Farm to School Professional Development: From Program to Classroom

by

Elisabeth Charles Evans

(Under the Direction of Gary T. Green and Jennifer Jo Thompson)

ABSTRACT

Farm-to-school (FTS) programs continue to create opportunities for students to access fresh, local, and nutritious food through edible garden programs and serving locally sourced foods. Among the barriers to these programs are educators' need for horticulture and nutrition education knowledge, which prompts the need for professional development. Grow It Know It (GIKI), a USDA-funded FTS teacher training program, has hosted nine trainings for educators in Northeast Georgia participating in FTS since 2018. This thesis evaluates the program's pilot years (2018-2020) and conducts a Photovoice study with seven participants to better understand the impact of the program. Using a mixed methods approach, the results of both studies demonstrate that the GIKI program created an effective professional development model, increased participants' confidence and self-efficacy, and identified persistent barriers such as recruiting colleagues to support an FTS program at their school. This thesis concludes with recommendations for future FTS professional development programs.

INDEX WORDS: Farm-to-School, Professional Development, Teacher Self-Efficacy

Farm to School Professional Development: From Program to Classroom

by

Elisabeth Charles Evans

BS, University of Georgia, 2018

A Thesis submitted to the Graduate Faculty of The University of Georgia in Partial Fulfillment of the Requirements for the Degree

MASTER OF SCIENCE

ATHENS, GEORGIA

2022

Farm to School Professional Development: From Program to Classroom

by

Elisabeth Charles Evans

Major Professors: Gary T Green & Jennifer Jo Thompson

Committee: Jesse Abrams & Kathy Thompson

Electronic Version Approved:

Ron Walcott

Dean of the Graduate School

The University of Georgia

December 2022

DEDICATION

For our participants,

This work could not have been completed without your time, patience, and dedication to your work. Thank you for sharing your experiences. Happy growing!

ACKNOLWEDGEMENTS

First, thank you to my major professors Dr. Gary T. Green and Dr. Jennifer Jo Thompson. Without your guidance and support we would not be here today. Thank you to my committee members for their time throughout this process. Thank you to the Grow It Know It team, Alicia Holloway, Andie Bisceglia, Kathy Thompson, Jenn Thompson, and so many others for the opportunity to work with this project. Lastly, thank you to my fiancé and his unwavering confidence in my ability to finish this degree.

TABLE OF CONTENTS

ACKNOWLEDGEMENTS……V

LIST OF TABLES……...VII

LIST OF FIGURES……VIII

CHAPTER

1. Introduction and Literature Review……...1
2. A Framework for Farm to School Professional Development…….……...12
3. Photovoice Study of The Grow it Know It Teacher Training Program……...50
4. Synthesis and Conclusion……86

APPENDICES

A. Evaluation Survey Instruments (2018-2020)……...99
B. Evaluation Reflection Materials……100
C. Evaluation Spring 2021 Focus Group Guides……...101
D. Evaluation Quantitative Results……103
E. Evaluation Code Book ……..111
F. Study Data Collection Tools……..112
G. Study Quantitative and Qualitative Results……...115

LIST OF TABLES

Page

Table 2.1: Reflection Prompts Used During GIKI Trainings……21

Table 2.2: Examples of KLEW Responses……28

LIST OF FIGURES

Page

Figure 2.1: Timeline of Data Collection……16

Figure 2.2: Photo of a KLEW Prompt: What do I think I **K**now About Teaching Students and/ or Colleagues About the Food Systems?.....20

Figure 2.3: Overall Change in Median Scores from Pre- to Post-Surveys.……...25

Figure 2.4: Participants' Action Plan for their School Garden……..30

Figure 3.1: Change in Confidence: Retrospective Pre & Post-Survey Results…….58

Figure 3.2: Likelihood of Implementation…….59

Figure 3.3: RD PHOTO Reflection of Canned Food Drive……...63

Figure 3.4: JJ PHOTO Reflection of Her Students Working in the Greenhouse.…….64

Figure 3.5: SG Photo of Spanish Heritage Garden……68

Figure 3.6: RE PHOTO Reflection of Her Students Using the String Method to Plant Seed…...69

Figure 3.7: RE PHOTO Reflection of Her Students Harvesting Sweet Potatoes……..75

Figure 3.8: TG PHOTO Reflection of His Students Trying the Corn They Planted in May of 2021……76

CHAPTER 1

Introduction and Literature Review

This thesis examines the impact of farm-to-school (FTS) professional development (PD) on educators' teaching practice through an evaluation and eleven-month Photovoice study of the Grow It Know It (GIKI) teacher training program. This study sought to fill the gap in the literature between the need for FTS PD and understanding of how PD impacts educators' teaching practices, ability to put FTS into practice, and the ability of PD to mitigate barriers of FTS programs. Findings contribute to the growing body of literature regarding FTS program implementation and sustainability.

This thesis proposes two overarching research questions: *What are the components of an effective FTS PD program? How does FTS PD enable educators to put FTS into practice?* Through these research questions I: (1) identify the ways in which the GIKI teacher training pilot program created and sustained an effective FTS professional development program, (2) determine the change in educators' confidence and teaching practice following participation in the GIKI teacher training program, (3) characterize the ways in which educators are incorporating lessons, activities, knowledge, and skills learned at GIKI's teacher training into their classrooms; (4) identify how educators have capitalized on resources, skills, and/or networks presented at teacher training to create, expand, or maintain their FTS program; (5) record teacher-reported student outcomes, and (6) determine what additional resources and professional development educators still need to sustain FTS programs. Based on the results of this thesis, I provide recommendations for future FTS professional development programs.

Literature Review

Many FTS programs connect locally grown foods to schools and create opportunities for students to engage in agriculture and nutrition education through garden- and food- based activities. These programs have the potential to create new markets for local growers and improve student nutrition through education and hands-on learning activities. The FTS model continues to rise in popularity across the United States. The most recent USDA FTS Census (2021) reported 67,369 schools participating in FTS activities during 2019. These programs are reaching almost 43 million students via taste tests, cooking demonstrations, field trips to farms, growing edible school gardens, and serving local foods during school meals (USDA, 2021).

The literature around FTS demonstrates the capacity of such programs to promote experiential learning opportunities that have varied positive outcomes. Such outcomes include nutrition and garden knowledge (Lautenschlager & Smith, 2007), students' willingness to try fruits and vegetables (Bontrager Yoder et al., 2014; Ratcliffe et al., 2011), a positive correlation between intake of fruits and vegetables and academic performance (Berezowitz et al., 2015), increases in student comprehension or academic success (Berezowitz et al., 2015; Carlsson et al., 2016; Williams and Dixon, 2013), social and environmental responsibility (Cutter-Mackenzie, 2009), ethnic tolerance (Lautenschlager & Smith, 2007), an increase in students' pride for their school (Cutter-Mackenzie, 2009), and opportunities for collaborative success (Bisceglia et al., 2020). Educators may seek out FTS programming for the student outcomes previously stated.

Despite the multitude of positive student outcomes, FTS programs themselves are often met with barriers that prevent sustainability or maximizing the program benefits. Each stakeholder – educator, farmer, school food authority (SFA)– can face roadblocks when participating in FTS; however, for the context of this thesis, I will focus on the experiences of

educators and the solutions to barriers they may face, always keeping in mind the crucial partnership between educators, SFAs, and local farmers.

Educators participating in FTS face barriers related to time, specifically time to plan lessons that incorporate FTS while meeting curricular demands and time to use their school garden space (Burt et al., 2018; Thompson & Narciso, 2017). Additionally, educators lack horticulture (Burt, Koch, & Contento, 2017) and nutrition education knowledge (Dunn, et al., 2019) – both major components of FTS – further blocking their ability to implement and sustain programs. Educators participating in FTS need personnel, funding, and physical space to maintain elements of FTS programs – like school gardens – which can be difficult to secure and sustain long term (Burt, et al., 2018; Thompson & Narciso, 2017).

To overcome barriers related to FTS implementation and sustainability, the literature suggests implementing PD for those participating in FTS (Burt, Koch, & Contento, 2017; Thompson & Narciso, 2017). For the purpose of this thesis, PD is defined as "any activity that is intended to partly or primarily to prepare paid staff members for improved performance in present or future roles in the school districts" (Little, 1987, pg. 491). There is a range in which educators may engage in PD. Engagement may be formal or informal experiences that include structured time spent with a mentor, materials given to educators to use in the classroom, or even through self-observation or personal inquiry (Desimone, 2009). Goals of PD include changing a teacher's classroom practice, changing a teacher's attitudes and beliefs, and changing students' learning (Dunn, et al., 2019; Desimone, 2009; Guskey 2002).

In the context of FTS, research suggests that PD has the potential to provide the time necessary for planning lessons, which allows time for garden-based instruction and opportunities to acquire knowledge and skills related to horticulture and nutrition education (Burt, Koch, &

Contento, 2017; Thompson & Narciso, 2017). Additionally, PD may be able to support networking among educators and community members, another need identified by the literature (Burt et al., 2018).

These PD programs have the potential to help educators develop the knowledge and skills necessary to overcome barriers; however, few studies report on the inner workings of these types of programs (Peralta, et al., 2020). The few studies that have done so report a range of PD needs that vary based on educators' personal backgrounds, professional backgrounds, and their experience with FTS (Thompson & Narciso, 2017). In their evaluation of the Georgia Organics Golden Radish Award program, Thompson and Narciso captured PD needs like "creating and sustaining community involvement in F2S", "starting and managing school garden programs", and "developing policies and procedures with F2S language" (2017). To meet the varying degree of support needed, PD should offer a range of activities to support each stage of an educator's involvement in FTS (Thompson & Narciso, 2017).

Program Background

The GIKI program was initiated in 2014 as a partnership between the University of Georgia (UGA), the Clarke County Cooperative Extension Office, and the Clarke County School System. The program aimed to build relationships within the community to create and maintain FTS programs in the school system that emphasize agriculture, nutrition, and sustainability education. In the early stages of the program, Bisceglia investigated the ways in which the school body socially organized around FTS programming (Bisceglia, 2018). Bisceglia found positive associations among students and their learning outcomes, success in the classroom, ability to work with peers, and relationships across racial and economic differences. In addition to student impacts, this study identified the need for FTS professional development to fill the gap between

educators' interest in FTS and their need for basic horticulture, nutrition, and other food, agriculture, natural resources, human (FANH) topics.

In 2018, the GIKI team was awarded a USDA grant to develop a pilot program that would fill the gap between educators' interest in FTS and the skills necessary to create, implement, and sustain a program. This program was supported by a host of key players, each offering a unique skillset. The GIKI team represented various departments at the University of Georgia, including Crop and Soil Sciences, Educational Theory and Practice, Horticulture, and the Office of Service Learning, which also housed an AmeriCorps VISTA program in support of GIKI.

The GIKI teacher training program identified two long-term goals: 1) develop a model for a sustainable food, agriculture, natural resources, and human (FANH) education program that builds on local resources and is applicable to other counties, and 2) create a positive impact on the long-term sustainability of food systems by improving student nutrition. To successfully meet the program's goals, GIKI identified five objectives: 1) develop and pilot a professional development program, 2) conduct ongoing formative assessments for the pilot programs' overall improvement and success, 3) engage community members and organizations to create a resilient community of practice that will sustain the program past the grant cycle, 4) based on the evaluation of the pilot program, create a toolkit for dissemination throughout the Southeast via Cooperative Extension, and 5) conduct a summative evaluation of student learning outcomes and GIKI team experiences with both the district-level trainings and school level intensive consultations.

Using the Clarke County program as a model, the teacher training program partnered with Barrow County to pilot the training program. Barrow County was chosen on account of its

strong agricultural heritage and existing FTS network between the Barrow County Cooperative Extension Office, Barrow County School Nutrition Department, Barrow County School System, and the Wimberly Center for Community Development (Wimberly Roots). Existing partnerships between the school system and community organizations were advantageous to the planning and recruitment of the program. Once the partnership with GIKI and Barrow County was established, the Barrow County ANR (Agriculture and Natural Resource) Agent, Alicia Holloway, played a critical role in supporting the development of the pilot program.

Through the partnership with Barrow County School System, GIKI piloted district level PD between 2018 and 2020. The pilot program hosted two intensive three-day summer trainings and four one-day trainings during the fall and spring semesters. To provide ongoing professional development each month, GIKI supported existing FTS programs in Barrow County – the FTS Boosters Club and the School Garden Association. In addition, the pilot program offered yearlong, school-level support through "mini grants," which provided financial and personnel support to two schools each year of the grant cycle. Following the pause of in-person activities due to COVID-19, trainings resumed in the summer of 2021.

Author Positionality

I came to this research with an undergraduate degree in natural resources, recreation, and tourism, and following graduation, I worked as a naturalist at a state park in Winder, GA – in Barrow County. During this time, I worked alongside various community members (including Alicia Holloway, the Barrow County ANR agent) to preserve the history of the park and local environment through various environmental education (EE) programs. Following my time in this position, I accepted a year of service with the GIKI program as an AmeriCorps VISTA (Volunteer in Service to America) in Clarke County. During this year of service my

understanding of EE programs expanded to include agriculture, food systems, and nutrition education. Working with GIKI revealed the importance of incorporating EE-style programs into schools as it gave students the opportunity to engage in hands-on, real-life learning experiences and connected them to their food in an entirely different way than I had ever experienced before.

I worked with many educators during my year with GIKI. Some educators had even worked as AmeriCorps VISTAs in previous years or had participated in the GIKI training at least once, while others had no experience at all. Many educators were interested in their students working in the garden; however, it could be difficult to do, even when they had previous experience with FTS programs or gardening in general.

Following my year with GIKI, I was accepted into a graduate program and awarded an assistantship with the GIKI teacher training program. During my first year of graduate school, I had the opportunity to do an independent study to comb through the GIKI teacher training data and literature around FTS programs. My time spent sifting through FTS literature and familiarity with the GIKI program raised a few questions: How is FTS PD such as GIKI implemented in educators' classrooms? How does GIKI's model help educators overcome challenges? And, how can PD help educators overcome barriers within schools? These questions have guided my interest and work in this research.

During the second year of my master's program, I worked directly with the GIKI teacher training program. I worked with personnel to plan and organize the Summer 2021, Spring 2022, and Summer 2022 training schedules, managed registration, and led activities as needed. If working as a VISTA in the schools did not make me a strong believer in the GIKI program, or FTS programming in general, this surely did. During this time, I had the opportunity to observe participants, which provided context for much of the data collected for the evaluation of the pilot

program. While taking on an active role gave me greater access to the inner workings of the GIKI program, it may have limited may view as I may have developed preconceived notions about the program. Potential bias towards the program was reduced by working with other researchers such as Dr.'s Jennifer Jo Thompson and Gary T Green. Additionally, triangulating data validates the evidence of the results of this thesis. Triangulation was done by collecting multiple forms of evidence through multiple data points. For example, in the evaluation I collected pre- and post-surveys, participants' reflection materials, and conducted semi structured focus groups.

Purpose

This thesis consists of two studies: (1) an evaluation of the USDA-funded GIKI teacher training pilot program, and (2) a longitudinal Photovoice (Wang & Burris 1997) study to understand the role of PD in alleviating FTS program barriers and enhancing educators' ability to put FTS PD into practice. Chapter Two evaluates the USDA-funded GIKI teacher training pilot program to (1) summarize the program's accomplishments, (2) report on the impacts of the program on filling the gap between educators' interest in FTS and their need for FTS PD, and (3) explore the framework of the pilot program as an effective PD model. I conclude this section with recommendations for future FTS PD programs.

Chapter Three reports on a "post-intervention" study that observed seven GIKI teacher training participants over the 2021/22 school year to assess the long-term impact of the training. Using Photovoice methodology (Wang & Burris 1997) and a retrospective survey, I report the following: (1) the change in participants' confidence regarding FTS topics, (2) what activities and lessons they are incorporating into their teaching practice, (3) the networks they used to

sustain their programs, (4) teacher-reported student impacts, and (5) persistent barriers following their participation in the GIKI teacher training program.

I conclude this thesis by synthesizing the results of the evaluation of the GIKI teacher training pilot program (chapter 2) and the post-intervention study (chapter 3). Based on the results, I provide recommendations for future FTS PD programs and add to the growing body of literature that seeks to identify strategies to further support and sustain FTS programs.

Literature cited

Berezowitz, C. K., Bontrager Yoder, A. B., & Schoeller, D. A. (2015). School Gardens Enhance Academic Performance and Dietary Outcomes in Children. *Journal of School Health*, *85*(8), 508–518. https://doi.org/10.1111/josh.12278

Bisceglia, A., Hauver, J., Berle, D., & Thompson, J. J. (2020). How the collaborative work of farm to school can disrupt neoliberalism in public schools. *Agriculture and Human Values*. https://doi.org/10.1007/s10460-020-10128-3

Bontrager Yoder, A. B., Liebhart, J., McCarty, D., Meinen, A., Schoeller, D., Vargas, C., & LaRowe, T. (2014). Farm to Elementary School Programming Increases to Fruits and Vegetables and Increases Their Consumption Among Those With Low Intake. *Journal of Nutrition Education and Behavior*, *46*(5), 341–349.

Burt, K. G., & Koch, P. (2017). *Gardens by integrating the curriculum*. *4*(5), 427–435.

Burt, K. G., Luesse, H. B., Rakoff, J., Ventura, A., & Burgermaster, M. (2018). School gardens in the United States: Current barriers to integration and sustainability. *American Journal of Public Health*, *108*(11), 1543–1549. https://doi.org/10.2105/AJPH.2018.304674

Carlsson, L., Williams, P. L., Hayes-Conroy, J. S., Lordly, D., & Callaghan, E. (2016). School gardens: Cultivating food security in Nova Scotia public schools? *Canadian Journal of Dietetic Practice and Research*, *77*(3), 119–124. https://doi.org/10.3148/cjdpr-2015-051

Cutter-Mackenzie, A. (2009). Multicultural school gardens: Creating engaging garden spaces in learning about language, culture, and environment. *Canadian Journal of Environmental Education*, *14*(1), 122-135.

Desimone, L. M. (2009). Improving impact studies of teachers' professional development: Toward better conceptualizations and measures. *Educational Researcher*, *38*(3), 181–199. https://doi.org/10.3102/0013189X08331140

Dunn, C. G., Burgermaster, M., Adams, A., Koch, P., Adintori, P. A., & Stage, V. C. (2019). A systematic review and content analysis of classroom teacher professional development in nutrition education programs. *Advances in Nutrition*, *10*(2), 351–359. https://doi.org/10.1093/advances/nmy075

Guskey, T. R. (2002). Professional development and teacher change. *Teachers and Teaching: Theory and Practice*, *8*(3), 381–391. https://doi.org/10.1080/135406002100000512

Lautenschlager, L., & Smith, C. (2007). Beliefs, knowledge, and values held by inner-city youth about gardening, nutrition, and cooking. *Agriculture and Human Values*, *24*(2), 245-258.

Little, J. W. (1987). Teachers as colleagues. In V. Richardson-Koehler (Ed.), *Educators' handbook: A research perspective* (pp. 491–518). New York: Longman.

Peralta, L. R., Werkhoven, T., Cotton, W. G., & Dudley, D. A. (2020). Professional development for elementary school teachers in nutrition education: A content synthesis of 23 initiatives. *Health Behavior and Policy Review*, *7*(5), 374–396. https://doi.org/10.14485/HBPR.7.5.1

Ratcliffe, M. M., Merrigan, K. A., Rogers, B. L., & Goldberg, J. P. (2011). The Effects of School Garden Experiences on Middle School-Aged Students' Knowledge, Attitudes, and Behaviors Associated With Vegetable Consumption. *Health Promotion Practice*, *12*(1), 36–43. https://doi.org/10.1177/1524839909349182

Thompson, J. J., Ph, D., & Narciso, M. (2017). *Georgia Organics Farm To School Evaluation*.

USDA (2021). *Farm to School Census Results Overview*. USDA Farm to School Census. Retrieved October 15, 2022, from https://farmtoschoolcensus.fns.usda.gov/census-results-overview

Wang, Caroline, Burris, M. A. (1997). *Photovoice: Concept, Methodology, and Use for Participatory Needs Assessment* (pp. 369–387). Health Education and Behavior.

CHAPTER 2

A Framework for Farm to School Professional Development

Introduction

Farm-to-school (FTS) connects students to local, nutritious foods through partnerships with local farmers, taste tests, and edible school gardens. Studies have found that FTS programs can have positive student outcomes such as increased willingness to try fruits and vegetables as well as a potential for increased learning outcomes (Berezowitz et al., 2015Bontrager Yoder et al., 2014; Ratcliffe et al., 2011). Though popular, FTS programs face many barriers to integration such as educators' lack of knowledge around horticulture and nutrition education, time to plan and integrate a school garden, and personnel to support a school garden programs (Burt et al., 2018; Burt, Koch, & Contento, 2017; Dunn, et al., 2019; Thompson and Narciso, 2017). The current literature suggests professional development (PD) to overcome barriers like the ones described above.

In this chapter I present the evaluation of the USDA-funded Grow It Know It (GIKI) Teacher Training Pilot Program. Results of this evaluation will explore the impact of the GIKI program on educators' ability to overcome barriers related to FTS and the programs' effectiveness as a FTS PD program. Based on the results of the evaluation, I discuss the key components of the program that make it an effective and sustainable model for future FTS PD programs.

