	RQ2. Learning Disciplinary Knowledge Recognizing Disciplinary Perspective Understanding Interdisciplinarity RQ3. Understanding Service-Learning as Pedagogical Practice Understanding the Community Partner as Educator	RQ4. Identifying Student Learning Learning Situated in Sustainable Agriculture Education Teaching in Sustainable Agriculture Education
First Iteration: Open Coding/Surface Content Analysis			
RQ1. Course Design and Structure	RQ1. Role: Instructor of Record		RQ2. Understanding Interdisciplinary Teaching
RQ1. Environment_Class size	RQ1. Model Adaptive		RQ3. Faculty Expectations
RQ1. Barriers	RQ1. Collaborative Scholarship		RQ3. Pedagogical Practice
RQ1. Faculty Personalities	RQ1. Benefits Pedagogical Knowledge		RQ3. Problem Solving
RQ1. Administrative Practice	RQ1. Challenges_Consensus		RQ3. Purpose
RQ1. Assessment	RQ1. Challenges_Content		RQ3. Reciprocity
RQ1. Benefits_ Enriching	RQ1. Challenges_Continutity		RQ3. Reflection
RQ1. Benefits_Each Iteration Becomes Easier	RQ1. Challenges_Faculty Reward System		RQ3. Rewarding_Personal Growth
RQ1. Benefits_Excitement	RQ1. Challenges_Justification		RQ3. Rewarding_Professional Growth
RQ1. Benefits_Learning	RQ1. Challenges_Time		RQ3. Social Impacts
RQ1. Benefits_Networking	RQ2. Access to Information		RQ3. Student Development/Success
RQ1. Understanding the Model	RQ2. Complex		RQ3. Understanding SL
RQ1. Professional Impacts: Funding	RQ2. Confidence in Interdisciplinary Practice_Doing what you Say you are Doing		RQ4. Participation
RQ1. Professional Impacts: Networking	RQ2. Defining Interdisciplinarity		RQ4. Transformation
RQ1. Professional Impacts: Pedagogical Practice	RQ2. Discipline		RQ4. Collaboration
RQ1. Role: Community Partner	RQ2. Knowledge Expertise		RQ4. Interdisciplinarity
RQ1. Role: Faculty	RQ2. Disciplinary Language Barrier		RQ4. Social Practice Promotes Learning
RQ1. Role: Graduate Teaching Assistant	RQ2. Learning from Others		RQ4. Understanding an Alternative Approach
			RQ4. Learning in SAE
DATA	DATA		DATA

campus...I think we need to be more intentional...this is a different way of learning about sustainable agriculture and food systems concepts.

Faculty describe equity among the collaborative faculty:

I think some of the burden seems like it is falling on the lead faculty just because everybody's busy and it's not clearly one person's job to do it...it needs to fall on somebody to get stuff out to the students. And I think that's the challenge in really trying to figure out how to equitably do all of that, given everybody's schedule and teaching obligations and you know because it [collaboratively taught course] is a relatively small chunk of your overall job.

As noted above, communication among faculty was an especially important concept to be successful in a collaboratively taught course, which emphasizes the concept of language as a cultural tool in the learning process (Lattuca, 2002). In this study faculty shared that they felt they had to almost translate to others their disciplinary understandings. Common understanding or consent, even if in disagreement with other disciplinary languages, is a starting point to clearly articulate across the institution a model for collaborative and interdisciplinary practice.

