Experiences from a land-based learning project focused on local food interventions

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Abstract

Farm-to-school programs have many documented benefits but are typically centered around school gardens or local food procurement, which can be a limitation for schools. Land-based learning takes a student-centric approach to agricultural education, allowing students to identify and develop interventions to improve their local food system based on the content presented in the classroom, providing the possibility for delivering farm-to-school con-

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tent outside of its traditional settings. We present findings from the evaluation of a land-based learning program implemented in northern Michigan. The program engaged two teachers and their respective students across two schools, each school's food-service directors, two local farmers, and a Michigan State University extension educator to form two Locally Integrated Food Teams (LIFTs). Students were presented content about local food procurement across 20 instructional sessions, during which each LIFT worked to develop a shared understanding of the local food system and school lunch sourcing to identify an intervention to increase the amount of local food in their school lunches. The LIFTs then proposed their interventions to Michigan State University faculty, implemented their intervention, and presented the results of the intervention during the program wrap-up day. To explore the experiences of LIFT members, we conducted focus groups and collected observational data from the program participants. We find that delivering farm-to-school content in a land-based learning framework provides many of the same benefits of traditional farm-to-school programs, while allowing for greater flexibility in the construction of the program and providing additional educational benefits not commonly discussed in the farm-to-school literature.

Keywords
land-based learning, local food systems, community engagement, farm to school, experiential learning, pedagogy, alternative food networks

Introduction
Schools act as an important site of contact for students with the food system. Issues in food system sustainability, such as corporate consolidation and influence over public policy, devaluation of food-service labor, and the use of unsustainable industrialized growing practices, directly affect the food students receive in their cafeterias, which themselves are vital sites for the social reproduction of the current corporate food regime (Gaddis & Coplen, 2018). Furthermore, while not all schools have a formal agricultural education program, many educators across the U.S. already teach about food and agriculture, with or without state stand-

ards in place to promote their inclusion in classroom instruction (Stewart et al., 2021).

Education related to food systems encompasses agriculture, the environment, and nutrition as part of complex socio-environmental systems (Chase & Grubinger, 2014; Pauley et al., 2019; T. G. Roberts et al., 2016). There are several curricular approaches to teaching about food systems in U.S. high schools. School-based agricultural education (SBAE) remains the dominant paradigm in most formal agricultural education programs. Over the last three decades, scholars and practitioners have increasingly called for SBAE to integrate concepts and content related to sustainability and social justice to maintain relevance. During this same time span, farm-to-school (FTS) programs have become increasingly common, including in schools without an agricultural education program, as a method to provide opportunities for students to learn about and experience their local food system. This is accomplished by a variety of activities, including procuring locally produced food for school lunches or taste tests, creating school gardens that teach students about food production and preparation, visiting farms, doing cooking demonstrations, and holding promotional activities such as "harvest of the month," which highlight locally grown food (Prescott et al., 2020). In doing so, FTS programs emphasize the local context of each school and its community, resulting in a pedagogical approach valuing locally created knowledge over standardized curricula (McKim et al., 2019).

A pedagogy that values locally created knowledge has the practical impact of making students aware of the specific sustainability issues that exist in their local food system, improving their ability to engage as informed citizens in their communities. FTS programs have also increasingly integrated concepts related to social justice, food sovereignty, and sustainability, reflecting many of the demands made of SBAE (Powell & Wittman, 2018). A growing body of literature has subsequently documented the many potential social, educational, environmental, and economic benefits of FTS programs, indicating their potential to serve as a cornerstone for agricultural education (Mishra et al., 2022).

Despite the potential benefits provided by FTS

programs, several barriers remain to their universal adoption. First, while FTS organizations and practitioners indicate that local food procurement or the creation of school gardens are not necessary to operate a functional FTS program, most programs are anchored in one of these interventions. These can act as a barrier to adoption for schools lacking the capital to invest in either approach. Second, the diversity of approaches and interventions that exist under the FTS umbrella, while providing substantial flexibility, has also presented a challenge for practitioners and scholars seeking to evaluate the impact of their programs, particularly as it relates to educational outcomes. Finally, while FTS programs engage students in developing an understanding of the food system, the long-term investments associated with common FTS interventions necessitate less flexibility in how individual cohorts may interact with the program. This, in turn, can de-center students as potential change agents, which can instead reinforce neoliberal notions of individual responsibility and choice as their primary axes for driving change, while also placing constraints on the potential educational outcomes for students.

It is at this nexus that we position our research. This study explores the implementation of an innovative educational approach, land-based learning (LBL), a flexible, student-led approach to agricultural education with roots in place-based learning, in a FTS setting. In this study, we present findings from the implementation of an LBL curriculum that integrated FTS content related to local food procurement in two high schools in northern Michigan. In this program, students collaborated with community partners to identify barriers to sustainability in their local food systems and then developed and implemented an intervention at their school to address those barriers. This paper addresses the following research questions:

1. Does FTS academic content without a predetermined intervention provide the same academic benefits as traditional FTS programs centered around local food sourcing or school gardens?
2. Does delivering FTS content in an LBL framework provide additional educational benefits to students or other project participants?

