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Building Teacher Leaders and Sustaining Local Communities through a Collaborative Farm to School Education Project—What EcoJustice Work Can PreService Teachers Do?

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As the third graders approached the pumpkin patch, their excitement grew. Each of them set off to search for the just right pumpkin to pick for Mr. Shelton, the farmer and our field trip host. An inquisitive girl stopped to admire a bright yellow flower and said to her teacher, “I wonder how this flower got into the pumpkin patch.” A few moments later, two boys discovered green pumpkins. Screams of “They’re deformed!” rang through the field. A plan began to brew in my mind. After a brief chat with Mr. Shelton to make sure my plan wouldn’t interfere with his farming efforts, I asked the girl who discovered the flower to pick a few to bring back to our meeting area for a group discussion, and I asked the boys to bring a green pumpkin as well. We continued on our farm tour, stopping to observe and learn about a beaver dam on the edge of the field, all while the students excitedly carried their pumpkins and field findings. Back at our meeting area a little while later, we gathered together and I presented our field discoveries. “In the field people found orange pumpkins, yellow flowers, and green pumpkins. What do you think the story of these objects is? How did they all wind up in the same field?” In small groups that included a blend of 3rd graders and undergraduate preservice teachers, they observed, discussed, and journaled. We gathered together again and groups began to share. With help from each other and some scaffolding from me, we collectively created the story of the pumpkin life cycle—from flower to green pumpkin to orange pumpkin. Mr. Shelton jumped right into the discussion by cracking open a big orange pumpkin so everyone could see the seeds inside and reminded us all about the importance of the seeds and the green plant that produces the flowers.

*Patricia Bricker, Teacher Educator, October 2011
A Community of Practice in Action*

William Shelton, the aforementioned host of the farm field trip, is a fourth generation farmer in Whittier, a small community in Jackson County, North Carolina. William describes the challenge of farming and retaining the culture of agriculture:

Whittier is not a farm area anymore. We're just a kind of fringe zone in a larger tourist area now. That being sadly the case, those of us in these fringe areas need to work together to gain recognition as an integral part of the total local culture. This will be something of an uphill battle when the public perception of farmers is somewhat dubious and when there is such a huge gulf between farm and non-farm populations and when the youth are completely out of touch with rural farm life. Why most of the young people, even around here, wouldn't be able to say 'sooey' if a sow bit 'em! (Crowe, 2002)

Western North Carolina is home to almost 12,000 family farms like William Shelton's (Appalachian Sustainable Agriculture Project [ASAP] 2009). Most of the land in Western North Carolina is privately held and provides a beautiful back drop for the number one industry today—tourism. But for too long, farmers have not benefited from the tourism dollars while it is the farmland (and the lovely mountains) that holds the attraction for tourists. Farmers need to be able to stay on the farm, to earn their livelihood, or at least a part of it, from the land.

Collectively these farms generate more than \$500 million in sales. These sales support farm jobs. The phrase 'farm jobs' is not heard much, and when it is used, typically describes any labor force the farm may employ as opposed to the entrepreneurs who own and run the farm. (ASAP, 2009, p. 5)

Agricultural land provides food and jobs but also something equally important – our mountain ways and culture – the “culture” of agriculture. Food traditions brought over with the Scottish and Irish remain today; farmers and their families not only growing and eating the crops that were from their traditions, but engaging in the traditions of that food. That's why Western North Carolina (WNC) is not known for its “southern” food but its “Appalachian” food, such as sorghum molasses and greasy beans.

WNC farms are small (half the state average, a quarter of the national average). Due to their size and challenging growing conditions it is still difficult to eke out a living farming. These tough living conditions are slowly changing but global influences are strong and ever-present. In the mid-1990s, with the looming elimination of a tobacco quota system that kept prices high, there is real concern that the culture of agriculture in WNC will be significantly impacted. Burley tobacco, long the staple of the farming community, provides a stable and resilient crop that keeps many mountain farms in production. But the tobacco buyout in 2004 removes much of the support for growers. The 2004 tobacco buyout is the final straw and by 2007 we have lost more than three-quarters of the tobacco growing income our region enjoyed just five years earlier.