It was also observed that lack of structure around allocation of resources among faculty and their respective departments that support collaborative teaching efforts created barriers for participation. Complexity associated with navigating multiple departmental-level administrations were identified in ownership and use of the core courses taught in the minor, departmental teaching credit and misconceptions of allocated funding and allocated time for teaching in the minor included in the teaching load for each faculty. One faculty member spoke to the stated mission of both the college and the broader university, which calls for faculty "to be doing interdisciplinary work." Additionally, shared was the view about the disconnect between what the university supports and how faculty are pursuing this kind of work by referencing collaborative teaching in their home department: *"The way collaborative teaching is implemented is*

very different, it's not collaborative teaching it is co-teaching...where one person has half the semester and the other person has the other half." The challenges faced by faculty in pursuing a collaborative course model are very real, but can be ameliorated by changes in organizational procedures and policies that can empower faculty to pursue work that compliments both strategic growth plans and an enhanced student/faculty experience. One faculty member spoke to this issue from her perspective as a CAFS Taskforce member:

I think the conversation we had with the associate dean at the last taskforce meeting was really illustrative because...it seems like this minor is making these conversations happen at the administrative level, which maybe is a bigger scale than some of the other collaborative teaching that's happened on a piece meal basis. It just seems like [the CAFS minor is] facilitating those conversations and hopefully it will come out that there will be some decisions, some structure, some support at the administrative level for trying to make this happen. We are all seeing that it does work and it is rewarding so I think there's a lot of potential.

These findings further support the role of institutional culture and how faculty work with their own understandings and social practice in the larger community. Navigating these cultural differences is complex; collaborative teaching can serve as a gateway to collaboration across the institution further enhancing the university's mission and strategic plan.

Faculty Learning: Interdisciplinary and Collaborative Teaching

Within the framework of this study, interdisciplinarity was conceptualized according to Lattuca (2001) as enhanced through a "non-disciplinary" perspective by faculty and administration in higher education. Interdisciplinarity occurs on a continuum of activity. At one end is informal communication that includes insight gained from conversations between faculty across disciplines and departmental affiliation; with formal collaboration on the other end, including practices such as collaborative research agendas or teaching teams. A reconceptualization of interdisciplinarity that includes multiple knowledge perspectives and methods, as well as embodies civic-based activities, adds to the impact of interdisciplinary teaching practice.

When the practice of interdisciplinary teaching was discussed in participant interviews, faculty acknowledged the importance of having an expert within his/her discipline as part of the practice model. Faculty viewed the collaboration of faculty sharing their disciplinary knowledge and understanding of the course content as essential to addressing complex social issues within the context of SAE. A concept of significance in higher education is that of the specialization, often described as the silos approach to knowledge. One faculty member, for example, described their experience in one of the core courses: "We had a lot of different perspectives there that helped frame what should be presented." Also added was that it *"had been in a discipline [and] I knew really well where our discipline was related to community food systems, but then seeing how other disciplines were viewing it was really eye opening."* One faculty member stated that it is *"absolutely essential that everybody has some sense of the value of this other person's knowledge."* This approach to interdisciplinary teaching in the CAFS minor creates a model for teaching and learning in SAE as a collaborative process that incorporates multiple disciplinary understandings from a group of faculty to solve complex problems by creating and answering new questions the inquiry exposed.

As defined by Lattuca (2009), an academic discipline is more than just the subject matter and methodologies implemented in research and education; it is a culture of shared knowledge and understanding. Faculty teaching in the CAFS minor were highly motivated to teach in the core courses, which influenced reading literature outside of their own disciplines. Lattuca and Creamer argue that "discipline[s] [are] the dominant force and the central source of identity for faculty members" (p. 6). This view lends insight into the social and cultural implications of interdisciplinary work, whereby participating faculty bring disciplinary knowledge, practices and beliefs that affect the overall outcome of the experience. Faculty who took part in interdisciplinary teaching gained new teaching strategies and insights, were intellectually stimulated and were more reflective in terms of their own learning and their students' learning.

Summary

SAE is an emerging field of study that includes not only traditional agriculture and life sciences courses, but also a range of diverse fields that are impacting the way we view agriculture education. Thus, SAE is increasingly incorporating knowledge and skills from sociology, nutrition, agriculture, education, political science, architecture and planning and economics. Institutions of higher education—and particularly land grant universities—are responding to calls for a greater institutional commitment to revitalizing agriculture education programs. As evidence of this push, the National Academies of Science (2009) urged the enhancement of agricultural literacy and student recruitment in the field of agricultural sciences.