Literature Review

Land-based learning is grounded in approaches that emphasize experiential learning, local engagement, and critical reflection, potentially addressing some limitations of other models and enhancing the relevance of agricultural education.

The Evolving Needs of SBAE

Currently, SBAE is structured around the three-circle model (Croom, 2008). This approach frames agricultural education as a Venn diagram between classroom instruction, leadership development via the National FFA Organization, and supervised agricultural experiences (SAE), which provide students with experiential learning opportunities. While this approach is nominally flexible and broad enough to meet the evolving demands of agricultural education, recent scholarship has argued that SBAE is constricted by its narrow focus on preparation for "traditional" agricultural careers and is losing relevance as other disciplines use agriculture to teach about broader and interconnected challenges such as climate change and systemic racism (Hartmann & Martin, 2021). These calls build on long-standing concerns that many SBAE programs offer limited or no SAE opportunities and struggle to encourage participation in leadership development experiences, further limiting the engagement students have with the increasingly complex real-world challenges facing producers and others invested in agriculture (Croom, 2008).

The American Association for Agricultural Education (AAAE) has identified using systems thinking as an important approach to "Addressing Complex Problems" in its national research agenda (T. G. Roberts et al., 2016). This call has been echoed by a range of practitioners and scholars of environmental education who have noted the growing overlap between sustainability and agriculture (e.g., land use, agricultural production and natural resource management, energy consumption, and climate change) that educators need to prepare their students to address (T. G. Roberts et al., 2016). Further, research illuminates the need to pull disciplines from their silos toward a shared

agenda of systemic resilience (Reilly et al., 2022; Pauley et al., 2019). In their work, T. G. Roberts et al. (2016) identified a lack of understanding among educators about how best to prepare students to address complex problems as a gap within agricultural education, criticizing research within the discipline for not providing sufficient information on processes, procedures, and programs that educators could utilize.

An additional conversation is taking place in agricultural education about how social justice is entwined with teaching and learning in the discipline. Hartmann and Martin (2021) have proposed a critical pedagogy of agriculture, which would not only integrate conversations about sustainability into agricultural education, but also broader conversations about food insecurity, social inequality, and community health. Such an approach would not only be more relevant to the deep connections between social and agricultural systems but would also encourage students to see themselves as capable of changing the social realities of current agricultural systems (Hartmann & Martin, 2021).

These recommendations go beyond a call for individual educators to adjust their approach in the classroom; instead, they require systemic support from organizations such as the National FFA Organization, without which individual teachers will be working against the prevailing winds in the discipline to accomplish localized change (Hartmann & Martin, 2021). However, while the National FFA Organization and other relevant organizations have shown some willingness to evolve over the last several decades, progress has remained slow. For instance, the rise of service learning as a relevant pedagogical approach over the last three decades has prompted many practitioners to call for its formal integration into the three-circle model. As Roberts and Edwards (2015) documented, this rise ultimately led to the FFA adopting a range of service-learning initiatives beginning in 2007, as well as service-learning–based SAEs being recognized as a distinct category within that pillar of the three circle model. However, despite these developments, service learning has not been universally adopted in SBAE, reflecting ongoing resistance ranging from critiques that the current three-circle model is already flexible enough to functionally allow space for service learning as well as questions regarding the intellectual rigor of service-learning curricula. This resistance has stymied the creation of resources to facilitate the universal adoption of service learning in SBAE (R. Roberts & Edwards, 2015). These challenges add to the existing challenges of placing SAE on a more equal footing in practice within the current three-circle model.

Farm to School and Agricultural Education

While not explicitly discussed in the context of SBAE, the rise of FTS programs over the last three decades has indirectly addressed many of the calls made within SBAE, largely at a local level. FTS provides valuable insights into integrating environmental education and systems thinking into SBAE while providing material benefits to the local community. FTS programs first emerged in the mid-1990s as an outgrowth of concerns about the state of the food system, including climate change, the plight of small and midsized producers, growing food insecurity, and the rise of public health concerns due to inadequate diets (Feenstra & Ohmart, 2012). The initial focus of FTS was on the procurement of local food by school cafeterias; however, as FTS programs have expanded nationally, a wide variety of activities has been included under the FTS umbrella, including the development of school gardens, composting and food waste reduction initiatives, farm tours, cooking demonstrations, and nutritional education (Feenstra & Ohmart, 2012). The National Farm to School Network, a prominent nonprofit in the space, defines FTS programs as having one or more of the following features:

> "1. Procurement: Local foods are purchased, promoted and served in the cafeteria or as a snack or taste test;
> "2. School gardens: Students engage in hands-on learning through gardening; and
> "3. Education: Students participate in educational activities related to agriculture, food, health or nutrition." (NSFN, n.d., para. 4–6)

The grounding of FTS programs in attempts to address meaningful challenges facing actors across

the food system via experiential learning ideally places FTS programs to address many of the concerns expressed regarding SBAE. Further, the reach of FTS programs has extended to many communities that do not include traditional agricultural education programs, most notably schools in urban settings. In the existing literature, there is a growing body of research documenting the impact this community focus and widespread adoption of FTS has had across the food system. For students, the benefits of FTS programs include greater awareness of gardening, healthy eating, and seasonality; an increased willingness to consume fresh fruits and vegetables; and overall academic achievement (Mishra et al., 2022). For the community, efforts to bolster sourcing from local producers has increased local economic activity by providing midsized producers with a stable source of income, encouraging consumer dollars to circulate locally (for instance, see Christensen et al., 2019).