Literature Review

The most recent United States Department of Agriculture (USDA) (2021) FTS census indicates that in 2019, 34% of schools had an edible garden and that 20.9% use edible gardens for educational purposes. Studies have found that FTS programs can impact students' willingness to try new fruits and vegetables (Bontrager Yoder et al., 2014; Ratcliffe et al., 2011) and academic performance (Berezowitz et al., 2015; Carlsson et al., 2016; Williams and Dixon, 2013). While FTS programs have been shown to yield positive results, they are often met with barriers that prevent their long-term sustainability, such as limits on funding, personnel, time to plan and incorporate lessons (Burt et al., 2018; Thompson & Narciso, 2017), and basic horticulture and nutrition education knowledge (Dunn, et al., 2019). Researchers suggest engaging educators in professional development (PD) may help overcome these barriers (Burt, Koch, & Contento, 2017; Thompson & Narciso, 2017).

Professional development is defined as "any activity that is intended to partly or primarily prepare paid staff members for improved performance in present or future roles in the school districts" (Little, 1987, pg. 491). PD ranges from formal to informal experiences that include structured time spent with a mentor, materials given to educators to use in the classroom, or even self-observation or personal inquiry (Desimone, 2009). Goals of PD include improving or maintaining a teacher's classroom practice, their attitudes, and beliefs, as well as their students' learning (Dunn, et al., 2019; Desimone, 2009; Guskey 2002).

In the context of FTS, research suggests PD is critical for a school garden program to fully integrate into a school's culture (Burt, Koch, Contento, 2017). Engaging in PD sets aside time for educators to develop curricular connection and learn new knowledge and skills related to horticulture and nutrition (Burt & Koch, 2018). Additionally, PD may be able to support

networking among educators and community members—another identified need for educators engaging in FTS (Burt et al., 2018; Burt, Koch, Contento, 2017; Thompson & Narciso, 2017). Though FTS PD can support educators as they engage in FTS, there are few studies that provide detailed assessments of PD interventions, which limits our understanding of educators' function in creating positive student outcomes (Peralta, 2020).

Background

Grow It Know It (GIKI) is a USDA-funded FTS teacher training pilot program. The long-term goal of this program was to develop a model for a sustainable food, agriculture, natural resources, and human (FANH) education program that builds on local resources and is applicable to other counties, with a secondary goal of creating a positive impact on long-term sustainability of food systems by improving student nutrition. To successfully meet the program's goals, GIKI applied five objectives: 1) Develop and pilot a professional development program; 2) Conduct ongoing formative assessments for the pilot programs' overall improvement and success; 3) Engage community members and organizations to create a resilient community of practice that will sustain the program past the grant cycle; 4) Based on the evaluation of the pilot program, create a toolkit for dissemination throughout the Southeast via Cooperative Extension; And, 5) Conduct a summative evaluation of student learning outcomes and GIKI team experiences with both the district-level trainings and school-level intensive consultations. The summative evaluation presented here examined three key questions regarding the GIKI teacher training pilot program: *(1) In what ways did the GIKI teacher training pilot program create and sustain an effective FTS professional development program? (2) What student learning outcomes were documented during the grant cycle? (3) How can future FTS professional development programs support educators engaging in FTS?*

Between 2018 and 2020, The pilot program hosted two intensive three-day summer trainings and four intensive one-day trainings during the fall and spring semesters. The program modeled a "one size does not fit all" approach. Through experiential learning, GIKI supplied basic knowledge and skills related to garden- and food-based learning and created time for participants to reflect and integrate their new knowledge and skills into their respective programs. This approach gave participants the freedom to create a program that worked for them, their available resources, and their school's culture. The GIKI program provided ongoing professional development each month by supporting existing FTS programs in the pilot county – the FTS Boosters Club and the School Garden Association. In addition, the pilot program offered yearlong, school-level support through "mini grants," which provided financial and personnel support to two schools during each year of the grant cycle. After pausing in-person trainings in 2020 due to COVID-19, intensive summer trainings resumed in 2021. This evaluation focuses on program activities held between 2018-2020.

Methods

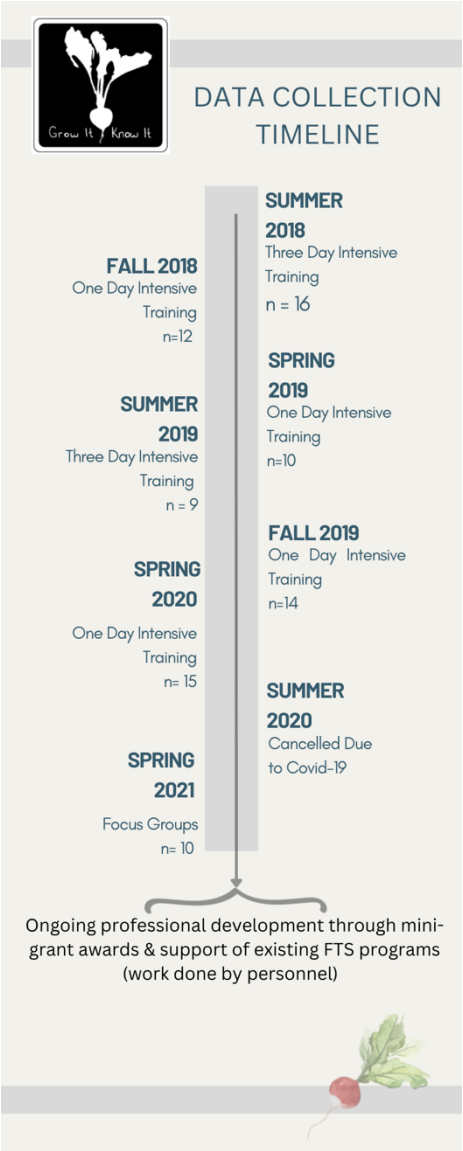

Figure 2.1 Timeline of Data Collection

In the next section I present the data collected throughout the two years of the pilot program (Fig 2.1) and the analysis of said data. The *Methods and Analysis* consists of five sections: Survey Data, Reflection Activities, Focus Groups, Supplemental Data, and Recruitment. Multiple sources of data were collected to triangulate the findings, and validate the results of the analysis. Figure 2.1 illustrates the timeline of data collection and sample sizes from

each training. Additionally, this figure illuminates the ongoing work and data collected from GIKI personnel (i.e., the program coordinator and AmeriCorps VISTA).

Surveys – Training Outcomes & Quality

Pre- and post-training surveys were created to provide a formative evaluation of the pilot program. Each pre-survey included a Training Outcomes section that asked participants to self-report their confidence regarding training topics and to assess their FTS program goals. Post-surveys included the same section plus a Training Quality section, which asked participants to rate each training session and identify which sessions were most helpful to them and their program's goals. Survey questions reflected the topics covered during the training.

A four-point forced Likert scale was used to measure the change in participants' confidence regarding each training topic. A forced Likert scale does not contain a neutral point, which forces the participant to form an opinion. The scale included: 1 (*not confident at all*), 2 (*somewhat confident*), 3 (*confident*), and 4 (*very confident*). Short answer responses were used to capture changes in participants' FTS goals and current support for their FTS programs. Short answer prompts asked, "(Pre) What are your goals for farm-to-school activities (including school gardens) this year? (Post) Have your goals for farm-to-school changed? And if so, how?" Training quality also used a four-point forced Likert scale to determine how helpful each training session was. The scale included: 1 (*not helpful at all*), 2 (*somewhat helpful*), 3 (*helpful)*, and 4 *(very helpful*). In a short answer format, participants were asked to identify their top two to three sessions from the training and explain why those sessions were most helpful to them. Finally, the survey provided a short answer space for participants to add additional comments about the training.

Pre-surveys were distributed at the three-day intensive summer training (June 2018 and 2019) and one-day fall (October 2019) training. Post-surveys were administered after the three-day summer (June) 2018 and 2019, one-day fall (October) 2018 and 2019, and one-day spring (February) 2019 and 2020 trainings. When planning the training, the GIKI team expected to enroll a cohort of participants for the entire school year to attend a three-day summer training and the subsequent one-day fall and spring trainings. However, there were shifts in participant attendance from summer to fall and spring, with many summer training participants sending colleagues to the fall and spring trainings or returning the following year. As such, the pre-/post-survey data were not always collected with the same participants. GIKI also added a pre-survey in Fall 2019 to capture the baseline of these participants.

Quantitative and qualitative data from surveys were analyzed separately. Qualitative data were transcribed and uploaded into Atlas.ti version 9.1.1 (Scientific Software Development GmbH), a qualitative analysis tool used to organize and index themes in the data. Data were then analyzed using a Framework Analysis approach, which includes five steps: familiarization, identifying a thematic framework, indexing the data, charting the data, and interpreting the data (Ritchie & Spencer, 2003). The thematic framework was structured to reflect the grant narrative and current FTS literature (Appendix E). Themes included: training quality, training outcomes, building partnerships, resources, student outcomes, and program sustainability. Following the discovery of literature around educator PD program, the framework was refined to include participants' change in farm-to-school goals and effective professional development. Data were then indexed, or grouped, into corresponding themes. Then, themes were charted, summarized, and prepared for interpretation.

Quantitative data were uploaded into IBM SPSS version 28.0 (IBM), a statistical analysis software platform. Due to shifting attendance and topics covered at each training, there were inconsistencies in the pre- and post-surveys, which limited the number of items include in the statistical analysis. Data analysis included descriptive statistics of all surveys. Further, given small and variable sample sizes across trainings, a Wilcoxon Signed Rank Test was used to analyze participants' change in confidence before and after attending the three-day intensive training programs. The same test was used to compare changes in confidence between the summer training pre-survey and the subsequent fall and spring training post-surveys. The Wilcoxon Signed Rank Test is a non-parametric test broadly analogous to a repeated measures t-test (Pallant, 2020). This test is designed for repeated measures, but rather than comparing the means it converts the scores into ranks and compares them at two points in time (pre and post training) (Pallant, 2020).

Reflection Materials – KLEW, Discussion Prompts, Flip Grid

Materials created during the training sessions provide deeper insight into what participants were learning and how they planned to apply that knowledge in their classroom. These materials include reflective discussion prompts, video recordings, and gallery walks. Discussion prompts were used to facilitate team building among school garden members, as we as allow participants to reflect on what they were learning and their program goals. The most frequently used prompt, referred to as KLEW (Fig 2.2), was used to provoke participants' reflection before and after each session topic:

What do you think you **K**now? What did you **L**earn? What is the **E**vidence you are learning it? What are you still **W**ondering? (KLEW)

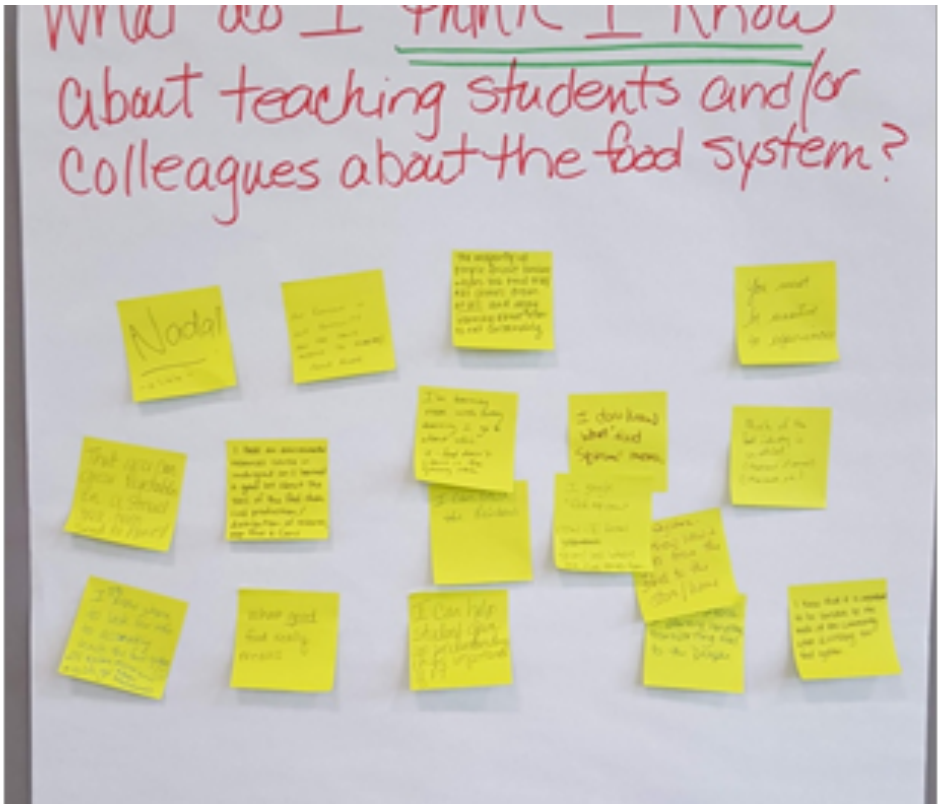

*Figure 2.2 Photo of a KLEW Prompt: What do I think I **K**now About Teaching Students and/ or Colleagues About the Food Systems?*

The KLEW prompts encouraged teachers to reflect on their previous knowledge and experience with FTS at the beginning of each training day; then, at the end of the day, the KLEW prompts asked them to reflect on what they learned at the training, the evidence of that learning, and what they still needed to learn to accomplish their FTS goals. Using KLEW evokes a pre/post style reflection throughout the day and is familiar to many educators who use this teaching prompt (or a variation of it) in their classroom settings.

In addition to KLEW, other prompts were used during the training. These prompts were used to plan program goals, integrate what they were learning, and determine the "bridges" needed to overcome barriers associated with both their goals and FTS teams (Table 2.1).

Training material data were analyzed along with other qualitative data collected during this project (pre/post-surveys, focus groups, and supplemental material). Data were transcribed and uploaded into Atlas.ti for analysis using the same thematic framework as described above.

Table 2.1 Reflection Prompts Used During GIKI Trainings.

Training	Prompt
Summer 2018 **Fall 2018**	"What was your biggest take away from the training? How will this change the way you teach?" "How will it change the way you work with your students and colleagues?" "Garden goals: short term" "Garden goals: Long term" "Marching Orders" (Your next steps or actions to meet these goals)
Spring 2019	"Where are you in the process of putting together a team?" "What are the barriers within your school to making this happen?" "What are the bridges that allow us to jump across the barriers?" "Marching Orders" (Your next steps or actions to meet these goals)

Focus Groups

Focus group discussions were used to capture teacher-reported student outcomes. Semi-structured focus group guides were used to lead discussions; however, participants were encouraged to pursue conversations regarding issues or topics that interested them. Participants

that attended more than one training workshop between 2018-2020 were invited to one of three focus group sessions in Spring 2021. Ten participants met with the grant PI and the GRA for 60-90 minutes via Zoom to discuss their experiences. Focus groups were audio recorded and auto transcribed within the Zoom platform. To thank participants for their time, a gift card to a coffee shop of their choice was mailed to them following their participation in the focus group.

Focus group data were analyzed along with other qualitative data collected during this project (pre/post-surveys, training materials, and supplemental material). Data were transcribed and uploaded into Atlas.ti for analysis using the same thematic framework as described in the previous section.

Supplemental Data – AmeriCorps VISTA and Cooperative Extension Reports

Additional data were recorded throughout the grant cycle by various personnel. The program coordinator provided written reflections at various points throughout the grant; however, reporting was inconsistent due to time constraints. AmeriCorps VISTAs assigned to work with several schools as part of this project were required to report their impacts and workplace responsibilities to the AmeriCorps network each month and each quarter. Data captured the number of student interactions, number of new programs created, and number of new activities each month. Their monthly and quarterly written reflections provided detailed descriptions of the data they reported. Additionally, written reflections described their relationships with program partners (i.e. local organizations supporting FTS), educators, and students. Supplemental data were analyzed in Atlast.ti along with the other qualitative data collected during this project (pre/post-surveys, training materials, and focus groups).

Participant Recruitment

In 2018, the Barrow County Cooperative Extension Agent recruited K12 educators from Barrow County to participate in the 2018-2019 pilot program. The following year, recruitment spread to the greater Clarke County area. As part of the training, participants received financial incentives to support their farm-to-school programs. In 2018, $200 was allotted to each participating school group to put towards garden supplies and materials for their FTS programs. In 2019, each participating teacher was awarded $200 to use at their discretion.

Training participants were also encouraged to apply for a year-long mini-grant. Mini-grant sites received weekly consultations with the GIKI Training program coordinator, the AmeriCorps VISTAs, and other partners at the University of Georgia. Both the program coordinator and AmeriCorps VISTA worked with the FTS teams at each school to develop activities and lessons, provide ongoing PD to teachers and staff, facilitate garden workdays, and create networks within the school community to sustain the FTS program. University partners spent approximately eight hours each week working with teachers and staff to incorporate FANH into their lessons and professional learning plans.

Mini-grant sites were selected based on the following criteria: participation in the training program, an existing or emerging FTS team, and strong administrative support for FTS. In total, six schools applied for the grant between 2018-2019 and three schools were awarded the grant along with a grant totaling $12,000 to fund their FTS goals.

Results

The results section begins by reviewing recruitment numbers. The following sections explore the results of the pre-/post-surveys, reflection materials produced during the training, a post- training focus group with participants, and materials provided by key players.

Between 2018-2020, the GIKI teacher training pilot program hosted 76 participants, including 51 unduplicated individuals. Participants included 44 elementary, middle, and high school teachers, 3 nutrition staff, 1 bus driver who was also a local farmer, 1 administrative assistant, and 2 informal educators (an educator who does not work in a school setting such as an educator at a local community center). In total, participants committed between 8 and 48 hours towards their professional development by attending the GIKI teacher training pilot program, adding up to a total of 1,008 hours between June 2018 and February 2020.

Surveys – Training Outcomes

In the summer 2018 and 2019 pre-surveys, participants reported an overall median score of 2 (*Somewhat Confident*) across topic areas. Post-survey scores increased to median scores of 3 (*Confident*) and 4 (*Very Confident*). Results of the Wilcoxon Signed Rank Test indicated that participants' confidence significantly changed across seven of the eleven topics presented at the intensive three-day summer trainings. Those seven topics included: planning garden spaces, starting seeds and transplants, soil health, building garden structures, food safety in the garden, overall garden management, and teaching the structure of the food system. There was no significant change in confidence in the following topic areas: using the garden space to teach the required curriculum, incorporating farm-to-school in the cafeteria, teaching others about food insecurity, and teaching about health and nutrition. All quantitative results can be found in Appendix D.

Five additional sessions from the summer 2018 and 2019 pre-surveys were compared to the fall 2018 and 2019 and spring 2019 and 2020 post-survey results. Median scores from these five sessions increased from 1 (*Not Confident at All*) and 2 (*Somewhat Confident*), to 3 (*Confident*) and 4 (*Very Confident*). Based on the Wilcoxon Signed Rank Test, only two sessions

had a significant change in confidence: “Troubleshooting plant disease and insect issues” and “Creating a Summer Care Plan for your School Garden” (Appendix D).

When I examined the pre and post scores for each training session on their own (i.e. Summer 2018, , Fall 2018, etc.), there was an overall positive change in participants confidence regarding FTS related topics. This trend can be observed in Figure 2.3. For example, in the summer of 2018 participants median pre-survey score was a 3 (Confident) and their post-survey median score increased by a half.

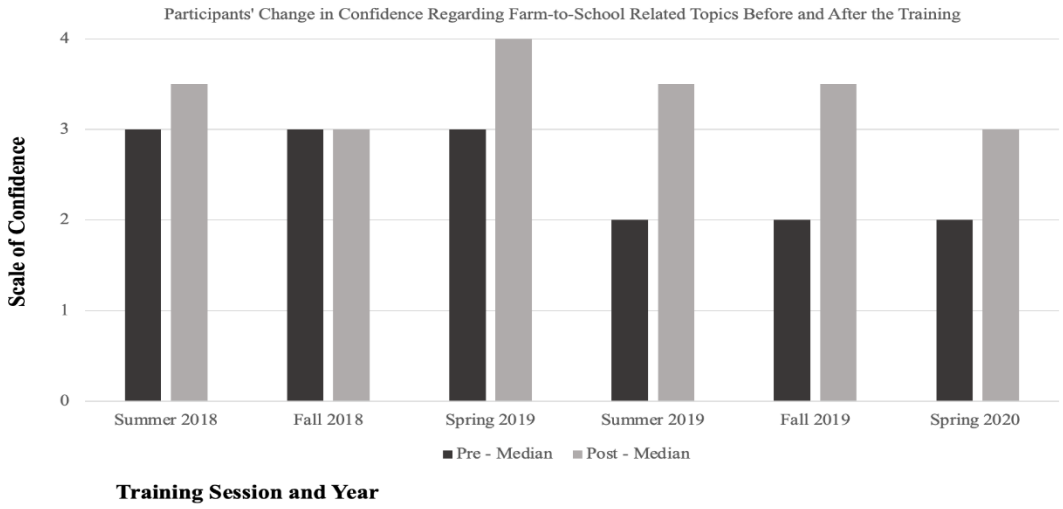

Figure 2.3 Overall Change in Median Scores from Pre- to Post-Surveys

In post-survey short answer responses, many participants expressed that attending the training evolved their initial goals for FTS to be more obtainable or concrete, although many failed to share how their goals had evolved. For example, in their pre-survey, one participant shared that their goal was to create a teaching garden. In their post-survey response, they were able to acknowledge that their goals had become, “… defined and achievable.”