The CAFS Minor at this southern land-grant university is an interdisciplinary approach to experiential-based curricula that promotes agricultural literacy at an institutional level. Opportunities are increasing for creating experiential, interdisciplinary degree programs across departments and colleges of agriculture in higher education (Clark et al., 2012; Hammer, 2004). The incorporation of interdisciplinarity, collaborative teaching and research agendas and experiential-based learning into agriculture education are suggested to reach the goal of transformation in agriculture education to maintain pace with the changing global agrofood system and related opportunities for student career success (NAS, 2009). This study supports faculty participation in

collaborative and interdisciplinary work by illustrating the professional outcomes of engagement and the impact on the culture of the institution. The current shift toward a student-centered approach to teaching and learning is accompanied by alternative pedagogical practices that stretch the traditional perspective of the role of faculty and student both in and outside of the classroom. Faculty in this study learned new pedagogical practices from interactions with other faculty teaching and learning in the courses and developed an appreciation for other disciplinary knowledge and practices. This finding resonates with Lattuca's (2002) description of disciplinary positions which frame faculty assumptions, practices, processes, values and relations to other disciplinary perspectives in their everyday work.

Faculty work as learning incorporated into research agendas within the scholarship of teaching and learning is an opportunity for agriculture education to enhance understanding of social practice and disciplinary cultures as context that affects every day work experience. This involves the development of a framework in higher education for understanding faculty work as a learning process—one that also values the challenges and benefits of conducting interdisciplinary collaborative research, teaching and extension/service. Scholarship in the area of faculty work as learning illustrates the positive impacts on classroom engagement and effectiveness, as well as the larger scholarly community (Lattuca, 2005). Collaborative work, when viewed as a social learning experience, creates value for administration in supporting faculty who participate within the organizational structure with the realization that training and development are occurring at the same time. This study and ones like it, can illustrate the benefits of viewing collaborative work as faculty development, thus shifting the understanding of how faculty learn in the current academic workplace.

Literature Cited

Aaker, J. 2007. The heifer model: Cornerstones values-based development. (1st ed.), Little Rock, AR: Heifer International.

Bailey, L.H. 1908. The state and the farmer. Danvers: General Books LLC.

Battisti, B.T., C. Passmore and Y. Sipos. 2008. Action learning for sustainable agriculture: Transformation through guided reflection. NACTA Journal 52: 23-31.

Clark, S., C. Byker, K. Niewolny, J. Helms. 2013. Framing an undergraduate minor through the civic agriculture and food systems curriculum. NACTA Journal 57(2): pp.56-67.

Colby, A., T. Ehrlich, E. Beaumont, J. Stephens. 2003. Educating citizens: Preparing America's undergraduates for lives of moral and civic responsibility. San Francisco: Josey-Bass.

Dowling, M. 2008. Atlas.ti (software). In L. Given (Ed.), The SAGE encyclopedia of qualitative research methods. (pp. 37-38). Thousand Oaks, CA: SAGE Publications, Inc. DOI: http://dx.doi.org/10.4135/9781412963909.n20

Fenwick, T. 2000. Expanding conceptions of experiential learning: A review of the five contemporary perspectives on cognition. Adult Education Quarterly 50, pp. 243-272. DOI: 10.1177/07417130022087035.

Fenwick, T. 2003. Learning through experience: Troubling orthodoxies and intersecting questions. Malabar: Krieger Publishing Co.

Francis, C.A., G. Lieblein, T.A. Breland, L. Salomonsson, U. Geber, N. Sriskandarajah and V. Langer. 2008. Transdisciplinary research for a sustainable agriculture and food sector. Agronomy Journal 100(3): 771-776.