While FTS programs have many documented benefits, challenges remain to their widespread adoption. First, while FTS programs can nominally feature only educational activities, the overwhelming majority feature some focus on local food procurement and/or the development of school gardens, stemming from the roots of the movement. These interventions require marshaling considerable resources, whether financial, logistical, physical, or in human capital, which can be prohibitive (Mishra et al, 2022). While significant progress has been made in mitigating the common barriers to local food procurement in schools, many still face the same challenges. Second, while there is a growing body of literature documenting the potential impacts of FTS programs, Prescott et al. (2020) note the limitations to generalizing many of these studies due to factors such as study designs that preclude causal inference, difficulty in developing evaluation frameworks appropriate to the chosen FTS intervention, and inability to determine long-term outcomes. Finally, the nature of FTS programs is such that while they are designed to engage students on a level closer to their own lived experience, the interventions are more often led by institutional champions, such as food-service directors, who will ostensibly remain and administer the program as students transition out of their school

(Bagdonis et al., 2009). While this is often a necessary logistical approach, and some scholars have noted the potential for farm-to-institution approaches that build structures to limit the need for an individual champion (Warsaw & Morales, 2022), this has raised questions about the potential limitations created by such a structure. Most notably, Allen and Guthman (2006) noted the parallels between FTS programs and existing school lunch programs in arguing that FTS programs actually *reinforce* neoliberal notions of individual responsibility, consumerism, and choice in students by emphasizing the value of these programs in developing students as conscious future consumers. Crucially, their comparison of FTS vs. conventional school lunch programs lists students solely as *recipients* of the programming, not as partners. However, growing bodies of literature within education, such as youth participatory research, have pointed to the value of viewing students not just as consumers of content, but as active participants in the creation of curricula (Anyon et al., 2018).

Land-Based Learning
A pedagogical approach that contains many elements of FTS, LBL addresses the call for delivery methods in agricultural education where students engage with communities or partners outside of the school to change systems (T. G. Roberts et al., 2016). LBL is a flexible process for building student-led teams that act on sustainability issues through four stages, each of which builds on the prior stage: (a) *identification* of a local phenomenon and partners; (b) *understanding* of place and connected systems; (c) place-based *intervention* to enhance sustainability; and (d) *evaluation* of changes in place, systems, and community (McKim et al., 2019). This flexible process provides an outline to engage students in a change process within a complex system.

LBL has roots in place-based education, which emerged out of a call within environmental education to focus on the impact of social systems on the environment, as well as place greater emphasis on the local environmental challenges facing learners (McKim et al., 2019). Place-based education eschews or adapts "universal knowledge" curricula developed in places far from where students learn

and live, to "link local knowledge with scientific thought and respect for place" in a specific setting (Ferguson et al., 2019, p. 726). The aim of place-based education is to develop an *enlightened localism*, wherein students are able to connect local phenomenon to global challenges through a *local/global dialectic* (Sobel, 2004). LBL further builds on the foundation of place-based learning by addressing criticisms of the approach raised within critical theory, particularly among decolonial scholars who noted place-based education often represents a continuation of settler-colonialism, wherein practitioners fail to acknowledge the histories and knowledge of Indigenous populations in their pedagogies and thus reproduce the settler-colonial project in creating "new" localized knowledge (Calderon, 2014). LBL, then, represents an approach seeking to pair the community-engagement principles of place-based education with this explicit commitment to social justice and critical theory (McKim et al., 2019).

While the approach has clear parallels and points of overlap with FTS, it differs in several key aspects. First, students are explicitly centered not just as recipients of the curriculum, but also as co-creators and leaders in the educational experience. While the other approaches discussed include significant levels of student engagement by design, they are defined primarily by the type of intervention involved (e.g., FTS and school gardens, service learning and community-facing projects). Within LBL, students are empowered to envision and design an intervention based on their understanding of the local food system, spaces for potential intervention, and their resources for implementing the said intervention. Since 2017, project leaders have been engaged with students who do not have access to state-certified agricultural education programs to carry out projects in collaboration with food systems actors with a focus on social, ecological, and economic sustainability (McKim et al., 2019).