When participants did share details regarding their change in goals, three major themes emerged: 1) goals centered around school-wide participation, 2) goals centered around a school garden, and 3) goals centered around connecting FTS-related activities to their curriculum or classroom.

Examples of these goals in post-survey responses include:

> *School-wide participation*: "I will be working on lesson plans to help other teachers get involved" (Summer 2018).
>
> *School gardens*: "I have many more goals now than when I started three days ago. Now, it is not just about getting our gardens started and producing vegetables, I want to contribute to a sustainable food system within our school. Let's start composting!" (Summer 2019).
>
> *Classroom and curriculum*: "Adding lessons for the core academic teachers on how they can use the garden with their classes" (Summer 2018).

School-wide participation tends to overlap with goals around school gardens and classroom curriculum. When participants described their goals with a focus on the school garden, they also described serving produce in the cafeteria or doing taste tests in the cafeteria, which involves more than just their classroom. One participant shared, "I want to increase the amount of produce we harvest for use in the school cafeteria and FCS classes" (Spring 2019). Similarly, when participants shared goals focused on curriculum/classroom connections, they also included actions to get others at their school involved. A participant shared, "my goals have shifted...A school garden can have such a tremendous impact on the school as a whole and is something that I hope to have the entire school involved in; not just a specific class" (Summer 2018).

Overall, the results of the pre- and post-surveys indicate an increase in participants' confidence regarding topics needed to create and sustain an FTS program. Additionally, the training program offered participants time to reflect and refine their program goals.

Surveys – Training Quality

Of the seventeen sessions that were rated in the training quality section of 2018-2020 post-surveys, all but one was given a median score of 4 (*Very Helpful*). The training Session "Food Safety" was given a median score of 3 (*Helpful)*.

Post-survey short answer responses revealed that the most helpful training sessions incorporated a "hands-on" approach and could be directly applied to their program following the training. For example, one participant claimed that the sessions they had chosen were most helpful because they could be "easily adapted to [a] classroom setting" (Spring, 2020). Another participant noted that they chose their highest-rated sessions because they were "most relevant to teaching kindergarten and had the most realistic and real-life information…" (Summer 2018).

During the training, participants used power tools, built raised beds, and installed an irrigation system. This hands-on experience provided the knowledge and skills necessary to build garden structures and increased participants' confidence to do this on their own and with their students. In reflection materials participants shared the significance of experiential learning on their ability to engage in food-related activities like making pickles quickly (i.e. "quickles"): "I am a hands-on learner and now feel confident making 'quickles'" (Spring 2020).

In addition, GIKI incorporated field trips to schools that were successful school garden models. Several participants specifically commented on the way that visiting and working in another school's garden gave participants a deeper understanding of the processes and techniques

that the GIKI team presented on. Their comments included: “We were out doing things, not just sitting and watching power points” (Summer 2018) and “Touring the school helped map out a plan for [my school]” (Summer 2018).

Reflection Materials

Reflection materials provided three key pieces of information: (1) what our participants were learning from the training and the evidence for it, (2) details regarding their program goals and objectives to meet those goals, and (3) persisting gaps in participants' knowledge and barriers they face. Notably, results of reflection materials contextualize the post-survey results and evidence to support the impact of experiential learning and reflection on educator PD.

Through reflection activities such as KLEW, the GIKI team encouraged participants to reflect on their past knowledge and new information they were learning from the training. This gave participants the opportunity to see their growth and have evidence of it. Participants shared that they learned new skills related to horticulture, cooking, and resources available in their community. Examples of KLEW responses can be found in Table 2.2.

Table 2.2 Examples of KLEW Responses

K What do I think I **K**NOW?	**L** What am I **L**EARNING?	**E** What is the **E**VIDENCE I am learning?	**W** What am I still **W**ONDERING?
I think I know how to properly wash and prepare veggies.	I learned how to prepare delicious meals using veggies from the garden	We went through the motions of harvesting and washing produce.	I wonder how to convince the cafeteria staff to serve the food we grow?
You can’t plant [your crops] in only compost.	Ratio of compost to top soil in raised bed is 25% compost to 75% top soil.	The compost song that [GIKI] taught us.	How to have the brown materials ready on-hand for proper compost ratio?

Notably, when prompted for evidence ("What is the **E**vidence you are learning?"), most responded with examples of hands-on activities held during the training. Responses include:

- "[I] actually put an irrigation system together" (Summer 2019).
- "We tried activities that students would do to learn about soil" (Summer 2019).
- "We made the tacos and ate them!" (Summer 2019).

In other reflection materials, participants shared the ways in which the GIKI program helped them identify a community of support that extends beyond their school to include other schools and organizations in their county and beyond. A participant shared,

> My biggest takeaway from this...working with the other teachers, I would like to have a kind of community of resources that we have here that we can go to and ask other friends and coworkers at the other schools, not just within [my school] but I can go to other teachers now and ask how they're doing things...I feel like I can go to the Grow It Know It [team] and ask them if I'm having a problem with something... (Summer 2018).

In addition to KLEW, other reflection activities created time for planning and integrating the training materials. These activities prompted participants to share their short-term goals, long term goals, and action steps, which resulted in detailed descriptions of participants' goals and objectives (Figure 2.4). In developing one school's action plan, participants identified specific goals and then designated "who, what, and when" regarding each step. For example, their plan included this specific goal: "What: Building + prepping beds - clearing bed 1, build bed 2, sheet mulch beds and pollinator beds. When: early mid- August. Who: Volunteer team of teachers, parents, and students" (Summer 2019). Another group shares,

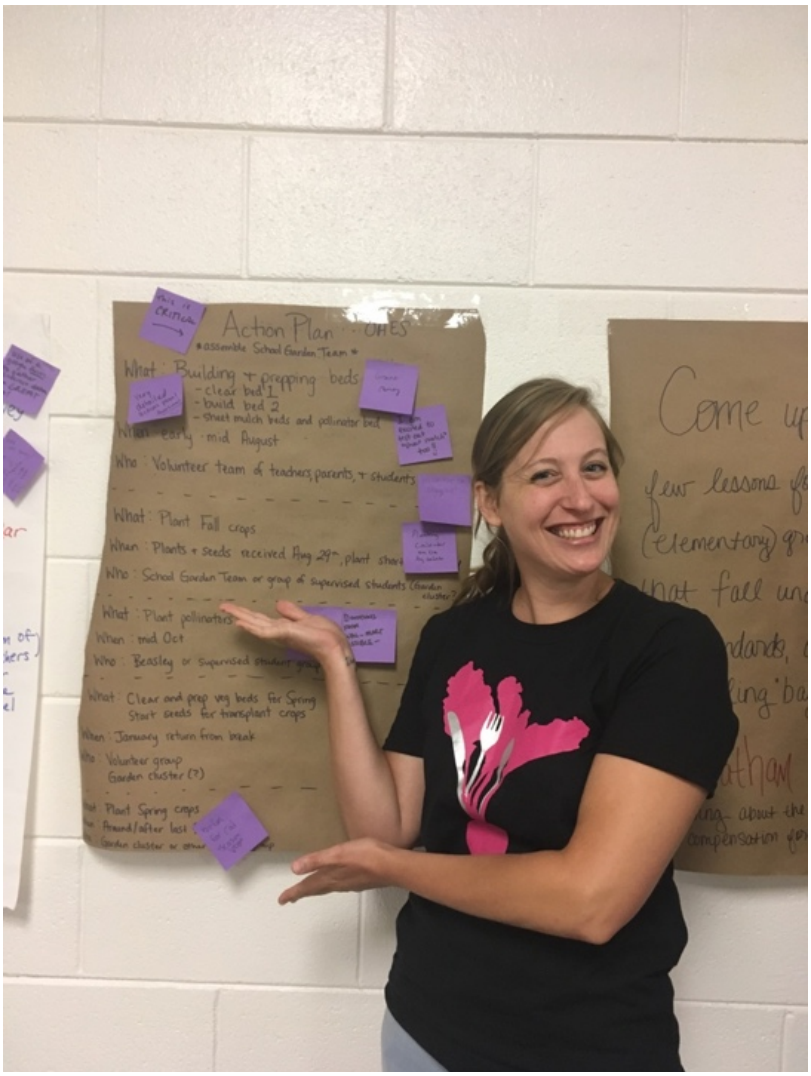

Figure 2.4 Participant's Action Plan for Their School Garden.

> Create awesome garden committee! (adapt lessons). Order seeds and irrigation supplies. Set up work/ planting day (ROTC kids need volunteer hours). Oct. 5th order beds supplies (7 new 4x4 + 2 trellis beds). November work day (build beds)… (Summer 2018).

Lastly, reflection materials revealed persistent gaps in participants' knowledge and barriers they faced. When the KLEW protocol asked participants to share out what they were "wondering" after learning about each training topic their responses revealed areas to focus on in future trainings, but also barriers such as support from their school community:

- "How I can use the garden in my physical science classroom" (Summer 2018).
- "How to get admin[istration] on board" (Summer 2018).
- "How to have enough help in the garden - maintaining it" (Summer 2019).
- "I wonder how to convince the cafeteria staff to serve the food we grow" (Summer 2019).

When reflection materials explicitly asked, "What are the barriers within your school to making [an FTS team] happen?" participants' responses emphasized the difficulties of recruiting others to participate in FTS when they are already asked to do so much. One participant shared that their challenge to recruiting team members was due to a lack of motivation, "Intrinsic motivation among team members to go the 'extra mile'" (Spring 2019). Others explained that most of their colleagues already engaged in extracurricular activities and that there was no financial compensation for participating. One shared, "It is one more thing on the list they want us to do. It is not in our curriculum" (Spring 2019). Another clarified, "Everyone is already over extended. Participation does not come with a stipend" (Spring 2019).

Focus Groups

Focus groups revealed positive, teacher-reported student outcomes. Participants shared stories of students becoming more confident in the classroom and sharing their own agriculture experiences. One participant explained, "If I would ever ask questions or show interest, [these students] would just kind of shut down, 'yes' or 'no' answers…but last year, I felt like the kids who did have backyard chickens or a garden where they're growing tomatoes…they were so much more willing to talk about it and share it and be proud of it" (FG 3.11, P45). Another participant shared, "the kids would tell me a lot about 'Oh, this is what I grow at home' or 'this is what my grandma grows' or 'that you know my dad said growing up, he used to do such and such'" (FG 3.11, P59).

Others shared activities that took place in the garden that created opportunities for student ownership and pride in their work. One participant described how her "Green Team" students grew carrots in the garden and were able to serve them in the cafeteria. She shared, "…one year we got just a bumpin' crop of carrots…and our cafeteria manager and staff were really supportive and cooked up the carrots and they put a little label on the line like, "try these carrots they were grown here at school by the Green Team." The kids were excited…[they] were so proud of that…" (FG 3.11, P59). This activity demonstrated the pride that comes from growing, caring, and serving produce grown in the school garden, as well as the importance of having the support of the school cafeteria.

An FTS team from one school shared an example of the garden positively impacting one of their student's interest in school. The team explained that this student had very little concern for her schoolwork and would often do-nothing during class time. They also shared, "we had this one little girl that just…was not into school, certainly not into anything academic, but the garden spoke to her. She loved the garden…I went to her house to deliver some stuff because she didn't

get her stuff on the last day of school and she had taken a tire that was broken from her parent's car, filled it up with dirt, and started planting tomato plants in it. She said, "I figured out what I needed." I'm telling you this kid did nothing at school, but she took away how to build a garden" (FG 4.22, P32). The team went on to share that although the school garden was not successful in terms of production, it did impact this student and created a space for her to find something at school to enjoy.

Beyond teacher-reported student impact, participants conveyed that they gained the skills necessary for structuring learning opportunities that fostered these student outcomes from their participation in the GIKI teacher training program. One participant shared, "We're able to bring more to the classroom at this point than we did before…what [GIKI] shared with us has been helpful to pass on to the students, so that they have a better understanding of how food is grown, where it comes from, and what it takes to actually make something grow and thrive" (FG 3.11, P5). Another shared, "…I loved going through [the training] and I loved all the activities…to me the biggest thing really was just the overall idea of getting kids out into the garden, getting that hands-on practice…my primary focus is reading and writing skills, but tailoring those kinds of assignments around hands-on or more project-based approaches" (FG 3.11, P22). Lastly, someone shared, "through the training, we try new things, and so that makes me say [to my students], "look y'all I can do it, you can do it", you know?" (FG 3.26, P49).

Another participant expressed that the resources made available through their mini-grant award led to new classroom opportunities and student confidence, "We hatched eggs in my classroom, and I would never have had the background knowledge to do that if our VISTA hadn't been a chicken expert…it just worked out great. As the chickens started happening a lot

of the kids, especially some that were really shy, opened up and wanted to talk about their experiences raising chickens at their house" (FG 3.11, P45).

Supplemental Data – AmeriCorps VISTA and Program Coordinator Reports

Reports from personnel provided a deeper understanding of the day-to-day relationships and networks fostered through the pilot program. The AmeriCorps VISTA and Program Coordinator reports provided information on the number of impacts beyond the scope of the training, including the number of students engaged, number of services offered, number of volunteers recruited, and the value of in-kind resources (monetary or other donations).

The GIKI program coordinator divided their time between supporting mini-grant recipients, planning activities and lessons, forming partnerships within schools and in the community, and providing PD at local FTS organizations such as the School Garden Association and FTS Boosters Club. The program coordinator spent eight to ten hours each week between Summer 2018 and Spring 2020 providing PD to mini-grant awardees through piloting FTS activities and lessons. This approach provided ongoing PD to teachers and engaged their students in hands-on activities such as weeding garden beds, planting seeds, collecting compost in the cafeteria, and conducting a cooking demonstration in the classroom. One of their reflections captures this effort and students' enthusiasm for it:

> The lessons at [the Center for Innovative Teaching] and Russel are going well. We ran a pollinator lesson at CFIT today and planted 40 black-eyed susans and echinacea plants...that were donated by someone that [the administrator] knows...The students are still very excited when they see us coming in the morning... (AB reflection_2018).

The program coordinator's reports emphasized their time spent working with existing FTS partners in Barrow County. Reports also illustrated persistent challenges. One memo reads, "I am feeling left out from the inside scoop. Today I found out that there is in fact an FTS Boosters email listserv, and that I am not on it...just the challenges of working with the school system, when you are not an employee of that system..." (AB reflection_ 2018)

Two AmeriCorps VISTAs (one each year) worked alongside the program coordinator and recorded details about the mini-grant sites through monthly and quarterly written reports. These reports included descriptions of student engagement, relationships within the community, sustainability of the program, and persistent barriers. In total the VISTAs completed 193 activities and lessons, which were piloted in a classroom or made available to educators through the online database, and engaged 1,239 students via garden workdays, cooking demonstrations, taste tests, and other FTS-related lessons directly taught in the classroom.

During the first year, the VISTA spent most of their term compiling resources, making connections in the community, and getting the school garden program at their school sites started. The following year, the VISTA spent more time working directly with students and educators to create a database for garden and sustainability-based lessons. The goal of the database was to create lesson plans appropriate for every grade level in Barrow County in order to sustain FTS efforts beyond the VISTA term and GIKI grant cycle. The following VISTA report illustrates students' experiences participating in their school's FTS program:

> "[I] was approached by a couple of students stating that [I] encouraged them to pursue careers in agriculture, with one even stating they now wanted to become a teacher. [The students] are willing to try things and continue to be shocked when they find out that vegetables can be

delicious. Their world is continuously expanding and many of them are coming out of their shells" (2019 Quarterly Report).

The work done by the AmeriCorps VISTAs between 2018-2020 strengthened the FTS network within Barrow County by facilitating school-level relationships between the schools, parents, and local organizations; creating programs that engage students in FTS; and creating lessons for educators that integrate FTS into their curriculum. Though the VISTAs were successful in creating these school level partnerships and engaging students, they still faced challenges related to maintaining morale within the school, finding time to maintain a garden space, obtaining administrative approval for their work, and navigating strict mandated testing schedules. Additionally, at times the VISTAs were heavily relied upon to facilitate many of the FTS activities. In one report the VISTA explained the cause of the problem, "With limited time for students to assist in managing the garden, much if not all, of the garden maintenance has fallen to the VISTA" (2019 Quarterly Report). In the same report, however, the VISTA shared that the school they served had formed a committee to alleviate the VISTA – or anyone – from having sole responsibility of the program:

> The Garden Cat Support Committee has been essential in making sure the garden runs smoothly. The committee is comprised of members from every department and has positions held by several club organizations in the high school. The committee is responsible for writing grants for the garden, finding resources for the garden, and sponsoring Garden Cat workdays (2019 Quarterly Reports).

Discussion

Here, the discussion triangulates the results of the evaluation to answer the three key questions regarding the GIKI teacher training pilot program: (1) In what ways did the GIKI teacher training pilot program create and sustain an effective FTS professional development program? (2) What student learning outcomes were documented during the grant cycle? And (3) How can future FTS professional development programs support educators engaging in FTS? These questions relate to the grant's goals and objectives detailed in the background section of this chapter.

1. **In what ways did the GIKI teacher training pilot program create and sustain an effective FTS professional development program?**

Several factors underpin effective professional development programs—including *active learning*, *feedback, duration* of the program, *follow-up*, *collective participation,* and *cohesion* between the program's values and that of the educator and their school (Desimone, 2009; Dunn, et al., 2019; Guskey, 2002). The post-survey training quality section and the reflection material data collected with participants demonstrate that the program included these critical factors: GIKI created space for **active learning** through experiential education, which increased participants' confidence in their ability to engage in FTS. Examples of active learning include building garden structures, participating in taste tests, planning their goals, reflecting on their programs, observing successful examples, and identifying resources to overcome barriers they face. **Feedback** was provided by both the GIKI team and participants during planning and reflection activities. Providing feedback and sharing their own experiences revealed commonalities among participants and opportunities to support one another.

When participants interact and support one another, they engage in collective participation (Desimone, 2009; Dunn et al., 2019). GIKI further supports **collective**

participation by emphasizing the need for an FTS team and encouraging participants to attend the training with said team. The importance of an FTS team is emphasized throughout every workshop and even incentivized by a lower registration fee.

The **duration** of the program is important as intensive programs with twenty or more hours of contact time are more effective (Desimone, 2009; Dunn et al., 2019). The GIKI program offered trainings of various durations, but the core of this training—the three-day intensive summer training—provided participants with twenty-four hours of contact time. Participants were then encouraged to attend both one-day trainings and local FTS organization meetings, which offered an additional twenty-four hours of contact time each school year. Beyond formal meetings and mini-grants, the GIKI team followed-up with participants through informal communication channels to offer one-on-one consultations, which is crucial for the impact of the program to sustain beyond the training setting (Dunn et al., 2009).

Lastly, **cohesion** relates to the program's ability to reflect the values of the participants and the institutions they represent (Desimone, 2009; Dunn et al., 2019). Additionally, when professional development reflects participants' own values, their motivation may increase (Sancar, Atal, & Deryakulu, 2021). The FTS and the GIKI teacher training pilot program value community-based programming, FANH education, and hands-on garden- and food-based learning. These **values** are shared with the pilot program's partner organizations: Barrow County School System, Barrow County School Nutrition, Barrow County Cooperative Extension, and the Wimberly Center for Community Development. Cohesion creates well supported networks that provide resources for participants and opportunities for sustainability beyond the grant.

2. **What student learning outcomes were documented during the grant cycle?**

Studies have found a direct link between student learning outcomes and educators' motivations to implement new activities – when student outcomes are positive, educators are more motivated to implement new activities (Girvan et al., 2016; Guskey, 2002; Sancar, Atal, & Deryakulu, 2021). Our participants similarly connect the GIKI teacher training pilot program to shifts in their classroom practices. Through field trips and guest speaker presentations, our participants observed successful models for implementing garden- and food-based learning. Reflection materials collected with participants during the GIKI teacher training pilot program revealed the evidence that participants were learning new knowledge and skills. Prompts such as setting goals and creating action steps support participants in adapting what they were learning to their school and classroom contexts. Finally, in the focus groups participants shared specific examples of the way the GIKI program enabled them to implement what they had learned in their classroom, which led them to observe positive student outcomes. Trainees connected their participation in the GIKI teacher training pilot program with their ability to implement food and garden based experiential learning activities, such as cooking with students or simply engaging them in the school garden.

While our evaluation cannot determine the *direct* benefits of the GIKI teacher training pilot program on students' learning outcomes, in focus groups our participants reported observing an increase in their students' confidence in the classroom associated with food- and garden-based experiential learning, along with pride in their work and willingness to try new activities such as participating in a taste test with garden produce.

3. **How can future FTS professional development programs support educators engaging in FTS?**

In this section I discuss GIKI's framework and its contribution to the success of the program. As illustrated above, the GIKI teacher training pilot program increased participants' confidence, made time for planning, reflecting, and integrating new knowledge and skills. GIKI's success is rooted in an asset-based community development framework (ABCD), which is community-led, relationship-driven, and emphasizes existing assets in the community (Kretzmunn, n.d.; Mathie & Cunningham, 2005; Misner & Schulenkorf, 2016). By prioritizing what is available, rather than what is not, community members are supported to create sustainable change that reflects the values within their community (Garven, McLean, & Pattoni, 2016).