Appalachian Sustainable Agriculture Project (ASAP) begins its work in response to the changing climate of farming. Knowing that the loss of small family farms is already a growing problem, ASAP begins to explore a “buy local” campaign. Consumer surveys indicate that WNC residents are eager to purchase locally grown food and even willing to pay a bit more if they knew the food came from local farms. In 2002, ASAP becomes a nonprofit and created the first Local Food Guide. It

begins providing business planning and other services that promote local food and farms.

Another pivotal piece to the puzzle is added in 2002; ASAP begins its Growing Minds program. Beyond a vibrant agricultural community, ASAP is concerned that children in WNC and the Southern Appalachians are growing up without a connection to their agricultural heritage. Though raised in predominantly rural settings, children are quickly becoming distanced from where their food comes from and knowledge of food production. What starts as a school garden program at an elementary school in Haywood County quickly morphs into a full-fledge Farm to School program. In addition to school gardens, Growing Minds also provides resources and training to teachers, Child Nutrition Directors, farmers, and parents so that that area children are exposed to farm field trips, cooking with local foods in the classroom, and school lunches that include food from local farms. These place-based strategies are key to developing healthy relationships with food while enriching the overall educational experience. Today, and for the past seven years, ASAP continues to be the Southeast Regional Lead Agency for the National Farm to School Network.

In 2009, rather than relying on classroom teachers to embrace the Farm to School concept, ASAP decides to take an “upstream” approach. With funding from the Blue Cross Blue Shield of North Carolina Foundation and in partnership with Western Carolina University, a Farm to School preservice project is initiated. Farm to School is integrated into the science methods class and into the Community Nutrition class in the Health Sciences Department. Rather than relying on the classroom teacher to become interested in integrating Farm to School into their classroom instruction, ASAP reaches out to beginning teachers. Getting university students excited about school gardens, farm field trips, and cooking with local foods begins to offer a much more sustainable model.

EcoJustice and Farm to School

We approach this work using an ecojustice framework rooted in Orr’s (1994) call for education to instill “biophilia” or a love of life. Ecojustice helps students understand their role as stewards of the natural world (Mueller and Pickering 2010). It prepares teachers and students to develop what Lowenstein, Martusewicz and Voelker (2010) call “place consciousness,” or an awareness of what beliefs, practices, and activities make up the places they inhabit. The central focus of ecojustice is reaching an understanding of the tensions between cultures (i.e., intergenerational knowledge and skills, beliefs and values, expectations and narratives) and the needs of the Earth’s ecosystems (Mueller 2009).

Ecojustice is more significant than the mere material advancement of the world’s underclasses by creating a place for the “cultural commons”. The commons is both the ecosystem (water, air, soil, biomes) and the knowledge and wisdom passed down through generations (indigenous medicine, arts, and ceremonies (www.ecojusticeeducation.org). Chet Bowers notes that,

the traditions of intergenerational knowledge and patterns of mutual support that enable people to live in ways where market forces do not dominate everyday life have been around since the beginning of human history ... all of the forms of knowledge, values, practices, and relationships that have been handed down over generations that have been the basis of individual and community self-sufficiency—and that have enabled members of the community to be less dependent upon a money economy. (2010, p. 1)

A commons-based society will place as much emphasis on democratic participation and environmental protection as it does on economic competitiveness and private property (Walljasper 2010).

Ecojustice education analyzes the threat to survival of the world's diversities: nature, languages, and cultures, which consumer culture incubates; ecojustice education advocates a revitalization of the commons and a commitment to its sustainability. The foundations for ecojustice theory extend from ecofeminism (examining the relationship between nature and women with emphasis on the challenges that women face), indigenous education (seeing humans as dependent upon living in harmony with nature), and earth-based spirituality (Love2010).