The efficacy of these interventions draws from the literature in place-based education and the concept of *empathetic experience. Premature abstraction*— asking students to dive into big crises and solve problems before they have had a chance to situate themselves in place—can result in them being

overwhelmed and thus disengaging (Sobel, 1996). Educators are responsible for contextualizing problems and making developmentally appropriate choices when it comes to asking students about addressing complex problems. Having students and educators engage directly with agroecological principles in their schools allows them to connect to the place they live by reinhabiting, a mode more difficult to evaluate than outcomes based on test scores, but nonetheless critical for the decolonization of the mind (Gruenewald, 2003). Place-based education asks educators to reflect on questions like, how does your teaching influence the place you live in and what will you leave for future generations (Gruenewald, 2003)? Place-based education asks an entire community to "take responsibility" for teaching about the possibilities of adulthood in their community (Smith & Sobel, 2010, p. 42).

Another key difference and point of innovation within LBL is the emphasis on evaluation. While the flexible nature of LBL makes a universal approach to evaluation impossible to outline, McKim et al. (2019) frame this as an important element of LBL. As learners develop their understanding of the local environmental and agricultural system and design an intervention to improve the sustainability of that system, a vital marker of understanding is the ability to express both *how* the proposed intervention will accomplish this and *how they will know* whether the intervention was successful. Notably, this often requires a deeper level of engagement between community, learners, and educators, as this level of evaluation requires a longitudinal approach.

In this paper, we analyze a case study of the application of LBL to two schools in Michigan's Upper Peninsula. In comparison with previous applications of LBL, this project builds on the approach with several innovations, including the integration of content related to each school's supply chain and barriers to local food procurement.

Methods

Given the unique approach to this LBL project, we used a case study design to gain the perspectives of those involved in the bounded system. Described by Merriam (2002) as a "description and analysis of a phenomenon" (p. 8), case studies may focus any-

where on the continuum from individuals to institutions to communities. In our study, the unit of analysis was an LBL project engaging high school students and their respective teachers, food-service directors, local farmers, and Michigan State University extension and faculty members. All research activities were approved by Michigan State University Institutional Review Board prior to initiating the project.

Case Study Design

The implementation of LBL in two schools in Michigan provided the case for our study. Each school developed an independent team, dubbed a Locally Integrated Food Team (LIFT), each of which comprised a school-based educator and corresponding class of students, their respective school food-service director, a local farmer, a nutrition educator, and an extension educator. In total, 33 high school students participated in the project, ranging from sophomores to seniors. LIFTs were engaged in a six-month experience that walked through the four stages of the land-based learning process. First, LIFTs *identified* those involved in local food production and cafeteria food procurement; worked to *understand* the challenges and af-

fordances of cafeteria food and local food production systems; developed, proposed, and implemented an *intervention* to increase local food offerings in the school cafeteria; and *evaluated* the impact of their intervention on local food consumption within the cafeteria. At Superior Central High School, the chosen intervention was to extend the growing season of their school's hoop house, which supplies food to the cafeteria, by piping heat from the school's boiler room. The LIFT at Negaunee High School chose to purchase and manage a hydroponics unit that could provide food for the cafeteria.

The research team provided LIFTs with multiple resources. First, the project team developed curricular materials that integrated common topics related to local food systems and FTS programs (e.g., the logistics of local food purchasing) with content aligned with the LBL model so students could apply these concepts to their own local food system (e.g., identifying key foods served in the cafeteria that are grown locally and when the growing season overlaps with the school year). A list of the learning objectives related to these materials is provided in Table 1. This content was complemented by experiential activities that gave students

Table 1. Learning Objectives of the Land-Based Learning (LBL) Curriculum

Objective		Day
1	Define food system, local food, and farm-to-school (FTS) purchasing	1
2	Explain the importance of purchasing local food	
3	Describe two food producers in Michigan	2
4	Identify *what* is grown in Michigan and *when* it is produced	
5	Explore the food purchasing and offerings within your school cafeteria	3
6	Identify "key foods" that intersect local food production and cafeteria food purchasing	4
7	Describe food production, economics of food, food processing, and marketing and education	
8	Align personal interests to one of the local food systems	
9	Identify salient barriers to local food purchasing by the school	5–7
10	Develop potential solutions to identified barriers to local food purchasing	
11	Research the costs, anticipated benefits, timeline, and barriers to proposed solutions	8
12	Present a solution to peers and relevant stakeholders	9–11
13	Propose the selected interventions through a mini-grant application	8, 11
14	Implement an intervention to increase local food purchasing	12–14
15	Evaluate the impacts of an intervention on the four systems of local food purchasing	
16	Implement an intervention to increase local food purchasing	15–19
17	Evaluate the impacts of an intervention on the four systems of local food purchasing	
18	Analyze career opportunities throughout the food system	20

direct engagement with the individuals supporting their school's nutritional program and the local food system, including question and answer (Q&A) sessions with their school's food-service director and local farmers. Next, each LIFT team was offered up to US$2,500 to implement their chosen intervention and was required to write a proposal for its projects, which the project team, along with other LIFT members, provided feedback on via a virtual session during the school day. Upon the completion of the program, each LIFT presented the findings of its evaluations to the project team for feedback.