Focus group data and personnel reports demonstrate that the GIKI teacher training pilot program was successful in supporting existing and creating new networks among stakeholders. Stakeholders included educators, school communities, local governmental agencies (Barrow County School System and Barrow County School Nutrition), and other institutions (Barrow County Cooperative Extension, University of Georgia). Individuals and organizations within these networks acted as a team to support ongoing professional development for educators engaged in FTS. Support was given in the form of monetary resources and personnel like the AmeriCorps VISTA. Collaboration among stakeholders creates efficiency within the program and new networks of support for PD programs (Collinson, 2009; Sancar, Atal, & Deryakulu, 2021).

Additionally, when a PD program shares the same values and beliefs as the attending participants, participants' motivation to implement new materials in the classroom increases (Hunzicker, 2011; Sancar, Atal, & Deryakulu, 2021). The GIKI teacher training pilot program encourages FTS programs to develop in line with their school and local community's values,

assets, and resources. As previously described, Barrow County had existing support for FTS and a strong agricultural background. The GIKI teacher training program backed these existing networks and created new ones, which advanced support of FTS programs within the county. Not every school system engaging in FTS will have this level of support; however, the GIKI model works to identify local stakeholders and resources that can support FTS practitioners and reflect the culture of the local community.

The program's framework encouraged educators to recruit a diverse group of colleagues from their schools, attend the training with a team, and participate in existing FTS programs such as FTS Boosters and the School Garden Association. Through this, GIKI worked with participants to establish communities of practice (CoP). Communities of practice, defined by Wenger (2011), are groups of individuals who share a common interest for something and learn to do it better through regular interaction with one another. The CoPs may happen formally, through organizations like FTS Boosters, or informally such as a couple of educators working on a school garden program together. Members of a CoP are not just a club, but rather an assortment of people with a shared identity that through experience, create and share new knowledge and skills (Wenger, 2011). During the GIKI teacher training pilot program, formal CoPs included attendance at GIKI trainings, FTS boosters, and the School Garden Association, while informal networks were those between participants and colleagues at their schools. The CoPs are used to gain resources to overcome barriers like a gap in knowledge as participants now had a community to turn to for answers and even physical resources such as seeds, starts, and supplies. The literature suggests that CoPs can, and should, be used to sustain and promote continued PD (Bricker, et al., 2015; Warr Pederson, 2017).

Persistent Barriers

Despite GIKI's ability to create an effective program through an asset-based framework and CoPs, barriers persist. Many participants struggle to build a team or overcome challenges related to participation at their schools. Reflection materials revealed that participants' colleagues were often not motivated to join because they were not getting paid for the additional time/effort, or because they had other commitments. Additionally, when reflection materials explicitly asked, "What are the barriers within your school to making [an FTS team] happen?", participants' responses echoed barriers found in the literature: time, resources, and personnel (Burt et al., 2018; Thompson & Narciso, 2017).

Though less visible, consistent administration support was another barrier identified by this evaluation. For example, administrators were reluctant to support teachers attending FTS PD during the school year, even when they had initially agreed to it. This lack of support was evident from the shifts in participant attendance from summer to fall to spring. Further, on more than one occasion, district administrators reversed decisions to pay for an AmeriCorps VISTA position to support our collaborative efforts on the ground, despite evidence that these positions strongly impact the success of school garden programs.

Recommendations

Based on the results of this evaluation, I offer four recommendations for future FTS PD programs:

(1) When developing an FTS PD program, use an ABCD approach and support educators in **identify existing networks and resources**. Networks may already exist within the local school system(s). The USDA farm-to-school census reported that 84.7% of school food authorities in the state of Georgia were participating in farm-to-school in 2019 (2021). That

percentage accounts for 2,139 schools and over 1.5 million students (USDA, 2021). These figures suggest that there is an existing foundation in a great deal of Georgia's school systems to build upon. Additionally, 67% of students in middle to high school grades were enrolled in a Career, Technical and Agriculture Education (CTAE) course during the 2018 fiscal year (GADOE). CTAE courses included both agriculture and nutrition science classes. Building upon existing CTAE programs within school systems may provide opportunities for expanding food and garden-based learning for students, while creating a network of support within schools for those engaged in FTS.

(2) Based on the results of our study, and the literature around effective professional development, I recommend future FTS PD programs strive to **provide ongoing support** throughout the school year. Ongoing support may look like a series of trainings such as GIKI's intensive summer training followed by one day professional learning day workshops during the school year. Another way future programs could provide ongoing support is through the establishment of CoPs among FTS practitioners in a school or school district. Much like GIKI, future programs can support the creation of CoPs by encouraging educators to attend with a team from their school, allow time for teams to set their program goals and delegate roles, and identify assets, like individuals with knowledge and skills related to FTS, in their community (school or greater). Additionally, creating opportunities for partnerships between FTS practitioners, local farmers, and community development organizations that emphasize food access and education may create opportunities for continued support of FTS PD.

(3) To better support educators engaged in FTS, future FTS PD programs need to collaborate with their local school system and establish *formal support* for FTS programs and FTS PD. Formal support would include **funding personnel to support FTS or school gardens**.

As the focus group and reflection data demonstrated, the AmeriCorps VISTAs and grant program coordinator had a lasting impact on schools' FTS programs. Personnel contributed by developing lesson plans that connected to the state mandated curriculum, fulfilling educators need for site-specific professional development, engaging students, and building relationships within the schools and between community partners to further support the schools' programs. School-level relationships included advocating for administrative support, recruiting other educators to use the school garden space and integrate FTS into their classroom curriculum, recruiting students to participate during and after school, recruiting parent volunteers and donations, as well as creating partnerships between schools and local organizations. The results of this evaluation echo other studies, like Thompson & Narciso, that relationships between schools and local organizations are crucial for FTS since many of them rely on volunteer labor and donations to maintain their programs (2017).

(4) Another indication of formal support may include **written approval and funding for educators to participate in FTS PD**. Written approval and funding may come from administration or the local school board. To ensure that FTS program sustainability is a priority, schools should include FTS PD as an option for continuing education credits to retain their teaching certification (Burt et al., 2018). Since the creation of an FTS team is critical for program sustainability, school administrators should encourage and support participation in FTS PD by a wide range of school staff members, including school nutrition staff and other auxiliary positions.

Limitations

Although our evaluation sample includes all the participants of the GIKI teacher training pilot program, our PD participants were self-selected meaning that our sample is made up of

educators who chose to participate in FTS PD, rather than a general educator population. This limits the generalizability of our findings. Further, due to shifting participation in GIKI PD events, the pre- and post-survey data were inconsistent, which limited the statistical analysis. Nevertheless, we were able to validate our findings by triangulating our survey data with multiple sources of qualitative data discussed above. Triangulating multiple sources of evidence allows us to demonstrate that the GIKI teacher training pilot program created an effective PD that increased participants confidence related to FTS topics.

Conclusion

Results of this evaluation provide a robust account of the role that PD plays in providing the necessary knowledge and skills to implement and sustain an FTS program (Peralta et al., 2020). The evaluation found that FTS PD can increase educators' confidence across various FTS topics (i.e., soil management, overall garden management, garden- and food-based instruction, food safety, etc.). Results from participants' surveys and focus groups suggest that their change in confidence arise from experiential learning and guided reflection at the training. Though the results capture teacher reported student outcomes, future research is needed to better understand the role of FTS PD on student learning outcomes. This evaluation provides insights into persistent barriers such as establishing an FTS team and gaining administrative support.

The evaluation indicates that GIKI was an effective and sustainable FTS PD model, which emphasizes the importance of existing networks, collaboration among all stakeholders, and the potential role of CoPs. I recommend that future programs gain *formal support* for FTS PD by establishing a school garden or FTS coordinator position for the school system(s) they are serving, as well as written support from administration for teachers to participate in FTS PD.

Literature cited

Berezowitz, C. K., Bontrager Yoder, A. B., & Schoeller, D. A. (2015). School Gardens Enhance Academic Performance and Dietary Outcomes in Children. *Journal of School Health*, *85*(8), 508–518. https://doi.org/10.1111/josh.12278

Bontrager Yoder, A. B., Liebhart, J., McCarty, D., Meinen, A., Schoeller, D., Vargas, C., & LaRowe, T. (2014). Farm to Elementary School Programming Increases to Fruits and Vegetables and Increases Their Consumption Among Those With Low Intake. *Journal of Nutrition Education and Behavior*, *46*(5), 341–349.

Bricker, P., Jackson, E., & Binkley, R. (2015). Building Teacher Leaders and Sustaining Local Communities Through a Collaborative Farmto-School Education Project—What EcoJustice Work Can PreService Teachers Do?. In *EcoJustice, citizen science and youth activism* (pp. 83-97). Springer, Cham.

Burt, K. G., & Koch, P. (2017). *Gardens by integrating the curriculum*. *4*(5), 427–435.

Burt, K. G., Luesse, H. B., Rakoff, J., Ventura, A., & Burgermaster, M. (2018). School gardens in the United States: Current barriers to integration and sustainability. *American Journal of Public Health*, *108*(11), 1543–1549. https://doi.org/10.2105/AJPH.2018.304674

Carlsson, L., Williams, P. L., Hayes-Conroy, J. S., Lordly, D., & Callaghan, E. (2016). School gardens: Cultivating food security in Nova Scotia public schools? *Canadian Journal of Dietetic Practice and Research*, *77*(3), 119–124. https://doi.org/10.3148/cjdpr-2015-051

Collinson, V., Kozina, E., Kate Lin, Y. H., Ling, L., Matheson, I., Newcombe, L., & Zogla, I. (2009). Professional development for teachers: A world of change. *European Journal of Teacher Education*, *32*(1), 3–19. https://doi.org/10.1080/02619760802553022

Desimone, L. M. (2009). Improving impact studies of teachers' professional development: Toward better conceptualizations and measures. *Educational Researcher*, *38*(3), 181–199. https://doi.org/10.3102/0013189X08331140

Dunn, C. G., Burgermaster, M., Adams, A., Koch, P., Adintori, P. A., & Stage, V. C. (2019). A systematic review and content analysis of classroom teacher professional development in nutrition education programs. *Advances in Nutrition*, *10*(2), 351–359. https://doi.org/10.1093/advances/nmy075

Garven, F., McLean, J., & Pattoni, L. (2016). *Asset-Based Approaches: their rise, role and reality*. Dunedin Academic Press Ltd.

Girvan, C., Conneely, C., & Tangney, B. (2016). Extending experiential learning in teacher professional development. Teaching and Teacher Education, 58,129e139. https://doi.org/10.1016/j.tate.2016.04.009

Guskey, T. R. (2002). Professional development and teacher change. *Teachers and Teaching: Theory and Practice*, *8*(3), 381–391. https://doi.org/10.1080/135406002100000512

Hunzicker, J. (2011). Effective professional development for teachers: A checklist. Professional Development in Education, 37(2), 177e179. https://doi.org/10.1080/ 19415257.2010.523955

IBM Corp. Released 2021. IBM SPSS Statistics for Windows, Version 28.0. Armonk, NY: IBM Corp

Kretzmunn, J., & Mcknight, J. (n.d.). *Assets-Based Community Development*.

Little, J. W. (1987). Teachers as colleagues. In V. Richardson-Koehler (Ed.), *Educators' handbook: A research perspective* (pp. 491–518). New York: Longman.

Mathie, A., & Cunningham, G. (2005). Who is driving development? Reflections on the transformative potential of asset-based community development. *Canadian Journal of Development Studies*, *26*(1), 175–186. https://doi.org/10.1080/02255189.2005.9669031

Misener, L., & Schulenkorf, N. (2016). Rethinking the social value of sport events through an asset-based community development (ABCD) perspective. *Journal of Sport Management*, *30*(3), 329-340.

Pallant, J. (2020). *SPSS survival manual: A step by step guide to data analysis using IBM SPSS*. Routledge.

Peralta, L. R., Werkhoven, T., Cotton, W. G., & Dudley, D. A. (2020). Professional development for elementary school teachers in nutrition education: A content synthesis of 23 initiatives. *Health Behavior and Policy Review*, *7*(5), 374–396. https://doi.org/10.14485/HBPR.7.5.1

Ratcliffe, M. M., Merrigan, K. A., Rogers, B. L., & Goldberg, J. P. (2011). The Effects of School Garden Experiences on Middle School-Aged Students' Knowledge, Attitudes, and Behaviors Associated With Vegetable Consumption. *Health Promotion Practice*, *12*(1), 36–43. https://doi.org/10.1177/1524839909349182

Ritchie, J., Spencer, L., & O'Connor, W. (2003). Carrying out qualitative analysis. *Qualitative research practice: A guide for social science students and researchers*, *2003*, 219-62.

Sancar, R., Atal, D., & Deryakulu, D. (2021). A new framework for teachers' professional development. *Teaching and Teacher Education*, *101*, 103305. https://doi.org/10.1016/j.tate.2021.103305

Thompson, J. J., Ph, D., & Narciso, M. (2017). *Georgia Organics Farm To School Evaluation*.

USDA (2021). *Farm to School Census Results Overview*. USDA Farm to School Census. Retrieved October 15, 2022, from https://farmtoschoolcensus.fns.usda.gov/census-results-overview

Warr Pedersen, K. (2017). Supporting collaborative and continuing professional development in education for sustainability through a communities of practice approach. *International Journal of Sustainability in Higher Education*, *18*(5), 681–696. https://doi.org/10.1108/IJSHE-02-2016-0033

Wenger, E. (1998). Community of Practice: a Brief Introduction. *Learning in Doing*, *15*(4), 1–7.

Williams, D. R., & Dixon, P. S. (2013). Impact of Garden-Based Learning on Academic Outcomes in Schools: Synthesis of Research Between 1990 and 2010. *Review of Educational Research*, *83*(2), 211–235. https://doi.org/10.3102/0034654313475824

CHAPTER 3

Photovoice Study of The Grow it Know It Teacher Training Program

Introduction

Farm-to-School (FTS) programs incorporate school gardens into classrooms to engage students in agricultural and nutrition education (National Farm to School Network, 2020). Engaging in FTS programs may benefit students' academic success and health (Ahmed, 2011; Berezowtiz, Bontrager, & Schoeller, 2015; Bontrager et al., 2014; Murakami, Su-Russell, & Manfra, 2018), but educators engaged in FTS programs are often faced with many challenges that limit their impact and sustainability (Burt et al., 2018; Burt, Koch, & Contento, 2017; Diaz et al., 2019; Dunn et al., 2019; Ohly et al., 2016; Thompson, Brawner, & Kalia, 2017). Challenges include time to plan lessons that meet curricular demands (Burt, et al., 2018; Diaz et al., 2019), garner support from colleagues (Diaz et al., 2019), train personnel (Burt, et al., 2018; Diaz et al., 2019), maintain classroom management in an outside setting (Burt, et al., 2018; Diaz et al., 2019), and compete with meritocratic forms of success within schools (Bisceglia et al., 2020; Diaz et al., 2019).

Previous studies have recommended using teacher trainings or FTS professional development (PD) to overcome challenges that hinder FTS program success (Burt et al., 2018; Thompson et al., 2017). Engaging in FTS PD may create space for educators to plan lessons, learn knowledge and skills necessary for creating and maintaining an FTS program, and create networks of support within schools and their greater community (Burt, et al., 2018). The goal of PD is to change teachers' classroom practices, attitudes, and beliefs, as well as their students'

learning outcomes (Guskey, 2002; Dunn, 2019). To be effective, PD needs to be content focused, include active learning, resonate with schools' values, provide intensive engagement, offer follow-up, provide feedback (Desimone, 2009; Dunn, 2019; Guskey, 2002), and create communities of practice (Bricker, Jackson, and Binkley, 2015). Burt, Koch, & Contento found that PD builds teams within schools and empowers educators, which can lead to administrative support and more access to funding and resources (Burt, Koch, & Contento, 2017).

To better understand the role of PD in alleviating FTS program barriers, I investigated educators' ability to put FTS PD into practice. Specifically, this article reports on an eleven-month, longitudinal study with FTS PD participants in order to (1) determine the change in educators' confidence and teaching practice following their participation in FTS PD, (2) characterize the ways in which educators are incorporating lessons, activities, knowledge, and skills learned during FTS PD into their classrooms; (3) identify how educators capitalize on FTS PD networks and resources in order to create, expand, or maintain their FTS program; and (4) determine what additional resources and PD are still needed to sustain FTS programs. Understanding how teachers implement their training experiences into their classrooms provides a deeper understanding of how FTS PD can support resilient FTS programs and the impact it may have on student learning outcomes. Results are intended to add to the growing body of literature that seeks to find practical solutions to persisting barriers and identify additional sources of support for educators engaging in FTS.

Context

This study is situated in the context of the Grow It Know It (GIKI) Teacher Training Program. Since 2018, GIKI has addressed the needs of educators engaging in FTS programs through three-day intensive professional development trainings in the summer, along with one-

day trainings in the spring and fall. The program is supported by a network of partners made up of the local University and its Office of Service Learning, College of Education, Horticulture Department, and Crop and Soil Sciences Department. Additionally, the program is done in collaboration with the county-level Cooperative Extension agents, local school systems, and community organizations. This network of actors supplies a diverse skillset that covers basic horticulture skills, cooking and nutrition, food systems education, and teacher education.

The GIKI teacher training program embodies an experiential, asset-based, and reflective framework. During the training, participants reflect upon the content they are learning, are given guided time to establish their program goals, and create an action plan to achieve their goals. This training does not provide specific activities and lessons for educators to take back to their classroom. Rather, GIKI models example lessons and activities and provides teachers guided time to integrate the new knowledge and skills from the training into their respective curricula. Following the training, GIKI team members follow up with participants to answer questions, guide them to resources they may need, and support them in developing curricula for their classrooms.

Methodology

Sample Description and Demographics

All past GIKI teacher training participants (n = 55) were invited to participate in an eleven-month longitudinal study to understand the impact of FTS PD on their teaching practices. Ultimately, I recruited seven educators (n=7): five from the summer 2021 training and two from the February 2020 training session. I attribute our low recruitment rates to demands and stresses of COVID-19 on schools and educators, as well as the demand of the study (a school year-long commitment with weekly requirements). All our participants taught in a public school system

and had two or more years of teaching experience. The majority of our participants spent one hour or less each week teaching and preparing FTS-related activities.

Data Collection

This study included two types of data collection over the 2021/22 school year: (1) Photovoice methodology (Wang & Burris, 1997) and (2) a retrospective pre- and post-survey. All data collection tools can be found in Appendix A.

Photovoice

Photovoice is a participatory action research strategy that allows community members to capture their own experiences, behaviors, and ideas via photos that may otherwise be difficult for researchers to observe (Wang & Burris, 1997). In the context of this study, community members are public school teachers participating in FTS and the GIKI training. Photovoice asks community members to reflect on an area of concern, generate knowledge about the issue, and determine a potential course of action to address the issue through photos (Horwitz, 2012). Photovoice can be used to reach decision-makers through visual evidence of the identified concern (Wang, Caroline, & Burris, 1997).

Participants were asked to capture one photo each week during the 2021/22 school year that relates to their FTS professional development and/or the GIKI program, including participating and planning lessons or activities, working in the garden, recruiting personnel, or any action that relates to their unique experience. Each week, teachers were prompted to send one photo that captured their experience with FTS or the GIKI program along with a brief description. Participants were asked to exclude photos with their students' faces. Photos and their descriptions were received via email or text and stored in a secure file. Photos and their descriptions were used to guide the mid-year focus group and individual interviews. At the end

of the study, the researchers organized each participant's photos, descriptions, and reflections into an online portfolio and returned them to participants.

From 43 weeks of photo collection, I received one hundred and eighty photos from teachers. The number of photos submitted by individual teachers varied considerably, ranging from three to fifty. Photos included screenshots from emails, students working in gardens and greenhouses, students interacting with chickens and goats, preparation for taste tests, and our participants engaging in FTS PD.

Mid-year Focus Group

The mid-year focus group took place in February of 2022 and lasted 160 minutes. The focus group guide was semi-structured around the objectives of this study and photos collected up until December of 2021. Prior to the group discussion, focus group participants were asked to choose and reflect on their top three favorite photos.

Reflections were guided by the PHOTO protocol, where each letter of the acronym corresponds to a question (Hussey, 2006). This protocol has been used in other studies associated with educators due to its simplicity, direct application to teaching, and ability to promote action (Horwitz, 2012). PHOTO questions were modified to relate to our participants and their experience with the GIKI training: (1) Describe your **P**hoto. (2) What is **H**appening in your picture? (3) Why did you take a picture **O**f this? (4) What does this picture **T**ell us about your experience with FTS and(/or) the Grow It Know It program? And (5) How can this picture provide an **O**pportunity for us(/you) to sustain your FTS program? Participants were asked to create a title for each photo, display them on the walls, and participate in a gallery walk. After this process, participants engaged in a semi-structured discussion. Discussion topics included: (1) their experience with Photovoice and similarities between their photos, (2) components of the

GIKI training that they had used thus far in the year, (3) the goals they set during their participation in the GIKI training, (4) resources and networks used thus far in the school year, (5) student impacts, and (6) challenges they faced. Focus group data were audio-recorded, transcribed, and reviewed for accuracy before analysis.