Martusewicz and Schnakenberg (2010) advocate coupling usually discrete school subject areas with science. For example, social studies content can be used to analyze how some of our values lead to social violence and ecological devastation. We can reinforce the local and global cultural commons, not just socializing children into exploitation of nature and overconsumption. Rubinstein, Barton, Koch and Contento (2006) also advocate for education that taps into what used to be common knowledge—plants' life cycles (and their parts), gardening in different zones, why it matters where our food comes from, what plants are appropriate, and following traditional recipes.

Mueller (2009) cautions that ecological 'crisis thinking' should be tempered, as it leaves little room for hope and that pessimism may inadvertently perpetuate 'ecophobia' or fear of nature. In the same vein, Tatarchuk and Eick (2011) advocate for nature as a place for exploration and appreciation. Nature is an important 'outdoor classroom' and powerful tool within the context of our test-driven era. Locally, schools ought to reflect their communities and demonstrate concern for how they affect their surroundings. Moreover, schools might teach ways of living that offer minimal ecological impacts (Bartz, n.d). Correspondingly, the Farm to School program values highly the surrounding communities and this was a major reason why farmers have been attracted to participate. Farmers are not solely interested in selling their products; they join Farm to School programs to promote social good, healthy food for children, and to promote agricultural education (Izumi, Wright, & Hamm, 2010).

EcoJustice through Communities of Practice

Our project is also guided by Wenger's (2006) vision for communities of practice in which the Farm to School focus brings together a range of people with diverse experiences to participate in joint activities and discussion through sustained interactions over time. Three elements

define a community of practice: *domain*, commitment to the domain and a shared competence that defines its members; *community*, a group of practitioners who act together, help each other, and share information (members must interact at times); and *practice*, practitioners develop a repertoire of resources, experiences, and ways of solving problems. In education, the community of practice reaches into all aspects of living and learning in the outside world—the school or class is not the center of that learning. All participants, practicing teachers, university faculty, and preservice teachers “become communities of practice when learning occurs through peer interaction” (Enfield and Stasz 2011, p. 113). As preservice teachers form their identities, those who participate in communities of practice, both in schools and in the wider community, realize the learning inherent in *becoming* a teacher (Carter 2012).

The ASAP/WCU Project: Values and Curriculum

Our project begins with 49 junior-level university students enrolled in an elementary and middle grades education science methods course. There are a few middle grades and special education majors, but most of the participants are elementary education students. We dedicate one three-hour class to a Farm to School workshop led by ASAP educators, in collaboration with the course instructor. The workshop begins with a 45 minute whole group interactive session that introduces ASAP and its mission, provides an overview of Farm to School programs, highlights curricular connections, describes resources available, and explains this pilot project—including the possibility that students can apply to be part of the phase two implementation stage to be conducted in the following academic year. Students split into groups and for approximately 90 minutes actively participate in activities at three centers focused on cooking, seeds, and soils/rocks and designed to meaningfully integrate required goals and objectives across the curriculum. The workshop ends with a whole group debriefing session and reminders about ways to be involved in the ongoing Farm to School project. All students receive CDs with a large collection of Farm to School materials including background information, lesson plans, integration ideas, book lists, field trip support, gardening resources, and recipes. The workshops are supplemented by a required Farm to School reading and an optional Farm to School Open House targeted towards the university community, local public school educators and nutrition staff, and local farmers.

Students are surveyed before and after the workshop (one-group pretest-posttest design, $n=49$), observational notes are taken during the workshop, and we analyze documents used such as PowerPoint slides and handouts. We discover that students are highly engaged throughout the workshop. As shown in Table 1 and Figure 1, survey results indicate that workshop participation is associated with increased awareness ($M_{diff}= 1.86$ on 5 point scale), sense of the importance ($M_{diff}= .79$), and personal interest ($M_{diff}= 1.07$) in local food and farm-based instructional options.