Data Collection
Qualitative data describing the experiences of the LIFTs were collected via three mechanisms: (a) focus groups with each LIFT member type (i.e., students, teachers, food-service director, and farmer); (b) observations of student presentations; and (c) researcher observations of the implemented projects. All data were collected at the conclusion of the project during the wrap-up day held at a university-affiliated research and education farm. Two research team members conducted focus groups with students separately, the two teachers collectively, and then jointly interviewed one farmer and one food-service director. For all focus groups, data were collected using a semi-structured protocol that was developed and reviewed by all research team members, allowing for flexibility (Flick, 2009). During these sessions, participants were asked about the perceived successes and challenges of their interventions and how participating in this program affected how they viewed themselves within the food system, as well as next steps for increasing local food procurement based on their experiences with the LIFTs. A handheld recording device was used to capture focus group and interview data, and data were then sent to a third-party transcription service. Two project team members made notes of their observations during the wrap-up day, which were then discussed as a research team prior to formal analysis.

Data Analysis
The data were inductively analyzed, informed by observational notes taken by the research team

from classroom visits and student presentations during the wrap-up event. Open, axial, and selective coding processes were used to identify codes, categories, and themes. We employed open coding procedures reflecting our stage and style of research (Flick, 2009), with one research team member reading transcripts to identify descriptive patterns of data. Those identified patterns then informed a systematic open coding process where data were "disentangled" with concepts added to them, followed by axial and selective coding (Flick, 2009, p. 307). Two researchers performed open coding with the research team, meeting to perform thorough peer reviews to achieve consensus for identified codes. Several steps were taken to ensure quality, including peer debriefing, audit trails, member checks, and providing thick descriptions (Flick, 2009).

Subjectivity Statement
Our research team was composed of faculty, extension educators, a nutrition educator, a graduate student, and one undergraduate researcher, all of whom were engaged with the delivery of the project. Our team members worked directly with teachers and their students, and one of our team members also worked directly with the food-service directors and local farmers. Therefore, each member of our team had a vested interest in the success of the LBL project and personal connections with participants in the project. As a collective, we believed in the ability and agency of students, teachers, farmers, and food-service directors to carry out the functions of this project.

Our collective previous experiences influenced the project, particularly with the type of data we were able to collect. Teachers, farmers, and students in the project all had prior relationships with one of the team members, whose credibility was extended to the rest of the team members. Most likely, this resulted in a willingness to participate and provide deeper levels of data, and required the research team to be reflective about those relationships and how they could influence data analysis.

Findings and Discussion
Themes, categories, and codes are introduced in Table 2. The primary theme that emerged focuses

Table 2. Summary of Themes, Categories, and Codes

Theme	Category	Code
Students Re-Envisioning School and Local Food Systems	Student Interpretation of Experience	Agency
		Consequentiality
	Collaboration	Leadership
		Delegation
		Problem-Solving
	Project Legacy	Continuing Ideas
		Influence
		Relationship to Food

on how the project—and the adults engaged in it—influenced students' vision of school and local food. While adults (i.e., teachers, farmers, food-service directors, and research team members) played important roles in the LBL project, our data suggested that the most notable outcome was how students were affected by their experience with the project. This theme is explored by looking at its three categories: student interpretation of experience; collaboration; and project legacy.

Student Interpretations of the LIFT-UP Experience

Our first category explores how students interpreted the LBL experience, with students making direct juxtapositions to the type of school learning they typically experience. Principal among these connections and interpretations was *agency* within their educational experience. This agency, in conjunction with the other elements present from other educational approaches, is one of the distinguishing features of LBL. Students, teachers, and food-service directors discussed the existence and importance of student agency to design and implement their own intervention to increase the amount of local food in the school. One student stated the following when describing the agency felt after their teacher provided an option of adult help or not: "We decided we don't want any adult help, so we got to do a lot of it on our own." The same focus group elaborated on when adults were pulled in, "Then [after the interventions had been designed], we ran it by the adults in order to make sure that that was covered, and that was okay with

our [food-service director]." This agency, with students being in control of the design of the intervention as well as when to reach out for support, led one of the LIFTs to highlight they felt even more empowered by adult presence in the project: "It felt like we were in charge because the grown-ups were involved. It felt like we had more control over our situation." On a few occasions, students offered that the project provided adult-like experiences, saying, "Giving us a chance to work together and work it out like adults." Several adult perspectives highlighted student agency as well, with one food-service director expressing how schoolwide connection to the project has resulted in more willingness to engage in dialogue about food options at school:

> Once this project started, I've noticed the high schoolers being more open to conversing and giving their opinion and just input in general on what they'd like to see on the menu, what they do like, what they don't like.