End-of-Year Interviews

One-on-one, semi-structured interviews were conducted in May-June 2022. Like the focus group, individual interviews were guided by participants' photos and the PHOTO protocol (Horwitz, 2012; Hussey, 2006). Interviews lasted between 45-90 minutes and were tailored to each individual while generally covering: (1) the participant's ability to put FTS into practice, (2) challenges faced throughout the school year, (3) approaches used to overcome challenges, (4) student impacts, (5) resources used to sustain their program, and (6) advice they would give to those starting out in FTS. All interviews were audio-recorded, transcribed, and reviewed for accuracy before analysis.

Retrospective Pre- and Post-Survey

A retrospective pre- and post-survey was administered to participants at the end of the 2021/22 school year. The survey asked participants to self-assess their confidence in sixteen topic areas covered in our training before attending the GIKI teacher training program and their confidence at present. We selected a retrospective pre-/post-survey to avoid response shift bias, which often occurs in educational contexts as participants underreport changes between the pre- and post- test (Drennan & Hyde, 2008; Robinson, 2017). For example, survey participants may over assess their confidence before participating in a program and then, under report their change in confidence after the training. Underreporting their change following their participation may be caused by their new awareness of what they previously did not know. By asking participants to

retrospectively rate their confidence before attending the training and then after, they are given a chance to reflect on their previous knowledge, the knowledge they gained, and their confidence at that current point in time – alleviating the potential for response shift bias.

The retrospective survey models the pre- and post-survey used for the GIKI teacher training program. This survey used a four-point forced Likert scale to measure the change in participants' confidence regarding each training topic. The scale included: 1 (*not confident at all*), 2 (*somewhat confident*), 3 (*confident*), and 4 (*very confident*). Two additional sections were included in our retrospective survey. The first focused on the likelihood of implementing training topics and activities. Likelihood was reported using a seven-point Likert scale: 1 (*Very Unlikely*), 2 (*Unlikely*), 3 (*Somewhat Unlikely*), 4 (*Neither Unlikely or Likely*), 5 (*Somewhat Likely*), 6 (*Likely*), 7 (*Very Likely*). The second additional section involved participant demographics (i.e., the number of years they have taught, the subject and grade level they currently teach, the number of hours spent engaging and preparing for FTS activities, and others as reported in Table 1). Demographic questions were adapted from the California School Garden Survey and questions posed in the literature (Graham Heather, et al., 2005; Sancar, Atal, & Deryakulu, 2021).

Data Analysis

Quantitative analysis of retrospective survey data was completed using the quantitative data analysis software IBM SPSS version 28.0. Our statistical analysis captured descriptive statistics of the retrospective pre- and post-survey, as well as significance using the Wilcoxon Signed Rank Test. The Wilcoxon Signed Rank Test is a nonparametric test analogous to a repeated measures t-test that is often useful with a small sample size such as ours (Pallant, 2020). This test is designed for repeated measures, but rather than comparing the means it converts the

scores into ranks and compares them at two points in time (in this case, pre and post training) (Pallant, 2020).

Qualitative data from focus groups and interviews were analyzed using a Framework analysis (Ritchie & Spencer, 2003) via the qualitative data analysis software, Atlas.ti version 22.1.0 1 (Scientific Software Development GmbH). Framework analysis consists of five steps: (1) familiarization of the data, (2) identifying a thematic framework, (3) using the thematic framework to index or code the data, (4) charting the data, and (5) interpretation of findings. This process is iterative, and the researcher cycled through steps 1, 2, and 3 throughout the data collection process. Our thematic framework reflected the goals of the study. Pre-identified themes included: (1) change in confidence and teaching practice, (2) incorporation of the training materials, (3) networks and resources, (4) persistent barriers, and (5) teacher-reported student impacts. As data collection progressed, one new theme emerged within this framework: (6) educators' personal motivation for engaging in FTS.

Results

Retrospective Pre-/Post-Survey

Participants retrospectively reported their confidence before attending the GIKI training as median scores of 1-2 across the sixteen topic areas (Figure 3.1). Participants then reported that their confidence had increased across all topics since their participation in the GIKI teacher training program. There were significant changes in confidence across eight of the sixteen topics ($p<0.05$).

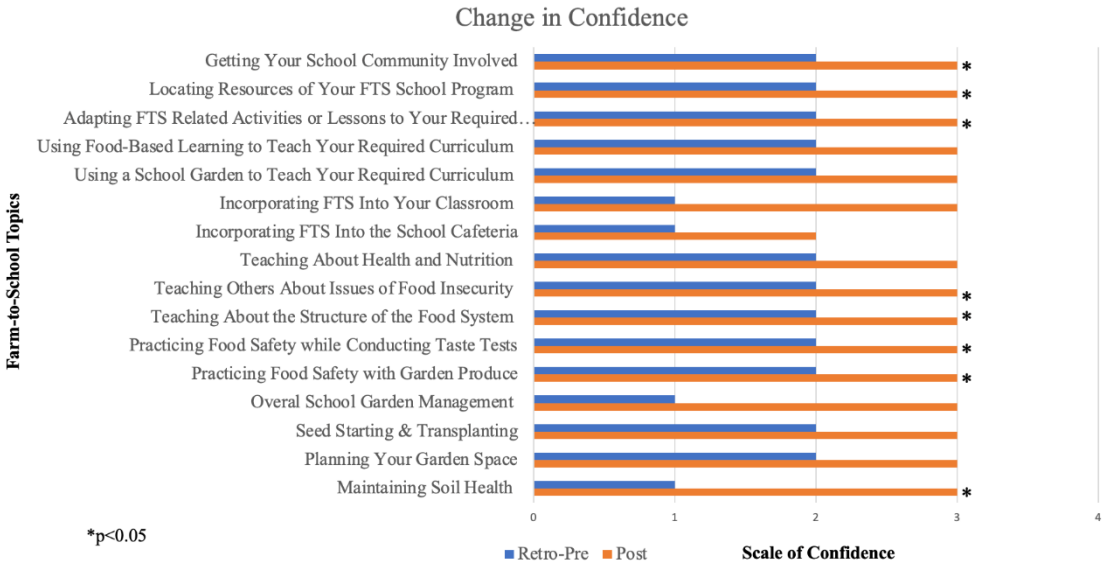

Figure 3.1 Change in Confidence: Retrospective Pre & Post-Survey Results

On average, when asked to rate their likelihood of implementing FTS topics, participants reported a likelihood from *Somewhat Unlikely* to *Very Likely* (Figure 3.2). The least likely topic to be implemented was Health and Nutrition, which 42.9% of our participants said they were *Somewhat Unlikely* to implement.

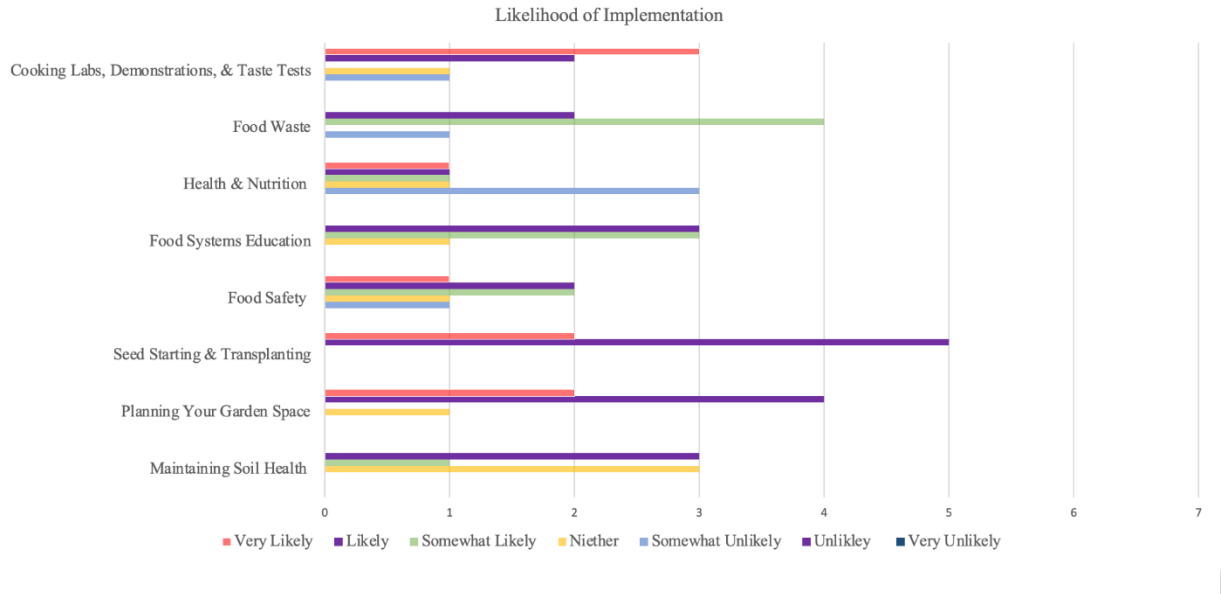

Figure 3.2 Likelihood of Implementation

Results from Photovoice Focus Groups and Interviews

Qualitative results are broken down into six sections representing each theme of our thematic framework: (1) Change in confidence and teaching practice, (2) Incorporation of the training materials, (3) Networks and resources, (4) Persistent barriers, (5) Teacher-reported student impacts, and (6) Educators' personal motivations.

Change in Confidence and Teaching Practice

During the interviews and focus groups, participants smiled and laughed as they combed through their photos. It was obvious that participants were proud of themselves and what they had accomplished. One participant shared, "[My students] have one heck of a confident teacher. I mean, I wrangled a goat" (RE, Focus Group). Another shared that the training allowed her to become the student, which gave her the confidence to engage her students in her classroom:

> …with [GIKI]…we got the chance to be the students and kind of go, 'oh, this is what it's supposed to look like' …And then we could go back home and say, 'Ok, I've got it in my head, kids, trust me'. So, I think it helped in that way… (JJ, Focus Group).

During her interview, the same participant reflected on her ability to put FTS into practice, "I've come a long way [since] Grow It Know It…with Grow It Know it, I feel like [I have] at least the first couple of steps to get me started…I would say I went from a solid three to maybe a solid seven" (JJ, Interview). When asked what took her from a three to a seven, she explained that it was due to her previous experience gained through her college education and her participation in the GIKI program. She shared, "…what Grow It Know It really helped with was those finer details…also seeing other people's experiences…really helped ease a lot of the major questions I had…" (JJ, Interview).

Participants indicated that their confidence stemmed from the relationships they acquired through the GIKI teacher training program. One participant shared, "The confidence, one hundred percent. Just knowing that I have somebody to reach out to. Just seeing that other people in the same shoes have been able to do it…" (RE, Interview). Feeling confident in their ability to put FTS into practice and engage their students created a willingness among educators to try new activities and lessons.

From this newfound confidence, one participant was driven to do a canned food drive with his students. He shared that he typically played a supporting role in these types of activities, "I've always been willing to help everybody else do something…" (RD, Focus Group). However, under his leadership, his students had collected 5,097 canned and dried food items by the end of their fall semester. His administration was so impressed by the efforts of these students that they threw a pizza party for every classroom. In his interview, he shared that his

students continued to stock the food pantry and were working on a summer plan to ensure food items were available for members in their community.

Participants' confidence not only impacted their ability to implement and try new activities, but also their capacity to adapt their program in the face of a challenge and find solutions to their problems. One participant shared the trials of adding goats to their program and though the goats had been a hit with her students, they also provided several challenges such as unforeseen illnesses. In response to these challenges this participant shared, "…we've not been ready for any of the things that have happened, but we've problem solved really fast" (RE, Interview 2022).

Lastly, when asked to share advice with others getting started with FTS, one participant recommended to "Trust the process and build the curiosity" (RD, PHOTO). Another shared, "…what you envision and what ends up happening are something fairly apart. But that isn't a failure, it's just the nature of the beast…you just have to adapt to make the best of it…" (SG, Interview). Lastly, another echoed these sentiments by explaining, "…one of the things that I have learned through the process is that even though it may not be one of my goals, my goals are gonna have to shift a little bit" (TG, Focus Group).

Incorporation of the Training Materials

Participants shared ways in which they incorporated parts of the GIKI teacher training program into their classroom, what made the program adaptable to their own teaching practices, and ways in which they are implementing FTS more broadly. Specific activities, lessons, skills, and knowledge from the training applied in our participants' classrooms includes new knowledge related to nutrition education, horticulture skills such as planting and building garden structures, and their school garden plans. One participant shared a photo of a pile of non-perishable food

that students donated for their Little Free Pantry program. In his PHOTO reflection he explained, "Using the knowledge we learned about nutrition and label reading, students were encouraged to bring in food donations that meet nutritional needs people need to sustain" (RD, PHOTO) (Figure 3.3). Another participant shared a photo of her students crowded around a raised garden bed, where they have placed a string in a neat line and are preparing to plant seeds. In her PHOTO reflection she clarified that the string planting method is one she learned from the GIKI teacher training program, "I learned that using a string technique [to plant seeds in the garden] in GIKI last summer and it was so useful with the little kids" (RE, PHOTO).

Figure 3.3 RD PHOTO Reflection of Canned Food Drive

During the GIKI teacher training program, participants created school garden plans, which had them establish short and long-term goals and identify action steps to achieve those goals. During the focus groups and interviews, participants reflected on their participation in this activity. One participant shared, "…the times where we've set goals for the year ahead, we've sketched out ideas…Those things have been good and helpful, and I've acted on that" (SG, Interview 2022).

Other participants shared the impact of the training on their ability to incorporate experiential learning into their classrooms, as well as new lessons based on their new knowledge

of the food system. In her PHOTO reflections, one high school Agriculture Education teacher shared that, “Through the GIKI program, I was able to take back tips and tricks and teaching strategies to better serve the students’ educational experience in the greenhouse” (JJ, PHOTO) (Figure 3.4). A middle school Agriculture Education teacher shared a photo of a new lesson he implemented related to sustainable agriculture models. In his PHOTO reflection he shared, “I am trying to creatively implement hands-on learning to teach students about the environmental impact of growing/ producing food” (BW, PHOTO).

Figure 3.4 JJ PHOTO Reflection of Her Students Working in the Greenhouse

.

The ability of participants to put the GIKI teacher training program into practice at their own schools appeared to be directly linked to the structure of the training. Participants emphasized the hands-on components of activities and lessons at the training and the opportunities they had to reflect and observe successful models. During their interviews, two participants explained what made the GIKI training impactful for them:

> One thing I loved about the Grow It Know It training was it was very hands-on for us. You hear the expression all the time, 'Teachers make the worst students. They don't listen to instructions. You got to get their focus'. But [GIKI] brought us in and it wasn't just…throw up the PowerPoint…[GIKI was] like, 'here's your actual ingredients, go cook'. And then we went back and reflect[ed] (JJ, Interview 2022).

> I think the biggest thing that helped me…it was inspiring to tour the super well-established programs… but then also having the dedicated work time to become a student…watch a lesson unfold… (CS, Interview 2022).

By observing successful models, like the compost system at the training site, one participant successfully implemented a compost system with his students. During his interview he reflected on what made that experience impactful: "…the maintenance and making sure the compost actually cooks and doesn't just sit there. That's kind of what I saw [at the training], I saw it actually happen" (BW, interview 2022).

More broadly, participants shared ways in which they were using FTS in their own classrooms. Some shared topics they were teaching in language arts, math, science, and social studies while using the garden. Other participants shared specific activities being done in the garden like germinating peas and making connections to their genetics curriculum. The only

elementary teacher shared that cooking with garden produce or time spent outside with their goats was used as a behavioral incentive for the whole school.

As mentioned in the context section of this chapter, the GIKI teacher training program does not disseminate pre-made activities and lessons. Instead, the training provides knowledge and skills necessary for implementing and sustaining FTS programs, as well as guided time for educators to adapt and integrate the knowledge and skill to fit their classroom or curricular demands. Participants shared that they were using new knowledge related to food system and nutrition education to start new programs and implement new activities such as sustainable agriculture models and a canned food drive. Additionally, participants shared that the horticulture skills gained from the training helped them engage in hands-on activities with their students like planting in the garden or greenhouse. Finally, participants felt that they were able to incorporate these components of the training into their own classrooms because of the experiential learning structure of the training (i.e., participants learned through hands-on practice and observation of successful models).

Networks and Resources

Participants shared that they accessed networks and relationships, rather than specific resources, made available through the training to support their programs. Additionally, participants described building existing networks of support within their schools and accessing statewide resources to gain further support of their programs. When describing networks and resources from the training they utilized, three participants from one county listed local organizations such as their Cooperative Extension Office and local FTS organizations (e.g., their FTS "booster" program). One participant shared a screenshot of an email thread as one of his weekly photo submissions to illustrate the behind the scenes work that goes into his program.

This photo also revealed the networks that were supporting his school's program. In his PHOTO reflection he shared, "Our relationship with [our county extension agent] and the Barrow County Farm-to-School Booster Club are vital parts of our school garden program" (CS, PHOTO).

Others described accessing resources through the GIKI planning team. One participant shared that through GIKI, she was connected to an expert at the local university who helped her create a plan for her school's new Spanish Heritage Garden, which is pictured in Figure 3.5. She explained,

> …this garden is near our Spanish language classroom…the process of getting plants in that is gonna take a little while. I did meet with [the Director and Outreach Coordinator] of the Latin American Ethno-Botanical Garden. [A GIKI planning team member] facilitated us and [did] a little zoom [meeting]…[The director] also came out here to the school to look at the space in person and take into consideration some of the limiting factors [of the space] (SG, Interview).

This example is one way in which GIKI created and supported networks for local educators participating in FTS.

Figure 3.5 SG Photo of Spanish Heritage Garden.

Some participants shared examples of how implementing new activities from the training, created opportunities to build relationships and networks of support within their school and school community. For example, one participant who ran the canned food drive for his school's Free Little Pantry Program shared that it "…attracted people to our garden and they have come to ask about our program more" (RD, PHOTO). Another teacher shared that by engaging her students in a gardening activity that incorporated mathematics, she was able to "…provide proof to [school administration] that students can use math in the garden" (RE, PHOTO). In her PHOTO reflection she shared that this "proof" is one way she hopes to sustain her program long-term (Figure 3.6).

Figure 3.6 RE PHOTO Reflection of Her Students Using the String Method to Plant Seeds.

Participants shared how networks within their school community have supported their FTS programs. Specifically, participants boasted about their FTS team members and the role they play. One participant shared how working with another educator at his school has helped him engage and boost enthusiasm for the school garden among students at his school,

> …you talk about partnerships; [my colleague] an AP teacher…his voice carries a lot more. I'm the salesman. He's the confident voice that [the students] need to hear. If you don't have one of those, you need to build one… (TG, Focus Group).

Participants revealed that the GIKI program was successful in helping them form relationships within their local communities to access resources for their programs. Participants also shared that through the implementation of new activities, they were able to acquire support from their school communities. Lastly, participants were able to reflect on the significance of having an FTS team – even if it was just one other teacher.

Persistent Barriers

As mentioned above, teachers also shared challenges they faced when implementing and sustaining their FTS efforts—including establishing an FTS team with other educators and auxiliary staff, as well as limited class time to engage in activities. Building a team is emphasized throughout the GIKI teacher training program, and while some have been successful at establishing a team (even a team of just two), others have struggled. The challenges of building a team may come from the extensive list of teachers' prior commitments and duties. One participant explained that he works at a smaller school with only eight educators. His colleagues were already responsible for other programs in the school, so they were not available to join the FTS team. He shared,

> While Grow It Know It's talking about the success of the program is the team, I didn't feel like I had a team. I was like, "can we get a committee together to talk"? Granted there's eight of us [at the school]. And so, the committee would be like, "we're the [Positive Behavioral Intervention and Support] committee, we're the school improvement team…(RD, Interview).

Additionally, participants shared times when they tried to work with other colleagues in their school and had negative experiences. One participant explained that they created lesson plans for the U.S. History curriculum at their school; however, when it came time to implement the lessons, other teachers were not willing to take their students outside to the garden. Our participant explained, "It really didn't take that long to set up, but the idea of taking a day or two to set up this garden bed plus making sure that it gets watered and grows through the summer so that it can be used. Then for it to fall flat was kind of disheartening on my end…. I guess I'm not doing that again…" (CS, Interview).

Other challenges for networks within school communities included poor communication between auxiliary staff such as cafeteria and maintenance crews, which hindered participants' ability to serve the produce grown in the garden. One participant explained, "…our biggest struggle is our cafeteria. That's our breakdown and I know that their hands are tied with a lot of things…" (RE, Focus Group). One participant, a high school agriculture education teacher, shared that he is confident in his ability to grow food in the context of his classes, but needed somewhere to send the produce they were growing. When asked about the cafeteria, he clarified, "…there's only like six or seven lunch ladies to feed 1500 kids. So, they already got their hands full. They don't have time to prepare…" (TG, Interview). He also explained that his school did not have a food science or family and consumer science program that had the capacity to take on any produce grown in the school garden.