Table 1
Comparison of Students' Thoughts about Farm to School, Pre and Post

	Pre		Post		M_{diff}	95% CI	d
	M	SD	M	SD			
Awareness	2.12	1.09	3.98	0.88	1.86	1.46 – 2.26	1.88
Interest	3.58	1.01	4.29	0.76	.71	.35 – 1.07	.79
Importance	3.34	1.03	4.41	.67	1.07	.72 – 1.42	1.23

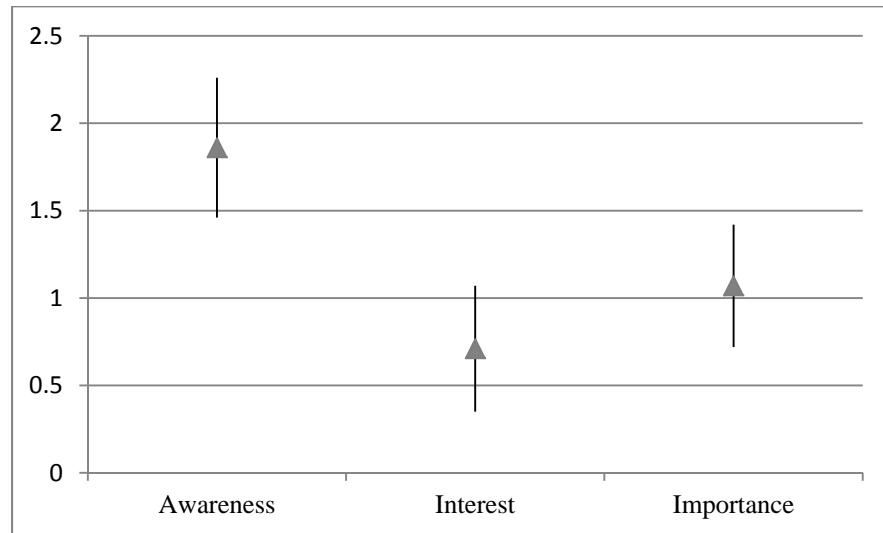


Figure 1: *Mean difference (post-pre) and 95% confidence interval*

Open-ended survey comments and observational notes provide additional insight into the impact of the Farm to School activities and two themes are identified. The first theme, *Values*, refers to ways in which participants found Farm to School to be worthy or of importance.

Many participants mention the larger Farm to School vision of making a difference for students and communities. As illustrated in Table 2, participants specifically note their attention to healthy children, environmental stewardship and community connections, and the engaging aspects of the program for teachers. Their interest in healthy children frequently emphasizes concern about obesity in a general sense but also on a personal level as observed when a participant shares: “I have a 10 year old sister and I noticed a lot of her classmates are a bit overweight for their age. I want her to have a healthy life so I’d like for her to be influenced more at school.” One participant says that Farm to School “helps form a community through working together. It also helps the environment.” Still others explain that Farm to School encourages students to think about the importance of local agriculture and where their food is grown, helps the local farmers, and supports the economy. The second identified theme is *Curriculum*. Participants say that a variety of curricular topics are included in Farm to School and pay particular attention to science, health, and integration. They also focus on teaching methods and describe Farm to School as engaging, hands-on and minds-on, and authentic.

Table 2
Impact of Farm to School Activities: Themes, Subthemes, and Illustrative Quotes

Theme	Subtheme	Illustrative Quotes
Values	Healthy Children	<p><i>I have a 10 yr. old sister and I noticed a lot of her classmates are a bit overweight for their age. I want her to have a healthy life so I'd like for her to be influenced more at school.</i></p> <p><i>Because of the current epidemic of obesity and diabetes I believe a teacher's role in nutrition should be a significant component of the curriculum.</i></p> <p><i>...helps children eat healthier, be more active, get outside more.</i></p> <p><i>I like this type of instruction [because it] will hopefully inspire children to be healthier.</i></p>
	Environmental Stewardship and Community Connections	<p><i>It helps form a community through working together. It also helps the environment.</i></p> <p><i>It is a great way to get the students thinking about the importance of local agriculture.</i></p> <p><i>Helps the local farmers, cuts down on transportation costs, lets students know where food comes from.</i></p> <p><i>Helps support local economy.</i></p>
	Engaging Aspects	<p><i>I love to garden and so I would love to</i></p>