The second code describing the student interpretation of experience category is *consequentiality*, where the tangible impacts of the project on their schools led to stronger feelings of connection with the experience for students in contrast to contrived learning situations. One teacher noted how the project was framed for students, saying, "And it's not hypothetical solutions. You're going to do it," adding for several weeks students said "oh, you mean we're really going to do this?" Students described the project as "more official" when com-

paring it to their usual project-type activities in other coursework. In addition to realizing how consequential these projects were in terms of them actually happening outside of a hypothetical context, one student noted their project "actually makes an impact in our community," adding another layer of importance to the work done in this program. Harkening to the adult-like feelings discussed previously, one focus group of students described how outside professionals affected their feelings toward the project during their intervention of piping warm air from the school's boiler room to the school's hoop house to extend the growing season,

> ... That's when I thought, "wow this actually serious, we're actually doing something big here." When we had to get [administrator], and started talking about making a hole in a wall. ... And a bunch of older, more official, professional people came in to talk to us about what we were gonna do and everything, and, of course, [State University Extension Educator] I think it is came in a lot to talk to us about it.

LIFT and Educational Collaboration
Our second category, collaboration, describes how students engaged with the curriculum and worked to implement their intervention. The first code, *leadership*, is built on ideas from students positing "all were included" and getting to "participate in something bigger than myself." One focus group highlighted how the project provided growth opportunities to expand their notions of how leaders act, with one student saying that leaders would

> Not necessarily sit back, but a big part of it is taking other people's ideas, and kind of going along with it because I mean, if I was just a leader [who insisted on] my idea only, nobody else—you would get nowhere with that.

Students also described leadership opportunities they engaged in outside the project class, with one saying that "branching out, we do good things at the beginning of class sometimes in Spanish. So, whenever I got the chance, I would like [to] update my class on what we're doing."

The second code in collaboration we identified was *delegation*, where students offered the importance of defining roles within teams. One focus group discussed the importance of sub teams, "I feel like the teams evenly split up the projects, and every team had a sort of importance" and that the teams "had their own mission" but "meshed together to make it, you know, more integrated, and everyone was involved." Connected to delegation, the third and final code that emerged was *problem-solving*—even when there was no clear solution. A teacher postulated the coming-to-terms with realizing the solution would not be immediate,

> We kind of had five phases, or five solutions to the one problem. And we realized early on that the product we get from each one of these phases may not be realized this year. You know, it's more of a long-term outlook.

Students offered a more focused discussion on working on compromise to solve issues, noting, "We obviously had some disagreements, but they were worked out throughout the process of talking [about what is happening]." Another added, "we were picking at all the bits and pieces to find compromises in between each group." Lastly, another group highlighted how dialogue sometimes meant dropping an idea: "[we had an idea to] continue during the summer, like have a summer program, but there was [*sic*] also a couple questions with that one. So, we didn't end up doing that one."

The Legacy of LBL
Our final category identifies the legacy of LBL projects, exploring concepts including continuing ideas, influence, and relationship to food. The first, continuing ideas, looks at project continuation within the respective schools as an institution. Students and teachers had hopes of the work they started lasting beyond the end of the project, with one student stating, "we prepared things for the future like so, it doesn't end with us, it continues on to future classes." Included were specific ideas, such as hoop house expansion: "Hopefully future classes will be able to expand on what we've done this year. It's not perfect, but hopefully they'll make it more efficient. ... [Our teacher will] probably

apply for another grant, and … maybe even expand the hoop house." Students from the other school echoed similar thoughts, hoping to continue the healthy trend: "We'll get other people with different ideas and the school can keep getting better and healthier lunches." Finally, hinting at inspiration from the project, one food-service director also posited continuation thoughts: "one of my, kind of, my five-year goal is to be able to have some sort of hydroponics system in each school that I run, um, all the way from elementary to the high school."

Influence was the focus of our second project legacy code, exploring how engagement in the project influenced others in the community and school institutions. Teachers, students, the farmer, and the food-service director all substantiated this code, with teachers offering ideas such as, "I think, before we started, I think there was like, two staff members eating. Now there's staff members almost eating salad bar on a daily basis," and "the amount of people talking about their lunch now is way higher." The farmer saw the project as an opportunity to influence others, saying "So, this has been an interesting opportunity to influence how people think about food in local food systems, especially in upcoming generations," while the food-service director was excited because the project is in line with the influence they want to make on the food served: "I've been very excited about this, um, project because it has been on my docket to try to get more local produce into the school system." Lastly, students even put numbers to that influence, tracking a "15% increase of vegetables and fruits being taken at lunch," with this finding consistent with prior research (Mishra et al., 2022).

The third and final code for the project legacy category explores the relationship to food and the application of new learning to one's connection to the food system and related careers. The food-service director highlighted an educational program on composting as helping develop that relationship,

> And the process, seeing the kids learn about the process of composting and how the food waste goes to grow more food. And that was one of the, not so much local food but a local

part of the community that really, uh, spoke to me.

Meanwhile, students suggested a growth in career awareness after having participated in the project:

> Not gonna lie at the beginning, we, I always heard farming, you know, you just kind of think of like the very typical like, oh, you're on a farm, you got to deal with cows, animals, chickens. But I didn't realize that there are so many more, um, opportunities within farming.

One student who hails from a farming background even mentioned how the project has influenced his family's business relationship to the food system: "We're looking into buying stuff from other farmers, and I don't think we ever did that before." Finally, offering an emblematic quote of the impact of the project, another student from the same focus group offered a new realization about local food: "Yeah, I always appreciate local food, I just never realized how difficult it was to get it out there."