Some participants explained that auxiliary staff such as school nutrition workers or grounds crew were contracted out, which limited the time they spent at the schools and their ability to form relationships. One participant shared that his program grew and harvested sweet potatoes, which he sent off to school nutrition to be processed and served at lunch. He shared,

"…last year…we got about 40 pounds [of sweet potatoes]. We don't have a lunchroom at our school - we have to send out. So, I sent [the sweet potatoes] with the [school nutrition] worker…they never came back to us…that was a true blow for me…" (RD, Focus Group). This loss not only impacted his confidence in his school community's ability to support the garden program, but also disrupted the learning process for students: seeing their work from start to finish and reaping the benefits of their hard work.

Additional challenges reported included limited time during the day and across the school year for educators to engage their students in the garden. One participant shared, "I teach four sections of life science and one agriculture science mini academy. I get the kids for four weeks and then they rotate…some of the kids don't get that experience of planting something…" (RD, focus group).

Ultimately, participants continued to face challenges that were outside the scope of FTS PD. Specifically, participants shared persistent barriers like establishing an FTS team at their school due to existing workloads, as well as differences between the schedules and priorities of auxiliary staff and educators. Other barriers included limitations within participants' school structures, like the amount of time available in a class period to engage students in the garden.

Teacher-Reported Student Impacts

Weekly photo prompts asked participants to capture their experience with FTS programming and emphasized the importance of photos being about *their* experience, not *their students'* experiences, while engaging in FTS. Nevertheless, our participants shared an overwhelming number of photos that captured their students hard at work in the classroom and out in the garden. This reflects the importance of students' engagement in teachers' own experiences of FTS. In both the focus group and interviews, participants described stories of

eager students and successful projects, which they linked to their experience in the GIKI program.

These positive experiences seem to validate participants' confidence around FTS-related topics and their ability to put FTS into practice. One participant explained that engaging in FTS is sometimes the only chance to have a positive experience with a student,

> I got to say, 'good job, buddy. Like, thank you. You worked so hard. I'm so proud of you. And I'm so glad we had a positive time today. I get to tell mom that you worked really hard in after school and I'm just so proud of you' and you know that sort of thing. Sometimes that was the only positive experience I had with a kid that could not keep it together in the classroom, but they could keep it together in the garden, you know? ...those kinds of programs are so hugely beneficial, to the kids and to the teachers (SG, interview).

Another explained how important these positive interactions can be for their relationship with their students, "…getting to see students who typically aren't necessarily successful in the classroom have that chance to be out there and get to experience success. It changes the relationship that I have with some of them…" (RD, Focus Group).

Participants reflected upon how FTS creates opportunities for their students to work together towards a common goal, take ownership and pride in their work, and create opportunities to learn social-emotional regulation. One teacher explained,

> It's an accomplishment. They have followed from the beginning to the end. And then someone tells them that they did a great job, and it was like, [the garden is] theirs. They own it. And that's one of the things that the kids like totally just support that (RE, Focus Group).

Another participant shared how she took the opportunity with her after school program to recuperate from an intense day with her regularly scheduled classes. She noted that on that day, her students did not plant or do anything "productive", but they did have an opportunity for emotional and social learning, which she concluded is an important outcome of being in the garden:

> One Thursday… I had just had the worst day in my regular classes, and I was like, y'all, it's actually sunny and warm do y'all want to go sit outside and listen to like a guided meditation and mindfulness...And they're like, that'd be awesome. So, we just sat in a little circle, and we listened to the thing, and oh my gosh, to feel, to feel sunshine on our back [after] so many days of, cold, just sitting and breathing outside was the biggest thing for all of us. We all needed that so much that day. Did we plant anything that day? No, we did absolutely nothing, you know, productive in the concrete sense, but it was so productive in an emotional health sense and that, that whole social emotional learning aspect of this is just a whole 'nother, huge tier of importance of it (SG, Focus Group).

Educator Motivation to Engage in FTS

In addition to our pre-identified themes that reflected our key areas of inquiry in this study, many participants revealed their personal motivations for engaging in FTS. In some cases, their motivation stemmed from their students, as well as the hands-on and work-based pedagogy of FTS.

Figure 3.7 RE PHOTO Reflection of Her Students Harvesting Sweet Potatoes.

While reflecting on photos of their students engaged in the garden, one participant explained, “It was a win for the students by providing them with an opportunity they never had before. Which makes me as a teacher feel as I have done my job (RE, PHOTO) (Figure 3.7). Another shared, “I have always wanted to share the wholesome nature of gardening. See these students take an interest in something they likely can’t do at their house is something I wanted to provide them” (TG, PHOTO) (Figure 3.8).

Figure 3.8 TG PHOTO Reflection of His Students Trying the Corn They Planted in May of 2021.

Attributes of FTS programs drive others to engage in FTS. One participant explained that she is motivated to engage her students in FTS because it is how she likes to teach: “I always feel like I’m the misfit teacher cause I’m the teacher that can’t sit…I gotta be doing…I have to be excited like the kids…in 21 years I have not taught the same thing the same way. And when you do farm-to-school, it’s never the same” (RE, Focus group). During the focus group, a participant

reflected on the similarities between everyone's photos and noted, "…all of our projects are student-based. It was the students in the garden working, your students in the field or in the greenhouse, or student donat[ing]…and being an ag[riculture] teacher, that's what I live for" (JJ, focus group).

For others, their personal motivation for engaging in FTS stems from their background or personal interest in agriculture and gardening. Their experiences and interests appeared to influence the types of projects they chose to implement and engage their students in. After describing his plan to partner with the Food2Kids program at his school, one participant reflected,

> …that's the way I grew up gardening was planting a lot of peas, picking 'em, and dropping 'em off at people's houses in five-gallon buckets…my dad would just pick 'em up and take 'em there, and he'd go back and pick his bucket up…I'm just doing what my dad did: growing stuff to give away… (TG, interview)

Throughout her interview, another teacher shared her passion for gardening and how that helps her stay motivated in a "high burnout profession",

> …it's so engaging for kids. It's so rewarding…I get to bring something that's just pure joy for me. And, you know, teaching is a high burnout profession and if you have something that helps…infuse more of your other things in life that you care about…then it does help sustain you personally…and professionally (SG, Interview).

For many participants, engaging in FTS fulfills their personal passions while performing their job.

Discussion

Results revealed that participants continued to feel confident following their participation in the GIKI program and, despite persistent barriers, continued to feel motivated to engage in FTS due to positive student outcomes and their own personal connections to agriculture and gardening. Participants shared more about their students and the impacts of their FTS program on their students during the mid-year focus group. However, in their interviews, participants reflected more on what they wish they would have done during the school year or wanted to do in the next school year. These differences reflect the pace of the school year: during the mid-year focus group our educators were embedded in what they wanted to accomplish, but during their interviews at the end of the year, they were wrapping up projects and making plans for the next year. Though there were differences between the mid-year focus group and end of the year interviews, their photo content did not change significantly over the course of the school year.

Collectively, these results reflect growing self-efficacy (SE) among our participants. Research links SE to educators' motivation and behavior, as well as students' attitude and achievement (Bandura, 1977; Holden et al., 2011). There are four major components of self-efficacy: (1) Performance accomplishment, which includes the successful application of skills and knowledge (Arslan, 2019; Bandura, 1977; Bandura & Wessels, 1994; Martin & Mulvihill, 2019). (2) Vicarious experience, which comes from learning from others, specifically watching others succeed (Arslan, 2019; Bandura, 1977; Bandura & Wessels, 1994; Martin & Mulvihill, 2019). (3) Social / verbal persuasion, which stems from encouragement while learning new skills. It may also come from positive communication between instructors, colleagues, students, parents, and administration while implementing new knowledge or skills (Arslan, 2019; Bandura, 1977; Bandura & Wessels, 1994; Martin & Mulvihill, 2019). Lastly, (4) physiological / emotional indexes, which are observed as lower levels of stress when implementing new

materials, as well as a sense of enjoyment from teaching activities (Arslan, 2019; Bandura, 1977; Bandura & Wessels, 1994; Martin & Mulvihill, 2019). Each of these is reflected in the results.

Participants in our Photovoice study shared how activities from the training—such as reflecting and planning their program goals and learning new planting methods—were successfully implemented into the farm-to-school program during the school year (*Performance Accomplishment*). When challenges impeded participants' original goals, they were able to successfully re-assess and adjust to meet their program and/or students' needs (*Physiological/Emotional Indexes*). Additionally, many participants acknowledged that the GIKI program gave them the confidence to put their goals into action and try something new (*Physiological/ Emotional Indexes*). Many participants shared that their confidence, new knowledge, and skills derive from learning through observing others' successes as part of the training (*Vicarious Experiences*). Participants reflected on the impact of training presentations and tours of successful programs such as another school's garden or the UGArden compost system (*Vicarious Experiences*). Lastly, participants shared examples of positive communication between GIKI team members, their students, their administration, and their school team (when available) (*Social/ Verbal persuasion*).

Results revealed ways in which farm-to-school programming created positive teacher-student interactions. Results reveals that positive experiences with students are significant for two reasons: (1) they increased participants' self-efficacy and (2) participants reported student impacts that break the mold and "disrupt neoliberal meritocracy that otherwise structures a student's school day" (Bisceglia et al., 2020, pg. 66).

Nevertheless, when participants faced challenges (like a negative experience working with teachers at their school) they were reluctant to try again. While professional development

can increase an educator's self-efficacy around FTS topics and ability to put FTS into practice, it cannot overcome challenges educators may face in their school or classroom: limited class time, adequate and consistent funding, and the support of a willing team within their school.

Conversely, participants shared overcoming challenges through the support of a school team. A "team" may have been just one other teacher supporting their FTS program, but the participants indicated their team was critical for their FTS program. Positive interactions and support from team members may be indicative of collective efficacy, which is linked to individuals' attitude and own self-efficacy (Holden, et al., 2011).

Limitations

The study captured a small sample of motivated public-school teachers that chose to participate in FTS and FTS PD. Likely, this sample does not represent the general body of teachers; however, this study triangulates quantitative and qualitative data to demonstrate the potential for FTS PD to overcome barriers cited in the literature and the impact of FTS PD post training intervention.

Conclusion

While the study captured a small sample of educators engaged in the GIKI teacher training program, and FTS PD more generally, it did provide a robust account of our participants' experience with FTS PD. Results revealed that FTS PD increases educators' SE by increasing their confidence, building their knowledge and skills through experiential learning, and providing networks of support. Additionally, participants shared ways in which their students were benefiting from the program as well their own motivations for engaging in FTS, which impacted their SE post-training intervention.

As Burt, Koch, and Contento (2017) determined, the results of this study suggest that PD programs such as GIKI can assist educators in building teams either through guided planning time or through the application of new activities at their schools; however, barriers persist. Being the sole actor of an FTS program may decrease teachers' self-efficacy over time. Without adequate support from other educators and colleagues at their school, as well as adequate and consistent funding educators may hesitate to implement new activities or gain access to available resources.

This study provides evidence to support FTS PD while revealing persistent barriers that may not be reduced by FTS PD alone. Our team recommends future FTS PD programs should incorporate experiential learning, guided reflection, time for integration of new knowledge and skills, and ongoing follow-up. Based on the results, the design of the FTS PD program was critical in building educators' SE. Additionally, future FTS PD programs should advocate for schoolwide participation and formal support of FTS programs from local and state school systems. Based on the results, "formal support" for FTS should include approval for all school staff to attend FTS PD and financial support of programs. Financial support could include allocating funds directly to the gardens, but more importantly towards personnel to support these programs.

Literature Cited

Ahmed, A. T., Oshiro, C. E., Loharuka, S., & Novotny, R. (2011). Perceptions of middle school educators in Hawai'i about school-based gardening and child health. *Hawaii Medical Journal*, *70*(7 Suppl 1), 11–15.

Arslan, A. (2019). The mediating role of prospective teachers' teaching self-efficacy between self-efficacy sources and attitude towards teaching profession. *International Journal of Educational Methodology*, *5*(1), 87-96.

Bandura, A. (1977). Self-efficacy: toward a unifying theory of behavioral change. *Psychological review*, *84*(2), 191.

Bandura, A., & Wessels, S. (1994). *Self-efficacy* (Vol. 4, pp. 71-81). na.

Berezowitz, C. K., Bontrager Yoder, A. B., & Schoeller, D. A. (2015). School Gardens Enhance Academic Performance and Dietary Outcomes in Children. *Journal of School Health*, *85*(8), 508–518. https://doi.org/10.1111/josh.12278

Bisceglia, A., Hauver, J., Berle, D., & Thompson, J. J. (2020). How the collaborative work of farm to school can disrupt neoliberalism in public schools. *Agriculture and Human Values*. https://doi.org/10.1007/s10460-020-10128-3

Bontrager Yoder, A. B., Liebhart, J., McCarty, D., Meinen, A., Schoeller, D., Vargas, C., & LaRowe, T. (2014). Farm to Elementary School Programming Increases to Fruits and Vegetables and Increases Their Consumption Among Those With Low Intake. *Journal of Nutrition Education and Behavior*, *46*(5), 341–349.

Bricker, P., Jackson, E., & Binkley, R. (2015). Building Teacher Leaders and Sustaining Local Communities Through a Collaborative Farm to School Education Project—What EcoJustice Work Can PreService Teachers Do?. In *EcoJustice, citizen science and youth activism* (pp. 83-97). Springer, Cham.

Burt, K. G., & Koch, P. (2017). *Gardens by integrating the curriculum*. *4*(5), 427–435.

Burt, K. G., Luesse, H. B., Rakoff, J., Ventura, A., & Burgermaster, M. (2018). School gardens in the United States: Current barriers to integration and sustainability. *American Journal of Public Health*, *108*(11), 1543–1549. https://doi.org/10.2105/AJPH.2018.304674

Diaz, J. M., Warner, L. A., Webb, S., & Barry, D. (2019). Obstacles for school garden program success: Expert consensus to inform policy and practice. *Applied Environmental Education and Communication*, *18*(3), 195–206. https://doi.org/10.1080/1533015X.2018.1450170

Drennan, J., & Hyde, A. (2008). Controlling response shift bias: The use of the retrospective pre-test design in the evaluation of a master's programme. *Assessment and Evaluation in Higher Education*, *33*(6), 699–709. https://doi.org/10.1080/02602930701773026

Dunn, C. G., Burgermaster, M., Adams, A., Koch, P., Adintori, P. A., & Stage, V. C. (2019). A systematic review and content analysis of classroom teacher professional development in nutrition education programs. *Advances in Nutrition*, *10*(2), 351–359. https://doi.org/10.1093/advances/nmy075

Graham, H., Beall, D. L., Lussier, M., McLaughlin, P., & Zidenberg-Cherr, S. (2005). Use of school gardens in academic instruction. *Journal of Nutrition Education and behavior*, *37*(3), 147-151.

Guskey, T. R. (2002). Professional development and teacher change. *Teachers and Teaching: Theory and Practice*, *8*(3), 381–391. https://doi.org/10.1080/135406002100000512

Holden, M. E., Groulx, J., Bloom, M. A., & Weinburgh, M. H. (2011). Assessing teacher self-efficacy through an outdoor professional development experience. *The Electronic Journal for Research in Science & Mathematics Education*, *15*(2).

Horwitz, J. (2012). Photovoice as a critical reflection methodology. *Agency through teacher education: Reflection, community, and learning*, 15-24.

Hussey, W. (2006). Slivers of the journey: the use of Photovoice and storytelling to examine female to male transsexuals' experience of health care access. *Journal of homosexuality*, *51*(1), 129-158.

Martin, L. E., & Mulvihill, T. M. (2019). Voices in education: Teacher self-efficacy in education. *The Teacher Educator*, *54*(3), 195-205.

Murakami, C. D., Su-Russell, C., & Manfra, L. (2018). Analyzing teacher narratives in early childhood garden-based education. *Journal of Environmental Education*, *49*(1), 18–29. https://doi.org/10.1080/00958964.2017.1357523

National Farm to School Network (n.d). *What is Farm to School*. (n.d.). Retrieved September 24, 2022, from https://www.farmtoschool.org/about/what-is-farm-to-school

Pallant, J. (2020). *SPSS survival manual: A step by step guide to data analysis using IBM SPSS*. Routledge.

Ritchie, J., Spencer, L., & O'Connor, W. (2003). Carrying out qualitative analysis. *Qualitative research practice: A guide for social science students and researchers*, *2003*, 219-62.

Robinson, S. (2017, August 19). *Starting at the End: Measuring Learning Using Retrospective Pre-Post Evaluations by Debi Lang and Judy Savageau*. Retrieved September 24, 2022, from https://aea365.org/blog/starting-at-the-end-measuring-learning-using-retrospective-pre-post-evaluations-by-debi-lang-and-judy-savageau/

Sancar, R., Atal, D., & Deryakulu, D. (2021). A new framework for teachers' professional development. *Teaching and Teacher Education*, *101*, 103305. https://doi.org/10.1016/j.tate.2021.103305

Thompson, J. J., Brawner, A., & Kaila, U. (2017). “You can’t manage with your heart”: risk and responsibility in farm to school food safety. *Agriculture and Human Values*, *34*(3), 683-699.

Thompson, J. J., Ph, D., & Narciso, M. (2017). *Georgia Organics Farm To School Evaluation*.

Wang, Caroline, Burris, M. A. (1997). *Photovoice: Concept, Methodology, and Use for Participatory Needs Assessment* (pp. 369–387). Health Education and Behavior.

CHAPTER 4

Synthesis and Conclusion

Introduction

The United State Department of Agriculture (USDA) reported that 12,334 schools operated an edible school garden across the United States during the 2018/19 school year (USDA, 2021). In Georgia, 51-75% of schools reported operational edible gardens (USDA, 2021). Although edible gardens are popular, educators wanting to participate in FTS face barriers such as a lack of horticulture and nutrition education knowledge, lack of time to fit an FTS program to their curriculum, and a lack of personnel and financial support (Burt et al., 2018; Burt, Koch, & Contento, 2017; Dunn, et al., 2019; Thompson & Narciso, 2017). Studies suggests that professional development may help to overcome these barriers (Burt, Koch, & Contento, 2017; Thompson & Narciso, 2017).

In an effort to overcome barriers related to FTS, Grow It Know It (GIKI) developed a teacher training program that was piloted in collaboration with Barrow County beginning in 2018. Between June 2018 and June 2022, the GIKI team hosted a total of four intensive summer trainings, five one-day trainings, and hosted 78 participants. Going forward, a Cooperative Extension partner in Barrow County, Alicia Holloway, intends to continue running the program with assistance from community partners such as the Wimberly Center for Community Development and faculty and staff from the University of Georgia.

This thesis examined how FTS PD impacted educators' ability to put FTS into practice. This thesis is composed of two parts: (1) an evaluation of the Grow It Know teacher training pilot program (2018-2020) and (2) an eleven-month (August 2021 – June 2022) study of educators that participated in the GIKI teacher training program. The goals of each study, methodology, and results are described in the following sections. This chapter concludes with recommendations based on the results of the studies.

Summary of Results

Chapter 2

Studies have suggested that FTS PD has the potential to bridge the gap between educators' interest in FTS and the knowledge and skills necessary to sustain FTS programs (Burt, Koch, & Contento, 2017; Thompson & Narciso, 2017); however, there are few studies that report on PD interventions (Peralta, 2020). The GIKI teacher training program sought to develop and pilot a professional development program, conduct ongoing formative assessments, and engage community members and organizations to sustain the program beyond the grant cycle. Data collected during the grant cycle includes mixed methods pre- and post-surveys, reflection materials created during the training, focus groups with past training participants, and supplemental data collected from GIKI personnel. Quantitative and qualitative data from surveys were analyzed separately and then triangulated to provide a summative evaluation of the GIKI teacher training program.

Between 2018 and 2020, the program ran two intensive three-day summer trainings and four intensive one-day trainings during the fall and spring semesters. The training reached 51 unduplicated individuals, who contributed between 8 and 48 hours towards their FTS PD. Results of the evaluation affirms that the GIKI program was successful in changing participants'

confidence regarding FTS related topics. Participants shared that they were able to set goals for their FTS program and create a plan to achieve those goals. In focus groups participants reported how the training impacted their students' learning outcomes. Participants shared that their students were more confident in the classroom, as well as examples of their students taking ownership and pride in their work. Participants indicated that their newfound confidence, ability to set goals, and student impacts were directly related to the experiential learning opportunities at the training, as well as time to reflect and integrate what they had learned. They shared examples of putting together raised beds or cooking their lunches with garden produce. Participants also noted the importance of visiting other schools with successful programs and hearing from other teachers engaged in FTS.

Based on the reports from GIKI personnel, I evaluated the impact of the "on the ground" support of the AmeriCorps VISTA and GIKI program coordinator. Their biggest contributions to schools were their ability to provide ongoing PD to teachers, engage students in hands-on activities, and build relationships within the local community to strengthen the FTS program.

Ultimately our summative evaluation answered three questions. First, *in what ways did the GIKI teacher training pilot program create and sustain an effective FTS professional development program?* The GIKI teacher training pilot program created an effective and sustainable FTS PD program by including *active learning*, *feedback,* intensive *duration* of the program, *follow-up*, *collective participation,* and *cohesion* between the program's values and that of the educator and their school (Desimone, 2009; Dunn, et al., 2019; Guskey, 2002). Second*, what student learning outcomes were documented during the grant cycle?* The student learning outcomes documented during the grant cycle included teacher-reported increases in students' confidence in the classroom associated with food and garden based experiential learning, along

with pride in their work and willingness to try new activities such as participating in a taste test with garden produce. Lastly*, how can future FTS professional development programs support educators engaging in FTS?* The results of this evaluation indicate that future FTS PD programs can support educators engaging in FTS by building upon existing networks in the community through an asset-based community development framework. Additionally, establishing communities of practice and funding personnel to support FTS programs can create opportunities for ongoing PD.