	for Teachers	<i>incorporate it into the classroom. Also, it's fun for the teacher!</i>
Curriculum	Topics: Science, Health, and Integrated Curriculum	<i>It opened my eyes to new ideas about teaching science and nutrition. I think this will be great for the students and can play a huge role in the science curriculum. Gives them a chance to learn about plants and how important they are to us. Also, while were "playing" in the dirt it's a great way to incorporate other things we find in the soil. Provides students with more knowledge of the environment they live in. It is a great way to get the students thinking about the importance of local agriculture and eating healthy. Can be an excellent topic to use in an interdisciplinary way, i.e. incorporating social studies, math, science, literacy.</i>
	Methods: Engaging, Hands-On and Minds-On, Authentic	<i>Fun, hands on, engaging for students This is great for hands-on minds-on learning. It involves the community. This is a great opportunity to allow students the chance to make connections between what they're learning and their lives. Active and authentic learning for students.</i>

Curricular Issues, Affect, EcoJustice, and Agency/Leadership

A subset of phase one participants is selected to move onto phase two of the project in the subsequent academic year. Educators from ASAP and WCU collaborate with five university students in elementary and middle grades education and five additional university students majoring in nutrition and dietetics. The students are chosen through an application process that follows the in-class presentations, which took place during our first phase. Incentives for participation include being part of a new innovative project, receiving support through both group and one-on-one meetings, and receiving teaching materials to use during the project and to keep after the project is over. As faculty review applications, staff and participants are selected based upon their expressed interest and commitment to the program as well as their internship placements for the upcoming year. The students meet approximately once each month with the project team in a professional learning community and also receive

one-on-one support upon request. The university students respond by implementing Farm to School projects with elementary students in a rural southeastern public school district. Each education student is an intern and implements project activities in her assigned internship classroom with the goal of teaching two Farm to School lessons each month. An on-farm workshop is offered to the preservice students, their cooperating teachers, and other area classroom teachers and dietitians. In addition to the engaging farm environment, the workshop includes an opportunity for preservice students to collaborate with classroom teachers, farmers, dietitians, and experience the Farm to School program in an authentic way. Despite pouring rain and reverberation on the tin roof overhead, participants are lively and connected. They leave the workshop energized and eager to implement ideas they learn.

A data-driven approach (Boyatzis 1998) is used for thematic analysis and code development. In Stage I, decisions are made regarding sampling and design issues. Data subsamples include pre-and post-interviews with each of the five education students, lesson plans with related reflections, student work samples from each of the five education students, and team meeting notes from seven sessions across the academic year. In Stage II, a qualitative research peer group uses subsamples of data to develop themes, and in Stage III the themes are applied to the collection of data, validity is assessed, and the results are interpreted. In addition, we conduct an overall analysis of the lessons' content and connections to required curriculum, while paying particular attention to patterns within the science lessons.

Through the data analysis process aforementioned, we identify a variety of ways in which participants are able to implement Farm to School activities as well as ways the implementation process impacts the preservice teachers. Four themes emerge from the data including Curriculum, Affect, EcoJustice, and Agency/Leadership.

Curriculum

Participants use Farm to School activities as a context for science lessons that connect to state standards as well as lessons that integrate multiple elementary subjects. The open-ended requirement of teaching at least two Farm to School lessons a month allows individuals to go in different directions based upon their comfort levels, areas of interest, and unique settings. In order from most common to least, the twenty-four analyzed lessons include a blend of Farm to School components including cooking, taste tests, gardening, and farm field trips. Again, in order from most common to least, the lessons also incorporate a range of subject areas including science, mathematics, language arts, healthful living, social studies and informational skills/technology. As one participant so clearly says, "Making it work with curriculum is really important."