Francis, N., P. Jordan, T.A. Porter, G. Breland, L. Lieblein, N. Salomonsson, M. Sriskandarajah, R. Wiedenhoeft and I. DeHaan. 2011. Innovative education in agroecology: Experiential learning for a sustainable agriculture. Critical Reviews in Plant Sciences 30: 1-2, 226-237.

Godemann, J. 2006. Promotion of interdisciplinary competence as a challenge for higher education. Journal of Social Science Education 5(2): 51-56.

Grossman, J., M. Sherard, S.M. Prohn, L. Bradley, L.S. Goodell and K. Andrew. 2012. An exploratory analysis of student-community interactions in urban agriculture. Journal of Higher Education Outreach and Engagement 16(2): 179-196.

Helms, J. 2014. Teaching and learning in sustainable agriculture curricula: A case study of faculty work as learning at a land grant university (Doctoral dissertation). From VTechworks. (http://hdl.handle.net/10919/47354)

Hammer, J. 2004. Community food systems and planning curricula. Journal of Planning Education and Research 23: 424. DOI: 10.1177/0739456X04264907

Jacobsen, K.L., K.L. Niewolny, M.S. Schroeder-Moreno, M. Van Horn, A.H. Harmon, Y.H. Chen Fasnslow, M.A. Williams and D. Parr. 2012. Sustainable agriculture undergraduate degree programs: A land-grant university mission. Journal of Agriculture, Food Systems and Community Development 2(3): 13-26.

Kuh, G.D. 2010. Five high impact practices: Research on learning outcomes, completion and quality. Washington, DC: Association of American Colleges and Universities.

Lattuca, L.R. 2001. Creating interdisciplinarity. Nashville: Vanderbilt University Press.

Lattuca, L. and E.G. Creamer. 2005. Learning as professional practice. New Directions for Teaching and Learning 102: 3-11.

Lave, J. and E. Wenger. 1991. Situated learning: Legitimate peripheral participation. Cambridge University Press: New York, NY.

Lyson, T. 2004. Civic agriculture: Reconnecting farm, food, and community. Lebanon: University Press of New England.

Lyson, T. 2005. Civic agriculture and community problem solving. Culture and Agriculture 27(2): 92-98.

National Academy of Sciences. 2009. Transforming agricultural education for a changing world. Washington, DC: The National Academies Press.

Niewolny, K.L., J.M. Grossman, C.B. Byker, J.L. Helms, S.F. Clark, J.A. Cotton and K.L. Jacobsen. 2012. Sustainable agriculture education and civic engagement: The significance of community-university partnerships in the new agricultural paradigm. Journal of Agriculture, Food Systems and Community Development 2(3): 27–42.

Parr, D.M. and M. Van Horn. 2006. Development of organic and sustainable agriculture education at the university of California, Davis: A closer look at practice and theory. Horticulture Technology 16(3): 426-431.

Parr, D. and C.J. Trexler. 2011. Student's experiential learning and use of student farms in sustainable agriculture education. Journal of Natural Resources and Life Sciences 40: 172-180.

Parr, D., C.J. Trexler, N.R. Khanna, B.T. Battisti. 2007. Designing sustainable agriculture education: Academics' suggestions for an undergraduate curriculum at a land grant university. Agriculture and Human Values 24: 523-533.

Peters, S. 2006. Every farmer should be awakened: Liberty Hyde Bailey's vision of agricultural extension work. Agricultural History Society 80(2): 190-219.

Pondish, C. 2012. Qualitative evaluation. In Secolsky, C. and B. Denison. (Eds.). Handbook on measurement, assessment, and evaluation in higher education. (473-482). New York, NY: Routledge.

Pretty, J. 1995. Participatory learning for sustainable agriculture. World Development 23(8): pp.1247-1263.

Robbins, D. 1999. Prologue. In R. Rieber (Ed.) The collected works of L.S. Vygotsky: Volume 6 Scientific Legacy (pp. v-xi). New York, NY: Kluwer.

Roberts, T.G., and A. Ball. 2009. Secondary agricultural science as content and context for teaching. Journal of Agricultural Education 50(1): 81-91.