Though the GIKI program had many successes, our evaluation also identified barriers related to establishing an FTS team and gaining administrative support. In a later section of this chapter, recommendations are discussed for future FTS PD programs to help them establish effective and sustainable programs, as well as overcome persistent barriers.

Chapter 3

The evaluation of the GIKI teacher training pilot program raised several questions regarding *how* educators were applying their training into their classrooms. This approach led to an eleven-month longitudinal mixed methods study that employed Photovoice (Wang & Burris, 2997) and a retrospective pre- and post-survey with prior participants in the GIKI teacher training (n=7). The goal of this study was to: (1) determine the change in educators' confidence and teaching practice following their participation in FTS PD, (2) characterize the ways in which educators are incorporating lessons, activities, knowledge, and skills learned during FTS PD into their classrooms; (3) identify how educators capitalize on FTS PD networks and resources in order to create, expand, or maintain their FTS program; and (4) determine what additional resources and PD are still needed to sustain FTS programs.

Participants were asked to send in at least one photo per week that captured their experience with FTS or the GIKI teacher training program along with a brief description. A total of 180 photos were received from participants. Photos were used to guide a mid-year focus group in February of 2020 and individual interviews at the end of the school year (late May and early June of 2022). During the focus group and interviews participants were asked to first reflect on their photos using the PHOTO protocol (Hussey, 2006), where each letter of the acronym corresponds to a question: (1) Describe your **P**hoto. (2) What is **H**appening in your picture? (3) Why did you take a picture **O**f this? (4) What does this picture **T**ell us about your experience with FTS and(/or) the Grow It Know It program? And (5) How can this picture provide an **O**pportunity for us (/you) to sustain your FTS program? Qualitative data from focus groups and interviews were analyzed using a Framework analysis (Ritchie & Spencer, 2003).

Retrospective pre- and post-surveys were administered at the end of the school year (May/ June 2022) and captured demographics, as well as participants' reported change in confidence regarding training topics and likelihood of implementing training topics into their classroom. Change in confidence was reported on a four-point forced Likert scale (*not confident at all* to *very confident*). Likelihood was measured on a seven-point Likert scale (*very unlikely*, *neither, very likely*).

Participants in this study taught in a public school, had two or more years of teaching experience, and spent one hour or less each week teaching and preparing FTS related activities. Survey results indicated that participants' confidence increased across all sixteen topics presented at the training. Of the sixteen, eight topics had a statistically significant change in confidence ($p<.05$). When asked how likely they were to implement eight topics from the training, participants were *Very Likely* to implement "Cooking Labs, Demonstrations, and Taste

Tests", *Likely* to implement "Seed Starting and Transplanting", and *Somewhat Likely* to implement "Food Waste". Almost half of our participants reported that they were *Somewhat Unlikely* to implement "Health & Nutrition".

Qualitative analysis of the focus group and interviews examined six themes: (1) *Change in Confidence and Teaching Practice*. When asked how they felt about their ability to put FTS into practice, participants communicated that they were confident in themselves. Participants also indicated that their confidence was a result of the PD program. (2) *Incorporation of the Training Materials*. Second, participants shared which activities, knowledge, and skills from the training they applied to their teaching practices. For example, participants used planting techniques from the training while working in the garden or greenhouse with their students. Some applied their new knowledge about the food system to develop new ways to teach their curriculum like having students research and create a sustainable agriculture model.

(3) *Networks and Resources*. Participants described which networks and resources from the training they capitalized on to sustain or grow their programs. Participants emphasized that the GIKI program was able to connect them to networks in their local communities (e.g., Extension and university partners), as well as build their own support system within their school communities (e.g., an FTS Team). Beyond the scope of the PD program, participants with an FTS team explained the role of their team members in supporting their FTS program.

(4) *Persisting Barriers*. Results indicated that participants were still facing barriers related to creating an FTS team. Participants shared that their colleagues were already engaged in other programs at their school, leaving very little room for them to participate in a FS program. Participants also faced barriers when collaborating with auxiliary staff like nutrition workers. Specifically, participants shared that nutrition staff had their own work requirements and time

constraints, which limited their ability to support an FTS program at their school (beyond their efforts to serve locally grown foods). Lastly, participants shared that they had limited time in their day to engage students in the garden.

(5) *Teacher Reported Student Impacts.* While reflecting on how their experience with FTS PD impacted their students, participants shared that engaging in FTS allowed students to take ownership of their work. Additionally, participants shared examples of how the garden space created positive interactions between them and their students.

As data collection progressed, one new theme emerged within this framework: (6) *Educators' Personal Motivation for Engaging in FTS*. For some, their motivation was influenced by how they grew up: growing food and feeding others in their community. For others, FTS embodied how they liked to teach and offered an opportunity to marry their passion for gardening with their profession.

Results indicated four ways in which participating in FTD PD increased participants' self-efficacy (Arslan, 2019; Bandura, 1977; Bandura, 1994; Martin & Mulvihill, 2019). First, participants demonstrated the successful application of skills and knowledge (performance accomplishment) through their examples of incorporating components of the training into their classrooms. Second, participants explained that the hands-on learning, reflection, and observation of successful models impacted their ability to put FTS into practice (vicarious experiences). Third, participants' retrospective surveys, as well as their focus groups and interviews indicated an increase in confidence in their ability to put FTS into practice, as well as their general motivation to engage in FTS (physiological/ emotional indexes). Lastly, participants shared positive communication between the program's team members, their students, administration, and school team (social / verbal persuasion).

This study has captured a small sample of educators engaged in FTS PD; however, it provides a rich account on how educators are applying FTD PD into their classrooms and the long-term impact of said PD like increased self-efficacy around FTS programming. Though, FTS PD can provide the necessary knowledge and skills, and create networks of support, barriers such as building an FTS team persist. Based on the results recommendations are provided for future FTS PD programs, which are described in a later section.

Synthesis

Together, the results of the evaluation and eleven-month longitudinal study illustrate the impact of FTS PD. Specifically, FTS PD has the potential to change participants' confidence around FTS related topics and increase their self-efficacy. By engaging in FTS PD with GIKI, educators were given space and time to create curricular connections, as well as a set goals for their programs – including action steps to achieve those goals. Educators used networks built through FTS PD to connect to resources within their local community, further supporting the sustainability of their programs. Once participants were back in their classrooms, they experienced positive interactions with their students when engaged in FTS, and they observed students taking ownership of their educational experiences and being successful in ways these educators had not experienced before. Though barriers around building an FTS team persisted, our results revealed that through successful implementation of FTS activities and lessons, participants of the GIKI teacher training program were able to gain support from their colleagues and school administrators. For example, participants shared how the successful implementation of an FTS program such as using the garden to teach math or serving the community via a canned food drive drove interest in their FTS program and administrative approval in the form of recognition of their students' work.

Undoubtedly, the impact of an FTS PD program is influenced by the structure of the program itself. The GIKI teacher training program, framed around an asset-based community development (ABCD) and communities of practice (CoP), modeled an effective PD program as described in the summary of chapter 2. Both studies identified experiential learning, time for guided reflection, and time to plan and integrate new knowledge and skills as critical to the success of participants and their ability to put FTS into practice.

Recommendations and Future Considerations

Based on the results of these two studies, recommendations are provided for future FTS programs. First, it is recommended that future trainings employ ABCD to draw upon support from existing networks. Using ABCD allows programs to focus on the resources available in the communities they are serving rather than what the external program determines local communities "need" (Kretzmunn, n.d.; Mathie & Cunningham, 2005; Misner & Schulenkorf, 2016). In the GIKI pilot program, Barrow County had an existing FTS presence. The local school system and Cooperative Extension Agent had emerging programs to support educators engaging in FTS. Instead of creating something entirely new, GIKI collaborated with community partners including the extension agent and school nutrition staff to support existing networks. Through this collaboration and support of existing networks, educators were able to access new networks like faculty and staff at the University of Georgia who shared their knowledge and skills.

In addition to structuring PD programs as asset-based, future FTS programs should consider the impact of experiential learning, guided reflection, and time for integration of information, as well as opportunities to follow up with participants. Based on the results, the design of the FTS PD program was critical in building educators' self-efficacy.

I echo the recommendations of other studies that strongly encourage programs create opportunities for ongoing PD through the creation of communities of practice (CoP) (Bricker, et al., 2015; Warr Pederson, 2017). A CoP can be created formally (through a PD program) or informally (through the relationships and connections made at a PD program). These groups build new knowledge through sharing personal experiences, successes, and failures with one another (Wenger, 2011). The GIKI program formed and nurtured a community of practice through the initial intensive three-day training, the additional one-day trainings during the school year, and quarterly meetings held in the pilot county. Participants in the GIKI training shared that through their participation they found a community to reach out to when they had questions or were trying to solve a problem. Some specified that seeing others like them engaging in the same work (FTS) helped them feel confident in their ability to put FTS into practice.

Given the ongoing challenges and barriers to sustaining FTS efforts, I recommend that future FTS programs advocate for formal and informal support of FTS programs from local and state school systems. I define "formal support" as written approval and funding for interested school staff (educators and auxiliary) to attend FTS PD, as well as funds allocated towards FTS programs and personnel to support these programs. Funding for personnel may take the form of a county FTS program coordinator, compensation for educators running school garden programs, or full-time employment of nutrition staff. Currently, there is a great deal of informal support of FTS programs in Georgia at the state and local level. Informal support at the state level includes "commending"

FTS efforts and acknowledging how they combat Georgia's obesity crisis and through encouragement of schools to adopt FTS programs (National Farm to School Network, 2021). Based on these results, I suggest that informal support expand to include acknowledgement from

state and local school systems that FTS has the potential to benefit students in ways that are equally important as academic learning outcomes and nutritional intake of fruit and vegetables.

This study, though small, provided a robust account of FTS PD and its impact on educators. Though this study was able to provide teacher-reported student outcomes, future studies may investigate the link between teachers' participation in FTS PD and their student's academic achievement, nutritional intake, and – most importantly – their social/emotional learning outcomes, as well as their overall attitudes towards school. Additionally, this study captured educators' motivations for engaging in FTS, such as fusing their passion for gardening with their work. Future studies may investigate the relationship between FTS/ FTS PD and job satisfaction/ turnover in schools.

Conclusion

Through an evaluation of the GIKI teacher training program, and a mixed method study of participant experiences implementing FTS PD, this thesis provides evidence that FTS PD can overcome barriers cited in the literature such as the need for basic horticulture and nutrition education knowledge, as well as provide time to plan lessons that incorporate FTS into their classroom. Additionally, results suggested that FTS PD creates a community for educators to find support while engaging in FTS. Overall, FTS PD has the potential to increase educators' confidence and ability to put FTS into practice.

Literature Cited

Arslan, A. (2019). The mediating role of prospective teachers' teaching self-efficacy between self-efficacy sources and attitude towards teaching profession. *International Journal of Educational Methodology*, *5*(1), 87-96.

Bandura, A. (1977). Self-efficacy: toward a unifying theory of behavioral change. *Psychological review*, *84*(2), 191.

Bandura, A., & Wessels, S. (1994). *Self-efficacy* (Vol. 4, pp. 71-81). na.

Bricker, P., Jackson, E., & Binkley, R. (2015). Building Teacher Leaders and Sustaining Local Communities Through a Collaborative Farm to School Education Project—What EcoJustice Work Can PreService Teachers Do? In *EcoJustice, citizen science and youth activism* (pp. 83-97). Springer, Cham.

Burt, K. G., Luesse, H. B., Rakoff, J., Ventura, A., & Burgermaster, M. (2018). School gardens in the United States: Current barriers to integration and sustainability. *American Journal of Public Health*, *108*(11), 1543–1549. https://doi.org/10.2105/AJPH.2018.304674

Burt, K. G., & Koch, P. (2017). *Gardens by integrating the curriculum*. *4*(5), 427–435.

Dunn, C. G., Burgermaster, M., Adams, A., Koch, P., Adintori, P. A., & Stage, V. C. (2019). A systematic review and content analysis of classroom teacher professional development in nutrition education programs. *Advances in Nutrition*, *10*(2), 351–359. https://doi.org/10.1093/advances/nmy075

Desimone, L. M. (2009). Improving impact studies of teachers' professional development: Toward better conceptualizations and measures. *Educational Researcher*, *38*(3), 181–199. https://doi.org/10.3102/0013189X08331140

Guskey, T. R. (2002). Professional development and teacher change. *Teachers and Teaching: Theory and Practice*, *8*(3), 381–391. https://doi.org/10.1080/135406002100000512

Kretzmunn, J., & Mcknight, J. (n.d.). *Assets-Based Community Development*.

Martin, L. E., & Mulvihill, T. M. (2019). Voices in education: Teacher self-efficacy in education. *The Teacher Educator*, *54*(3), 195-205.

Mathie, A., & Cunningham, G. (2005). Who is driving development? Reflections on the transformative potential of asset-based community development. *Canadian Journal of Development Studies*, *26*(1), 175–186. https://doi.org/10.1080/02255189.2005.9669031

Misener, L., & Schulenkorf, N. (2016). Rethinking the social value of sport events through an asset-based community development (ABCD) perspective. *Journal of Sport Management*, *30*(3), 329-340.

National Farm to School Network. (2021) State Farm to School Policy Handbook 2002-2020. https://www.farmtoschool.org/resources-main/state-farm-to-school-policy-handbook

Ritchie, J., Spencer, L., & O'Connor, W. (2003). Carrying out qualitative analysis. *Qualitative research practice: A guide for social science students and researchers*, *2003*, 219-62.

Thompson, J. J., Ph, D., & Narciso, M. (2017). *Georgia Organics Farm To School Evaluation*.

USDA (2021). *Farm to School Census Results Overview*. USDA Farm to School Census. Retrieved October 15, 2022, from https://farmtoschoolcensus.fns.usda.gov/census-results-overview

Warr Pedersen, K. (2017). Supporting collaborative and continuing professional development in education for sustainability through a communities of practice approach. *International Journal of Sustainability in Higher Education*, *18*(5), 681–696. https://doi.org/10.1108/IJSHE-02-2016-0033

Wenger, E. (1998). Community of Practice: a Brief Introduction. *Learning in Doing*, *15*(4), 1–7.

Wang, Caroline, Burris, M. A. (1997). *Photovoice: Concept, Methodology, and Use for Participatory Needs Assessment* (pp. 369–387). Health Education and Behavior.

APPENDIX A: Evaluation Survey Instruments (2018-2020)

Summer 2018/2019 Survey Topics

How confident are you in the following?

1. Planning your garden space
2. Seed starting and transplanting
3. Maintaining soil health
4. Building/putting together the necessary structures for a school garden (such as irrigation and raised beds)
5. Practicing food safety with garden produce
6. (If a teacher) Using a school garden to teach required curriculum
7. (If nutrition staff) Incorporating farm to school into the school cafeteria
8. Overall school garden management
9. Teaching others (e.g., parents, colleagues, students, etc.) about issues of food insecurity and access
10. Teaching others about health and nutrition
11. Teaching other about the structure of the food system

Fall and Spring 18/19/20 Survey Topics

How confident are you in the following?

1. Creating a summer care plan for your school garden
2. Encouraging pollinator habitat in your garden
3. Troubleshooting plant disease and insect issues
4. Involving the larger community in farm to school
5. Incorporating composting into your garden, cafeteria, and/ or classroom

Pre- & Post Survey Short Answer Questions

1. (Pre) What are your goals for farm to school?
2. (Post) How have your goals for farm to school changed?
3. (Pre & Post) What do you need to be successful in terms of maintaining your school garden?
4. (Post) Why were these sessions the most helpful to you?
5. (Post) Space for any additional comments

APENDIX B: Evaluation Reflection Materials

Summer 2018	KLEW What do you Know about X? What are you Learning about X? What is the Evidence you are learning it? What are you still Wondering about X? Video Reflection: "What is your biggest takeaway from the training?"
Summer 2019	KLEW What do you Know about X? What are you Learning about X? What is the Evidence you are learning it? What are you still Wondering about X?
Fall 2018	"Garden goals: short term" "Garden goals: Long term" "Marching Orders"
Spring 2019	Session title: Continuing School Garden Plan Work, Team Building "Where are you in the process of putting together a team?" "What are the barriers within your school to making this happen?" "What are the bridges that allow us to jump across the barriers?" "Marching Orders"
Fall 2018	"Garden goals: short term" "Garden goals: Long term" "Marching Orders"

APPENDIX C: Evaluation Spring 2021 Focus Group Guides

Grow it Know It Training Program
Participant Focus Group
(Provide consent letter via email; Invite/Answer any questions)
I will now start the zoom recording. As a reminder, we will be deleting the video recording but saving the audio recording for our analysis. After I start the recording, I'm going to ask you to state your name to affirm that you agree to participate in this study.

(Hit record)
As we've just discussed, you've been presented with information about this study and had your questions answered.
If you agree to participate, please state your name one at a time.

During this time, we will ask about your experiences with the GIKI teacher training program. We are interested in how the training ultimately impacts your teaching and your students. We recognize that each school has a unique program, with varying amounts of support. When discussing "Farm-to-School" you may refer to any of the following:

Activity(ies) in your school garden
Garden-based curriculum in the cafeteria, classroom, garden, after school program
Composting programs
Or any school activities, programs, projects, etc. related to your GIKI training experience.

*We understand that COVID-19 has up-ended everything you do. We will be asking you about how this has affected what you are doing later in the interview. For the beginning of the interview, we'd like to focus on your experiences – and your momentum going into the 2020 school year (before COVID).

Please do not feel pressured to answer every question.

1. What parts of your GIKI training have been more helpful to you over the long term?
    a. Are topics that you first learned about, like horticulture knowledge, still useful to you today?
2. Describe how the GIKI TP has impacted *your teaching* overall?
    a. Has the training impacted your confidence in teaching new topics related to what you experienced during the training?
    b. Have you developed/created/shared lesson plans within your department/school/county/state?
    c. What ways do you think your work has been recognized?
3. How do you think *your students* have been impacted by your participation in GIKI TP?
    a. Are there lessons that you developed or used from the training that strongly resonated with your students? In what way?
    b. [If Initiatives, groups, like garden clubs, compost collectors - the awesome opossums and garden cats at Apalachee – are brought up] Are there any observations you

would like to share about students' reactions to participating in these groups or programs?

c. Are there any observations you would like to share about students who have participated in your school's farm to school program? (Looking for development in their wellbeing, confidence, leadership, ability to work with others, attitude towards trying new foods or activities, etc.)

4. Describe, if any, *new partnerships or collaborations* supporting your garden-based teaching that have formed since participating in the GIKI TP.

a. How has the training impacted your ability to form a FTS team within your school?

b. [If one person shares a connection or resource acquired that seems outside of the GIKI network – grant money, business donation/ partnership, etc.] Has anyone else shared similar experiences?

c. What relationships with other teachers or support organizations would you like to continue or grow? (thinking along the lines of Cooperative Extension, FTS Boosters and the School Garden Association, Wimberly Roots, Farm Bureau, UGA, between schools).

5. [CFIT / Mini Grant Awardees Focus Groups Only] Describe how the *Mini Grant and VISTA position* have shaped your farm to school Program?

a. In what ways has this helped disperse the program into other departments in your school?

b. What resources have been made available through the Mini Grant and VISTA?

c. Are there any reflections regarding the sustainability (continuation) of your school farm to school program after the VISTA has left - or now that they are no longer there - that you would like to share?

6. Let's shift gears for a moment. Undoubtedly COVID has changed everything about your teaching. How has *COVID, in particular*, impacted your capacity to put GIKI into practice?

a. What are the major challenges you've faced?

b. Unexpected opportunities?

c. What, if any, resources from the GIKI training have been useful to continue your farm to school program at this time?

7. Where do you think GIKI resources and trainings should go from here? (I'm thinking along the lines of sparking conversation of FTS Booster and Garden Association meetings and Summer Training)

a. Is there something specific you would like future meetings or trainings to focus on or a new topic to be covered?

b. What do you need to be successful in linking new networks and resources?

8. What *advice do you have* for someone just getting started with farm-to-school/garden-based teaching?

Before we leave, please message your mailing address in the chat box – directly to me is fine – so that we can mail out your coffee shop giftcards.