Ninety-six percent of the lessons integrate more than one subject. In final interviews all participants comment on Farm to School and integrated curriculum, as illustrated in the following quotes:

Farm to School is a way to teach healthy living and eating but also a way to tag team subjects such as math that might not be as exciting. I

connected to required curriculum in every single possible way I could. Every single content area was touched on throughout the semester... Almost like a little goal I made up for myself. (Kari, 12/13/10)

Anything that integrates and makes things more real for students, I am all for. This experience has given me more of a big idea of ways to integrate. You're told to do this but it's hard to do. This gives a pathway into integration. Looking at what you need to teach and ideas you have for Farm to School, they lend themselves to each other for a lot of things... I could make this [one Stone Soup lesson] into an entire unit. Every content area can be addressed by this activity. Math—measuring, graphs, addition and subtraction, symmetry, data analysis, and probability. Language Arts—writing stories, compare/contrast, reading a variety of Stone Soup stories. Social Studies—becoming a responsible citizen, working in soup lines, relating community differences in recipes, using natural resources to meet needs. Science—States of matter, physical and chemical changes, conducting observations, making predictions. There are so many possibilities. (Samantha, 12/13/10)

In addition, every participant states that children's literature is a key element in their Farm to School work.

When looking more closely at the seventeen lessons that list science goals and objectives, we find a range of topics that encompass life science, earth science, and physical science. The life science topics of biodiversity and plant needs, growth, and adaptations are a natural fit for Farm to School in addition to the earth science topic of soils. The lessons that include physical science topics focus on properties of objects, states of matter, mixtures, and changes in properties. Lessons incorporate scientific inquiry as well as numerous science process skills including questioning, predicting, observing, experimenting, describing, measuring, comparing, recording, analyzing data, conducting secondary research, and discussing.

Affect

Our data indicates many positive contributions to participants' affect with related codes such as "loved this," "enjoyed," "enthusiastic," "good" "energy," and "joy." Preservice teachers repeatedly say that their students love Farm to School activities and how rewarding it is to have such enthusiasm, energy, and fun connected to their teaching. The essence of this is captured when one participant states, "It is a complete joy for me to work with them on it." She continues to say, "It was rewarding to have the school system's child nutrition director talk about how proud he is of the Farm to School interns, including me". She concludes her interview with us by exclaiming, "I've really, really enjoyed it. Just a really positive experience."

EcoJustice

Regular reference is made to helping public school students from diverse backgrounds eat right as one example of helping the local community. In reflecting upon the importance of this work, participants consistently

discuss the local obesity problem and the need to help students establish a healthy lifestyle. One participant shares her hope to grow a garden with future students and to donate the food to people in need at places, such as a homeless shelter or domestic violence safe house. There is a collective interest in “making a difference in our own area”.

There are many layers of connections between participants and their peers, public school personnel, families, university faculty, community partners, farmers, and local businesses. In post-interviews, every participant repeatedly emphasizes the positive impact of connecting in the monthly meetings and follow-up emails and phone calls between preservice teachers, university faculty, and ASAP staff, as illustrated in the following quotes:

It helped to hear different work people were doing; learn about different age groups; gain knowledge from university education and nutrition faculty, ASAP staff, and peers... Sharing ideas and collaborating while implementing an idea was rewarding. You often hear about good ideas but don't have this level of support in trying them out... In addition to monthly meetings, communication was great through emails, wiki, and phone calls—always someone available for questions, concerns, and support. (Jenn, 12/13/10)

It's really, really, nice to have other people, other interns, regroup, meet with people in the same boat, challenges, successes, share ideas, and get ideas for improvement and expanding upon it. Wouldn't have been possible without the support... So beneficial to bounce ideas off each other... Meetings keep you focused and accountable too. They provide reassurance. Sense of where you are compared to others. Beneficial. Enthusiasm rubs off and is contagious. (Kari, 12/13/10)

Participants also say that co-teaching with another Farm to School intern is both helpful and fun. One, in particular, states that she does not think she would have tried some of these activities if she didn't have the support from this Farm to School project and connections to this team.

Agency and Leadership

The project provides a way for each of the preservice teachers to develop their sense of agency or ability to act. As seen in the examples provided below, they are able to take risks, reflect on their learning, share their work with others, develop as professionals, grow more confident, and conjecture about their next steps.

One participant shares that her first Farm to School lesson is the first lesson she instructs in her internship classroom and that she is “nervous and shaky”. She observes the activities get the students excited about school and having fun. She is encouraged to “have at it” with her Farm to School ideas and at the end of the year anticipates that in her future teaching she will have a garden, cook local foods frequently, possibly donate foods grown to local shelters, and take her own field trips to visit gardens at her students' homes.