Conclusions and Recommendations

The findings of this research have several implications for the ongoing FTS movement. First, while much of the existing literature has focused on the specific content and interventions at the center of FTS programs, this research indicates the method of delivering that content is potentially just as meaningful as the content itself. LBL is a pedagogical approach that promotes student agency and project legitimacy. Consistently, students expressed the agency they experienced in this project as unique in educational settings, exciting, and constructive to their learning. While these projects yielded several of the same findings as previous FTS research about changes between participants and their views of the local food system, providing students with the opportunity to be directly engaged with the development of the FTS interventions from the beginning of the project is an innovative and replicable approach that drove meaningful impacts for student outcomes. Educators can employ LBL to structure and engage students in

authentic problems situated in their local community, such as asking students to answer the question, "How can we get more local food in the lunchroom?" As students encounter barriers to progress, supportive adults can engage in the classroom in roles that correspond to their professional identity—such as extension educators, nutrition educators, and farmers with experience in food systems and education. While students are driving the investigation and devising interventions, having a process in place to guide their action provides a sense of direction without determining the outcome of the project.

Notably, this approach may also address one of the longstanding barriers to FTS programs, namely a lack of startup capital to invest in local food procurement or the creation of a school garden. While this project did provide funds for each LIFT, the budget for each team (US$2,500) was relatively modest when compared to sustaining long-term purchasing requirements. At the same time, the results suggest the possibility that these smaller projects may build the momentum necessary to generate support for more substantial investments by local administrators, both by creating a greater demand for change, and demonstrating a "proof-of-concept" that such investments are worthwhile, a finding demonstrated elsewhere in the farm-to-institution literature (see, for instance, Warsaw & Morales 2022).

The results of this work also have broader pedagogical implications for agricultural education. LBL provided an educational approach that promoted student engagement in and ability to influence the local food system. Adults lent power to students, operating as the nearest levers for systems change in the school food environment. The project increased conversations between students and adults about school lunch, what values they share, and helped to define a direction for future community engagement in local food. Additionally, through LBL, students were provided opportunities to engage in authentic leadership experiences. Recognizing that a project is only as strong as its support, the importance of sharing power, and of compromising were understood by students through lived experiences in the project. As students engaged with a real-world problem that had no predefined solution, they experienced frustration and authentic responsibility for the outcomes of their collective action. These experiences are expected to help students conduct future open-ended investigations and problem-solving in group settings, skills which are urgently needed to address complex problems in the Anthropocene.

Future research should continue to expand and evaluate the value of LBL when applied to new contexts (e.g., urban settings, nonformal education spaces, postsecondary education). Importantly, evaluations of LBL should be inclusive of diverse outcomes such as systems thinking, community engagement, leadership skill development, content learning, career interest, empathy, and place identity. All these activities could support increasing the use of pedagogies, like LBL, that critically evaluate systems and engage students in changing those systems for a more sustainable future. In the FTS literature, additional research is needed to validate the findings of the approach presented here compared to other FTS applications. While the findings here suggest that a student-centric approach to FTS generates feelings of agency and connection among students, they do not imply that this approach does so more than other, traditional FTS programs centered first around a local food procurement strategy or school garden. Instead, these findings add to the growing need for more robust investigation and evaluation of various approaches to FTS to identify the mechanisms that drive positive community and educational outcomes.

References

Anyon, Y., Bender, K., Kennedy, H., & Dechants, J. (2018). A systematic review of youth participatory action research (YPAR) in the United States: Methodologies, youth outcomes, and future directions. *Health Education & Behavior, 45*(6), 865–878. https://doi.org/10.1177/1090198118769357

Allen, P., & Guthman, J. (2006). From "old school" to "farm-to-school": Neoliberalization from the ground up. *Agriculture and Human Values, 23*, 401–415. https://doi.org/10.1007/s10460-006-9019-z

Bagdonis, J. M., Hinrichs, C. C., & Schafft, K. A. (2009). The emergence and framing of farm-to-school initiatives: Civic engagement, health and local agriculture. *Agriculture and Human Values*, *26*, 107–119. https://doi.org/10.1007/s10460-008-9173-6

Calderon, D. (2014). Speaking back to Manifest Destinies: A land education-based approach to critical curriculum inquiry. *Environmental Education Research*, *20*(1), 24–36. https://doi.org/10.1080/13504622.2013.865114

Chase, L., & Grubinger, V. (2014). *Food, farms, and community: Exploring food systems*. University of New Hampshire Press.