Rogers, A. 2004. Non-formal education: Flexible schooling or participatory education? Dayton, OH: The Kettering Foundation Press (Preface and Introduction). New York: Springer.

Roper C.D. and M.A. Hirth. 2005. A history of change in the third mission of higher education: The evolution of one-way service to interactive engagement. Journal of Higher Education Outreach and Engagement 10(3): 3-21.

Rossman, G.B and S.F. Rallis. 2003. Learning in the field: An introduction to qualitative research. Thousand Oaks, CA: Sage Publications.

Sandmann, L.R. 2008. Conceptualization of the scholarship of engagement in higher education: A strategic review, 1996-2006. Journal of Higher Education Outreach and Engagement 12(1): 91-104.

Smith, J.K. and P. Hodkinson. 2008. Relativism, criteria, and politics. In Denzin, N.K. and Y.S. Lincoln. (Eds.), Collecting and Interpreting Qualitative Materials Third Edition, (pp. 411-434). Los Angeles, CA: Sage Publications

Stake, R.E. 2010. Qualitative research: Studying how things work. New York, NY: The Guilford Press.

Sustainable Agriculture Education Association [SAEA]. (n.d.-b). Academic Programs. From http://sustainableaged.org/Resources/AcademicPrograms/tabid/86/Default.aspx

Tolbert, C.M., M.D. Irwin, T.A. Lyson and A.R. Nucci. 2002. Civic community in small-town America: How civic welfare is influenced by local capitalism and civic engagement. Rural Sociology 67: 90-113.

Usher, R. 1997. Experience pedagogy and social practices, In Illeris, K. 2009. Contemporary theories of learning (169-183). NewYork: NY: Routledge Taylor and Francis Group.

Vogelgesang, L.J., N. Denson and U.M. Jayakumar. 2010. What determines faculty-engaged scholarship? The Review of Higher Education 33(4): 437-472. DOI: 10.1353/rhe.0.0175.

Von Glosserfeld, E. 1995. Radical constructivism: A way of knowing and learning. New York, NY: Routledge.

Vygotsky, L.S. 1978. Interaction between learning and development. In M. Cole, V. John- Steiner, S. Scribner and E. Souberman, (Eds.) L.S. Vygotsky: Mind in society (pp. 79-91). Cambridge, MA: Harvard.

Vygotsky, L.S. 1999. Sign operation and organization of mental processes. In Rieber, R. (Ed.), The collected works of L.S. Vygotsky: Volume 6 Scientific Legacy (pp. 39-44). New York, NY: Kluwer.

Wenger, E. 1991. A social theory of learning, In Illeris, K. 2009. Contemporary theories of learning (209-218). NewYork, NY: Routledge Taylor and Francis Group

Wenger, M. and M. Hornyak. 1999. Team teaching for higher level learning: A framework of professional collaboration. Journal of Management Education 23: 311-327.

Wright, D.W. 2006. Civic engagement through civic agriculture: Using food to link classroom and community. Teaching Sociology 34: 224-235.

Wynne, W.D. 2006. Civic engagement through civic agriculture: Using food to link classroom and community. Teaching Sociology 34: 244. DOI: 10.1177/0092055X0603400302

Yin, R.Y. 1997. Case study evaluations: A decade of progress. New Directions for Evaluations 76: 69-78.

Yin, R.Y. 2012. Case study methods. (Eds.) Cooper, H. APA Handbook of research Methods in psychology: Vol. 2 Research Designs. American Psychological Association: 141-155.

Zalanga, S. 2009. Interdisciplinary studies and scholarship: Issues, challenges, and implications for third world development and social change. Human Architecture: Journal of the Sociology of Self-Knowledge 7(3).

Zukas, M. 2006. Pedagogic learning in the pedagogic workplace: Educators' lifelong learning and learning futures. International Journal of Pedagogies and Learning 2(3): 71-80.