Another participant reflects that she is not sure how to “do this” at first, but in getting to know people in the community, participating in

professional development, and actual experience teaching the Farm to School activities, she is able to envision how they work. She has great hopes for the future and hopes her future school will allow her to do it.

A third participant notes that monthly meetings have, “helped me develop a vision for the type of teacher I want to be. It’s OK to not know everything. Kids are curious. We can do research. I can learn along with them.”

All participants have interest in incorporating Farm to School in their future teaching. They plan to enact the program through gardening, cooking, taste tests, and farm field trips. One participant demonstrates professional growth and confidence by expressing her future plans and also her reasons for them: “I want to do some cooking and taste tests to expose students to different foods, a class garden as there is so much to integrate, and a field trip for students to see where food comes from.”

At the same time, all participants express the realistic need to continue learning. One participant, for example, shares that she now feels pretty comfortable with cooking but “has a lot to learn about gardening”.

One of the most promising aspects of agency is the level of problem solving and reflection that the participants develop throughout the project. When meetings begin, university faculty and ASAP staff often help participants work through problems and challenges. Over the course of their time with the program, participants take on more of a problem solver role and by the end of our pilot study they are regularly helping each other think through situations and possibilities. For example, a participant shares that her cooperating teacher is excited about Farm to School but is also aware of the time constraints, that “every moment needs to be learning and doing” and that it is hard “to reconcile gardening in light of these things, because it is more exploratory and time consuming and slow”. This preservice teacher continues to say that her cooperating teacher helps her “come to a balance with it”. She is hopeful that when on her own, she can spend more time in the garden. She has seen how engaged students can be and how much they can learn.

What EcoJustice Work Can Teachers Do?

Throughout this project, we observed a three-hour Farm to School workshop in a junior-level Elementary and Middle Grades Education science methods course consistently increase preservice teachers’ awareness, sense of importance, and interest in local food and farm based instructional opportunities. It helps participants identify both the value of such efforts in making a difference for students and communities as well as the curricular connections and related teaching methods.

Through our implementation phase, senior year elementary education interns involved in a community of practice are able to implement Farm to School activities in a variety of ways that include all components of Farm to School and connections to required curriculum across multiple subject areas. We observed positive contributions to their affect, the positive impact of multiple layers of connections, attention to ecoJustice issues and making a difference in the world, and preservice teachers developing their sense of agency and leadership abilities.

The participating preservice teachers truly became leaders. North Carolina recently began to require our teacher candidates to demonstrate leadership skills. While some of our university students are searching for ways to show they meet this required competency, the Farm to School participants have numerous examples of authentic leadership. In her first month of internship, one preservice teacher plans the first Farm to School field trip ever done at her school and they travel to a farm that had never participated in the program with school groups. She worked with the farmers to plan the day and set up all the logistics for the entire grade level. Another intern plants her school's first garden despite having to wrestle several problems along the way such as getting permission from the principal to put in a garden, dealing with extremely compacted soil as well as a well-entrenched weed cloth in the provided site, and determining plants that could grow despite the quickly approaching winter season.

For successful programs involving preservice teacher education and Farm to School initiatives, we recommend the following:

- 1 In a manner similar to phase one of our project, introduce a large number of preservice teachers to Farm to School. Involve community support through groups such as ASAP.
- 2 As part of the introductory sessions, invite interested preservice teachers to become involved in a community of practice focused on learning together about implementation of Farm to School in public schools.
- 3 Strive to have the community of practice include diverse parties to allow people to learn from each other and benefit from collaboration, for sustainability purposes. Potential partners include staff in Farm to School agencies; university faculty from a variety of disciplines such as education, nutrition, and plant sciences; school teachers, instructional coaches, and administrators; farmers; cooperative extension agents; and preservice teachers at different points in their program.
- 4 Give preservice teachers general requirements but allow room for diverse approaches.
- 5 Meet regularly as a community of practice, at least once a month and more if schedules allow.
- 6 Consider an open-ended approach to meetings. Despite training in a variety of potential protocols, we were quite successful by simply letting people, one at a time, describe and reflect upon a lesson they had taught. Sometimes people brought student work samples and photographs. We would ask authentic questions, problem solve, make connections, and share ideas. Students shared that the simple, open format helped with comfort levels.
- 7 Have a structure such as a website in place to share lesson plans and ideas.
- 8 Use the meetings as a time to enjoy healthy local food together. Highlight what the food is and where it comes from. Participants appreciate the good food and have some social time while they continue learning about Farm to School possibilities.