Christensen, L., Jablonski, B. B. R., Stephens, L., & Joshi, A. (2019). Evaluating the economic impacts of farm-to-school procurement: An approach for primary and secondary financial data collection of producers selling to schools. *Journal of Agriculture, Food Systems, and Community Development*, *8*(Suppl. 3), 73–94. https://doi.org/10.5304/jafscd.2019.08C.002

Croom, D. B. (2008). The development of the integrated three-component model of agricultural education. *Journal of Agricultural Education*, *49*(1), 110–120. https://doi.org/10.5032/jae.2008.01110

Feenstra, G., & Ohmart, J. (2012). The evolution of the school food and farm to school movement in the United States: connecting childhood health, farms, and communities. *Childhood Obesity*, *8*(4), 280–289. https://doi.org/10.1089/chi.2012.0023

Ferguson, B. G., Morales, H., Chung, K., & Nigh, R. (2019). Scaling out agroecology from the school garden: The importance of culture, food, and place. *Agroecology and Sustainable Food Systems*, *43*(7–8), 724–743. https://doi.org/10.1080/21683565.2019.1591565

Flick, U. (2009). *An introduction to qualitative research* (4th ed.). SAGE.

Gaddis, J., & Coplen, A. K. (2018). Reorganizing school lunch for a more just and sustainable food system in the US. *Feminist Economics*, *24*(3), 89–112. https://doi.org/10.1080/13545701.2017.1383621

Gruenewald, D. A. (2003). The best of both worlds: A critical pedagogy of place. *Educational Researcher*, *32*(4), 3–12. https://doi.org/10.3102/0013189X032004003

Hartmann, K., & Martin, M. J. (2021). A critical pedagogy of agriculture. *Journal of Agricultural Education*, *62*(3), 51–71. https://doi.org/10.5032/jae.2021.03051

McKim, A. J., Raven, M. R., Palmer, A., & McFarland, A. (2019). Community as context and content: A land-based learning for primer for agriculture, food, and natural resources education. *Journal of Agricultural Education*, *60*(1), 172–185. https://doi.org/10.5032/jae.2019.01172

Merriam, S. (Ed.). (2002). *Qualitative research in practice: Examples for discussion and analysis* (1st ed.). Jossey-Bass.

Mishra, S. K., Khanal, A. R., & Collins, W. J. (2022). Farm-to-school programmes, benefits, health outcomes and barriers: A structured literature review. *Health Education Journal*, *81*(7), 781–792. https://doi.org/10.1177/00178969221119290

National Farm to School Network [NFSN]. (n.d.). *About Farm to School*. Retrieved July 25, 2024, from https://www.farmtoschool.org/about/what-is-farm-to-school

Pauley, C. M., McKim, A. J., & Hodbod, J. (2019). A social-ecological resilience perspective for the social sciences of agriculture, food, and natural resources. *Journal of Agricultural Education*, *60*(4), 132–148 https://doi.org/10.5032/jae.2019.04132

Powell, L. J., & Wittman, H. (2018). Farm to school in British Columbia: Mobilizing food literacy for food sovereignty. *Agriculture and Human Values*, *35*, 193–206. https://doi.org/10.1007/s10460-017-9815-7

Prescott, M. P., Cleary, R., Bonanno, A., Costanigro, M., Jablonski, B. B. R., & Long, A. B. (2020). Farm to school activities and student outcomes: A systematic review. *Advances in Nutrition*, *11*(2), 357–374. https://doi.org/10.1093/advances/nmz094

Reilly, C., Stevenson, K., Warner, W., Park, T., Knollenberg, W., Lawson, D., Brune, S., & Barbieri, C. (2022). Agricultural and environmental education: A call for meaningful collaboration in a U.S. context. *Environmental Education Research*, *28*(9), 1410–1422. https://doi.org/10.1080/13504622.2022.2040431

Roberts, R., & Edwards, M. C. (2015). Service-learning's ongoing journey as a method of instruction: Implications for school-based agricultural education. *Journal of Agricultural Education*, *56*(2), 217–233. https://doi.org/10.5032/jae.2015.02217

Roberts, T. G., Harder, A., & Brashears, M. T. (Eds). (2016). *American Association for Agricultural Education national research agenda: 2016–2020*. University of Florida Department of Agricultural Education and Communication. https://www.ageds.iastate.edu/files/inline-files/AAAE_National_Research_Agenda_2016-2020.pdf

Smith, G. A., & Sobel, D. (2010). *Place- and community-based education in schools*. Routledge. https://doi.org/10.4324/9780203858530

Sobel, D. (1996). *Beyond ecophobia: Reclaiming the heart in nature education* (First ed.). Orion Society.

Sobel, D. (2004). Place-based education: Connecting classroom and community. *Nature and Listening*, *4*(1), 1–7. https://placebasededucation.org/resources/documents/sobelpbexcerpt.pdf

Stewart, A. L., Ahmed, S., Warne, T., Byker Shanks, C., & Arnold, S. (2021). Educator practices and perceptions of integrating sustainability and food systems concepts into elementary education: Comparative case study in two northwestern states in the United States. *Frontiers in Sustainable Food Systems*, *5*, Article 714226. https://doi.org/10.3389/fsufs.2021.714226

Warsaw, P., & Morales, A. (2022). Farm-to-hospital programs and public health: Leveraging local food for organizational and behavioral change. *Journal of Agriculture, Food Systems, and Community Development*, *11*(2), 243–261. https://doi.org/10.5304/jafscd.2022.112.017