- 9 Work closely with cooperating teachers to help allay fears about time to do this work. As teachers are required to do more and more, it can seem overwhelming. With thoughtful planning, there are ways to integrate subject matter into the context of Farm to School. Integration helps to alleviate this discomfort.
- 10 Do not try to create a whole new infrastructure from scratch to support Farm to School. Instead, tap into existing resources. In our case, it was Honors College research projects, service learning requirements, beginning teacher organizations, and faculty research, service, and teaching interests.

As the Farm to School and preservice teacher education program moves forward, we recognize areas in need of further study. We see a need to systematically conduct classroom observations of preservice teachers to accompany their plans, reflections, and discussions. We are interested in and already beginning to expand the community of practice with the hopes that preservice teachers will complete this work alongside cooperating teachers who are also invested in the project—within schools that have system-wide supports. Future studies might follow preservice teachers over time in order to assess long-term impacts. There is a need to study the impact on elementary students in terms of health knowledge, attitudes and behaviors, but also in terms of knowledge, attitudes, and skills across the curriculum and engagement in school. We also suggest studies that might consider the impact of Farm to School communities of practice on teacher satisfaction and retention levels.

Our project indicates that Farm to School is a topic with the potential to address larger societal goals while also providing a motivating context for teaching required curriculum, including but certainly not limited to science. School gardens, farm field trips, and cooking with children provide concrete experiences that have a natural fit with inquiry and might ease teachers into science education, especially reluctant, new elementary teachers. Elementary preservice teachers often enter science methods courses worried about teaching science. They are insecure in their own science abilities. A cohesive Farm to School project has the potential to help build interest, confidence, and leadership and research skills. The integrated curriculum will help teachers find time to devote to science and mirror real world ways that science blends with mathematics, language, social studies, health, and technology. Farm to school activities provide numerous opportunities for inquiry, hands-on, mind-on learning and demonstrate where science exists in their personal lives and society.

As a final note, the community of practice framework helped the participants in this study grow from novices on the periphery of the practice towards more central participation, especially in the commons. They are invested in the domain, have been part of a sustained learning community, and have a shared practice. Upon conclusion of this project and graduation from the university, their regular community interactions have changed. Our hope is that they will connect with or perhaps even create new communities of practice to sustain and grow their work.

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Abstract

Appalachian Sustainable Agriculture Project (ASAP) focuses on strong farms, local food economies, and healthy communities valuing farms in rural Western North Carolina. Their Growing Minds Farm to School program connects farms and schools, providing positive experiences with healthy foods. In 2009, ASAP partners with Western Carolina University (WCU) and a local school system to integrate Farm to School into the pre-service teacher experience. Pre-service teachers in a science methods course participate in a three-hour Farm to School workshop, resulting in increased awareness, appreciation of the project, and personal interest in Farm to School goals. Subsequently, five of these teachers pursue Farm to School during their internships. Interns implement Farm to School with children, and meet monthly with ASAP staff, WCU faculty, and nutrition students. Interns identify rewarding connections with peers, nutrition students, university faculty, community partners, and local farmers. Researchers note the following intern behaviors: risk taking, emerging leadership, reflection on practice, professional development, increased confidence, planning for next steps, and sharing their work. Farm to School involvement promotes communities of practice, and designing required, but meaningful, curriculum. More broadly it promotes economic and physical health, citizenship, ecojustice consciousness, and re-connecting children to agricultural heritage.



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