APPENDIX D: Evaluation Quantitative Results

Descriptive Statistics
Summer 2018 & 2019 Pre-Surveys

	N Statistic	Minimum Statistic	Maximum Statistic	Median Statistic	Std. Deviation Statistic	Skewness Statistic	Skewness Standard error	Kurtosis Statistic	Kurtosis Standard error
Q1 Planning your garden space	27	0	3	2.00	1.492	-1.366	.448	.376	.872
Q2 Seed starting and transplanting	27	0	3	2.00	1.544	-1.015	.448	-.522	.872
Q3 Maintaining soil health	27	0	3	2.00	1.282	-1.345	.448	.505	.872
Q4 Building/putting together the necessary structures for a school garden (such as irrigation and raised beds)	27	0	4	2.00	1.450	-1.216	.448	.132	.872
Q5 Practicing food safety with garden produce	27	0	4	2.00	1.556	-1.257	.448	-.028	.872
Q6 Using a school garden to teach required curriculum	27	0	4	2.00	1.772	-.398	.448	-1.689	.872
Q7 Incorporating farm to school into the school cafeteria	26	0	4	2.00	1.338	2.077	.448	2.902	.872
Q8 Overall school garden management	27	0	4	2.00	1.430	-1.209	.448	.154	.872
Q9 Teaching others (e.g. parents, colleagues, students, etc.) about issues of	27	0	4	2.00	1.441	-1.027	.448	-.212	.872

food insecurity and access									
Q10 Teaching others about health and nutrition	27	0	4	3.00	1.469	-1.229	.448	.121	.872
Q11 Teaching others about the structure of the food system	27	0	4	2.00	1.436	-1.117	.448	-.041	.872

Descriptive Statistics Summer 2018 & 2019 Post-Surveys

	N	Minimum	Maximum	Median	Std. Deviation	Skewness		Kurtosis	Kurtosis
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Standard error	Statistic	Standard error
Q1 Planning your garden space	27	0	4	3.000	1.492	-1.366	.448	.376	.872
Q2 Seed starting and transplanting	27	0	4	3.000	1.544	-1.105	.448	-.522	.872
Q3 Maintaining soil health	27	0	4	3.000	1.282	-1.345	.448	.505	.872
Q4 Building/putting together the necessary structures for a school garden (such as irrigation and raised beds)	27	0	4	3.000	1.450	-1.216	.448	.132	.872
Q5 Practicing food safety with	27	0	4	4.000	1.556	-1.257	.448	-.028	.872

garden produce									
Q6 Using a school garden to teach required curriculum	27	0	4	3.000	1.772	-.398	.448	-1.689	.872
Q7 Incorporating farm to school into the school cafeteria	27	0	4	4.00	1.338	2.77	.448	2.902	.872
Q8 Overall school garden management	27	0	4	3.000	1.430	-1.209	.448	.154	.872
Q9 Teaching others (e.g. parents, colleagues, students, etc.) about issues of food insecurity and access	27	0	4	3.000	1.441	-1.027	.448	-.212	.872
Q10 Teaching others about health and nutrition	27	0	4	3.000	1.469	-1.299	.448	.121	.872
Q11 Teaching others about the structure of the food system	27	0	4	3.000	1.436	-1.117	.448	-0.41	.872

Related Samples Wilcoxon Signed Rank Test

	Null Hypothesis	Sig.[a,b]	Decision	Total N	Test Statistic	Standard Error	Standardized Test Statistic	Asymptomatic Sig. (2-sided test)	Effect Size
1	The median of differences between PreQ1 and PostQ1 equals 0.	.001	Reject	27	202.820	29.820	2.532	.011	.345
2	The median of differences between PreQ2 and PostQ2 equals 0.	.038	Reject	27	174.000	28.264	2.070	.038	.282
3	The median of differences between PreQ3	.009	Reject	27	205.00	30.102	2.608	.009	.355

	and PostQ3 equals 0.								
4	The median of differences between PreQ4 and PostQ4 equals 0	.002	Reject	27	201.500	28.381	3.030	.002	.412
5	The median of differences between PreQ5 and PostQ5 equals 0.	.011	Reject	27	203.000	30.239	2.530	.011	.412
6	The median of differences between PreQ6 and PostQ6 equals 0.	.152	Retain	27	130.000	24.431	1.433	.152	.3443
7	The median of differences between PreQ7 and PostQ7 equals 0.	.481	Retain	26	13.000	7.089	-.705	.481	.195
8	The median of differences between PreQ8 and PostQ8 equals 0	.046	Reject	27	157.500	26.256	2.000	.046	-.096
9	The median of differences between PreQ9 and PostQ9 equals 0.	.118	Retain	27	97.500	18.878	1.563	.118	.272
10	The median of differences between PreQ10 and PostQ10 equals 0.	.112	Retain	27	109.500	20.758	1.590	.112	.213
11	The median of differences between PreQ11 and PostQ11 equals 0.	.052	Retain	27	156.000	26.196	1.947	.052	.2164

Descriptive Statistics
Summer 2018 & 2019 (Pre-Surveys)

	N	Minimum	Maximum	Median	Std. Deviation	Skewness	
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Standard error
Incorporating composting into your garden, cafeteria, and/or classroom	24	1.00	3.00	2.000	.780	.000	.472

Troubleshooting plant disease and insect issues	24	1.00	3.00	1.000	.589	.694	.472
Creating a summer care plan for your school garden	15	1.00	3.00	2.000	.704	-.092	.580
Encouraging pollinator habitat in your garden	24	1.00	4.00	2.000	.929	.535	.472
Involving the larger community in farm to school	15	1.00	4.00	2.000	.884	.116	.580

Descriptive Statistics
Fall 2018, 2019 & Spring 2019, 2020 (post-Surveys)

	N Statistic	Minimum Statistic	Maximum Statistic	Median Statistic	Std. Deviation Statistic	Skewness Statistic	Skewness Standard error	Kurtosis Statistic	Kurtosis Standard error
Incorporating composting into your garden, cafeteria, and/or classroom	14	1.00	4.00	3.000	.995	-.425	.597	-.552	1.154
Troubleshooting plant disease and insect issues	21	2.00	4.00	3.000	.590	.001	.501	.351	.972
Creating a summer care plan for your school garden	5	3.00	4.00	4.000	.547	-.609	.913	-3.333	2.000
Encouraging pollinator habitat in your garden	13	1.00	4.00	3.000	1.182	-.366	.616	-1.329	1.191
Involving the larger community in farm to school	5	2.00	4.00	4.000	.894	-1.258	.913	.312	2.000

Related Samples Wilcoxon Signed Rank Test

	Null Hypothesis	Sig.[a,b]	Decision	Total N	Test Statistic	Standard Error	Standardized Test Statistic	Asymptomatic Sig. (2-sided test)	Effect Size
1	The median of differences between *(Pre) Incorporating composting into*	.207	Retain	14	39.500	9.520	1.261	.207	.238

	your garden, cafeteria, and/or classroom and (*Post) Incorporating composting into your garden, cafeteria, and/or classroom* equals 0.								
2	The median of differences between *(Pre) Troubleshooting plant disease and insect issues* and (*Post) Troubleshooting plant disease and insect issues* equal 0.	.000	Reject	21	186.500	24.197	3.781	.000	.584
3	The median of differences between *(Pre) Creating a summer care plan for your school garden* and (*Post) Creating a summer care plan for your school garden* equals 0.	.034	Reject	5	15.000	3.536	2.121	.034	.671
4	The median of differences between *(Pre) Encouraging pollinator habitat in your garden* and (*Post) Encouraging pollinator habitat in your garden* equals 0.	.097	Retain	13	50.500	10.553	1.658	.097	.460
5	The median of differences between *(Pre) Involving the larger community in farm to school* and (*Post) Involving the larger community in farm to school* equals 0.	.059	Retain	5	10.000	2.646	1.890	.059	.845

Descriptive Statistics
Training Usefulness (Compiled from 2018-2020 Post-Surveys)

	N Statistic	Minimum Statistic	Maximum Statistic	Median Statistic	Std. Deviation Statistic	Skewness Statistic	Skewness Standard error	Kurtosis Statistic	Kurtosis Standard error
S1 Community Garden Tours	40	0	4	4.00	1.083	-2.878	.374	7.428	.733
S2 Raised Bed Building or Irrigation Demonstration	21	4	4	4.00	.000	.	.	.	.
S3 Soil Health	21	3	4	4.00	.301	-2.975	.501	7.562	.972
S4 Food Safety	21	2	4	3.00	.669	-.626	.501	-.498	.972
S5 School Tours and Lessons	43	0	4	4.00	1.310	-2.074	.361	2.888	.709
S6 Seed Starting and Transplanting	21	0	4	4.00	1.590	-1.577	.501	.700	.972
S7 Time for Incorporating What You Learned into an Action Plan	21	3	4	4.00	.359	-2.202	.501	3.138	.972
S8 Food & Social Sustainability	21	3	4	4.00	.402	-1.700	.501	.975	.972
S9 Fall Garden Crops	21	0	4	4.00	.926	-3.155	.501	11.544	.972
S10 Garden-based Cooking Lessons	21	3	4	4.00	.218	-4.583	.501	21.000	.972
S11 Pollinator Gardening	18	4	4	4.00	.000	.	.	.	.
S12 Compost/ Food Waste Session	20	3	4	4.00	.308	-2.888	.512	7.037	.992
S13 School Garden Best Practices	12	2	4	4.00	.622	-2.555	.637	6.242	1.232
S14	36	2	4	4.00	.485	-2.158	.393	4.257	.768

Garden Planning Session									
S15 Integrated Pest Management	24	3	4	4.00	.442	-1.233	.472	-.531	.918
S16 School Garden Team Session	8	3	4	4.00	.518	-.644	.752	-2.240	1.481

APPENDIX E: Evaluation Code Book (exported from Atlas.ti).

Code	Comment	Code Group 1
"w" - cafeteria		
"W" - Classroom Connection		
"W" - Community		
"W" - SG		
Classroom Connection Goal		Farm to School Goals
CoP		
FTS Goals - Post survey		
FTS Goals - Pre Surey		Farm to School Goals
PD - Barriers Resolved	6/24/21, 8:46 AM, merged with Bridge	Overcoming Barriers
PD - Building Partnership		Overcoming Barriers
PD - FTS Community/ FTS team	6/22/21, 8:44 AM, merged with PD - FTS Community/FTS Team —> resources made available throught the training	Overcoming Barriers
PD - Persisting Barriers		
PD Linking with Participatory Planning		
PD Pro - Applicable Information		Effective Professional Development
PD Pro - Hands On		Effective Professional Development
Personal Goal		Farm to School Goals
School Garden Goal		Farm to School Goals
Schoolwide Participation Goal		Farm to School Goals
VISTA - Barrier		
VISTA - Building Relationships		
VISTA - Student Engagement		

APPENDIX F: Study Data Collection Tools

Retrospective Pre- & Post-Survey
Focus Group Guide
GIKI Teacher Training – Participant Implementation
Mid-year Focus Group, PHOTO Protocol
February 22nd, 2022
PowerPoint - has the directions/ PHOTO Questions
Hello,
Thank you for taking the time to join us. I have provided a consent letter via email; At this time, I invite any questions regarding the letter. I will now start recording. As a reminder, we will be saving the audio recording for our analysis. After I start the recording, I'm going to ask you to state your name to affirm that you agree to participate in this study.

(Hit record)

As we've just discussed, you've been presented with information about this study and had your questions answered. If you agree to participate, please state your name one at a time.

(Everyone says their name)

Thank you. Throughout our discussion, we will be using a protocol called PHOTO. Each letter in the acronym corresponds with a question, which is written on the screen. We ask that you choose your top 3 photos that you have taken so far this semester. Answer the five questions for each photo. Then, create a caption for each photo that explains how the photo relates to your FTS professional development experience and why you took that specific photo. Once we have the captions, we will all participate in a gallery walk to observe and reflect with each other's experiences this year. Finally, we will meet back together and open it up for discussion.
In total we will spend 90-120 minutes. 45-60 minutes on the PHOTO protocol and another 45-60 minutes engaged in discussion.
We recognize that each of you have a unique program, so when discussing "Farm-to-School" you may refer to any of the following:

- Any activities, programs, projects, etc. related to your GIKI training experience.
- This may take place in your classroom, cafeteria, school garden space, etc. That are related to school gardens, agriculture, nutrition, cooking and taste tests, livestock, sustainability, etc.

We invite you all to have an open discussion amongst one another. We want everyone to have the opportunity to share their experience, but please do not feel pressured to answer every question. Any other questions? Let's get started!

Photo Protocol Questions
Please write a few sentences regarding each question (1-6 sentences).

- Describe your **P**hoto.
- What is **H**appening in your picture?
- Why did you take a picture **O**f this?
- What does this picture **T**ell us about your experience with farm-to-school and(/or) the Grow It Know It program?
- How can this picture provide an **O**pportunities for us (/you) to sustain your farm-to-school program?

Questions/ Topics

1. Did anyone observe similar photos and/or captions to theirs?

2. What part of your GIKI teacher training have you used thus far in the school year? Is that represented in any of your photos? Please share.
    a. What **lessons, activities, skills, knowledge** were the most useful/did you use?
    b. How is that represented in your photos, if at all?
    c. How did you incorporate aspects of the GIKI Training into your classroom?
    d. How is that represented in your photos, if at all?
3. How have your goals changed since this summer? How are your goals for your programs represented in your photos?
    a. What goals have you accomplished thus far? How are they represented in your photos?
    b. What else is needed to accomplish the goals that are left?
4. How, if at all, did the GIKI training impact the resources or networks you have used thus far in the school year? How, if at all, is it represented in your photos?
    a. Confidence, new ideas, access to resources, networks
    b. How is this captured in your photo? Can you describe your feelings in this photo?
5. How do you feel that your participation in the GIKI teacher training program has impacted your students?
    a. Did you capture this in a photo? Can you describe your feelings in this photo?
6. What challenges have you faced this year in regard to your FTS program? Is that represented in your photos? How so?
    a. How has the GIKI teacher training aided in your ability to overcome those challenges?
    b. Did you capture this in a photo? Can you describe your feelings in this photo?
    c. What advice can you share with others?
7. What else do you feel you need in order to be successful in your program?

Interview Guide

GIKI Teacher Training – Impact on Participant Practices
Individual Interviews, PHOTO Protocol
Spring 2022

Hello,

Thank you for taking the time to join us. I have provided a consent letter via email; At this time, I invite any questions regarding the letter. I will now start the audio recorder. As a reminder, we will save the audio recording for our analysis. After I start the recording, I'm going to ask you to state your name to affirm that you agree to participate in this study.

(Hit record)

As we've just discussed, you've been presented with information about this study and had your questions answered. If you agree to participate, please state your name.

(Everyone says their name)

Thank you. We will start the interview the same way we started the Focus Group Discussion. Using the PHOTO Protocol, I will ask you to reflect on your top three favorite photos, answer the 5 questions, revisit your photos, and write a caption that explains the photo and why you took it. Once we have gone through the PHOTO protocol, I will ask about your farm to school experience throughout this past school year and how that relates to your experiences from the GIKI teacher training program.

I recognize that you have a unique program, so when discussing “Farm-to-School" you may refer to any of the following:

- Any activities, programs, projects, etc. related to your GIKI training experience.
- This may take place in your classroom, cafeteria, school garden space, etc.

Any other questions? Let’s get started!

PHOTO Protocol (15-20 minutes)

1. Describe your **P**hoto.
2. What is **H**appening in your picture?
3. Why did you take a picture **O**f this?
4. What does this picture **T**ell us about your experience with farm-to-school and(/or) the Grow It Know It program?
5. How can this picture provide an **Opportunity** for us (/you) to sustain your farm-to-school program?

1. Now that you have reflected on your photos, how do you feel about your ability to put farm-to-school into practice?
    a. Did you capture this in a photo? Can you describe your feelings in that photo?
    b. Did the GIKI teacher training impact your ability to put farm-to-school into practice?
    c. What lessons, activities, skills, knowledge were the most useful/did you use?
2. What challenges did you face throughout the year?
    a. Did you capture this in a photo? Can you describe your feelings in that photo?
3. What resources, if any, helped you overcome the challenges you described above?
    a. Did you capture this in a photo? Can you describe your feelings in this photo?
4. How do you feel that your participation in the GIKI teacher training program has impacted your students?
    a. Did you capture this in a photo? Can you describe your feelings in this photo?
5. What resources do you need to create and sustain a meaningful FTS program?
    a. Funding, resources, support?
    b. What do you need from future professional development?
6. What advice would you give to someone interested in starting a FTS program (or related garden/food based teaching/learning)?
7. Is there anything else I need to know?

APPENDIX G: Study Quantitative and Qualitative Results

Quantitative and Qualitative Data Results

Retrospective Pre- and Post-Survey Statistics

	Null Hypothesis	Sig.[a,b]	Decision	Effect Size
1	The median of differences between (b4) Maintaining soil health and (now) Maintaining soil health equals 0.	.031[c]	Reject	
2	The median of differences between (b4) Planning your garden space and (now) Planning your garden space equals 0.	.062[c]	Retain	
3	The median of differences between (b4) Seed starting and transplant and (now) Seed starting and transplant equals 0.	.062[c]	Retain	
4	The median of differences between (b4) Overall school garden management and (now) Overall school garden management equals 0.	.062[c]	Retain	
5	The median of differences between (b4) Practicing f0ood safety with garden produce and (now) Practicing f0ood safety with garden produce equals 0.	.016[c]	Reject	
6	The median of differences between (b4) Practicing food safety while conducting food labs and (now) Practicing food safety while conducting food labs equals 0.	.031[c]	Reject	
7	The median of differences between (b4) Teaching about the structure of the food system and (now) Teaching about the structure of the food system equals 0.	.031[c]	Reject	
8		.016[c]	Reject	

	The median of differences between (b4) Teaching others about issues of food insecurity and (now) Teaching others about issues of food insecurity equals 0.		
9	.062[c] The median of differences between (b4) Teaching about health and nutrition and (now) Teaching about health and nutrition equals 0.	Retain	
10	.125[c] The median of differences between (b4) Incorporating FTS into the school cafeteria and (now) Incorporating FTS into the school cafeteria equals 0.	Retain	
11	.062[c] The median of differences between (b4) Incorporating FTS into your classroom and (now) Incorporating FTS into your classroom equals 0.	Retain	
12	.062[c] The median of differences between (b4) Using a school garden to teach your required curriculum and (now) Using a school garden to teach your required curriculum equals 0.	Retain	
13	.062[c] The median of differences between (b4) Using food-based learning to teach your required curriculum and (now) Using food based learning to teach your required curriculum equals 0.	Retain	
14	.031[c] The median of differences between (b4) Adapting FTS related activities or lesson to your required curriculum and (now) Adapting FTS related activities or lesson to your required curriculum equals 0.	Reject	
15	.031[c] The median of differences between (b4)	Reject	

	Locating resources for your FTS school program and (now) Locating resources for your FTS school program equals 0.		
16	.031[c] The median of differences between (b4) Getting your school community involved and (now) Getting your school community involved equals 0.	Reject	

Descriptive Statistics for Retrospective Pre-Survey

	N Statistic	Minimum Statistic	Maximum Statistic	Median Statistic	Std. Deviation Statistic	Skewness Statistic	Skewness Statistic	Kurtosis Statistic	Kurtosis
1 b4) Maintaining soil health	7	1	3	1.00	.951	.764	-1.687	-1.687	1.587
2 b4) Planning your garden space	7	1	3	2.00	1.000	.000	-2.600	-2.600	1.587
3 b4) Seed starting and transplant	7	1	4	2.00	1.254	.682	-1.099	-1.099	1.587
4 b4) Overall school garden management	7	1	4	1.00	1.291	.651	-1.704	-1.704	1.587
5	7	1	2	2.00	.535	-.374	-2.800	-2.800	1.587

b4) Practicing f0ood safety with garden produce									
6 b4) Practicing food safety while conducting food labs	7	1	3	2.00	.756	.595	-.350	-.350	1.587
7 b4) Teaching about the structure of the food system	7	1	3	2.00	.756	.595	-.350	-.350	1.587
8 b4) Teaching others about issues of food insecurity	7	1	3	2.00	.690	.174	.336	.336	1.587
9 b4) Teaching about health	7	1	3	2.00	.577	.000	3.000	3.000	1.587

and nutrition									
10 b4) Incorporating FTS into the school cafeteria	7	1	3	1.00	.787	1.760	2.361	2.361	1.587
11 b4) Incorporating FTS into your classroom	7	1	4	1.00	1.215	1.147	-.057	-.057	1.587
12 b4) Using a school garden to teach your required curriculum	7	1	3	2.00	.816	.000	-1.200	-1.200	1.587
13 b4) Using food-based learning to teach your required curriculum	7	1	3	2.00	.900	.353	-1.817	-1.817	1.587

14 b4) Adapting FTS related activities or lesson to your required curriculum	7	0	3	2.00	.976	-.277	.042	.042	1.587
15 b4) Locating resources for your FTS school program	7	1	3	2.00	.690	.174	.336	.336	1.587
16 b4) Getting your school community involved	7	1	3	2.00	.756	.595	-.350	-.350	1.587
alid N (listwise)	7								

Descriptive Statistics for Post-Survey

	N Statistic	Minimum Statistic	Maximum Statistic	Median Statistic	Std. Deviation Statistic	Skewness Statistic	Skewness Statistic	Kurtosis Statistic	Kurtosis
1 (now) Mainta	7	2	4	3.00	.577	.000	-1.687	3.000	1.587

ning soil health									
2 (now) Planning your garden space	7	3	4	3.00	.535	.374	-2.600	-2.800	1.587
3 (now) Seed starting and transplant	7	3	4	3.00	.535	.374	-1.099	-2.800	1.587
4 (now) Overall school garden management	7	3	4	3.00	.535	.374	-1.704	-2.800	1.587
5 (now) Practicing f0ood safety with garden produce	7	2	3	3.00	.488	-1.230	-2.800	-.840	1.587
6 (now) Practicing food safety while conduding food labs	7	2	4	3.00	.577	.000	-.350	3.000	1.587
7 (now) Teaching about the	7	2	3	3.00	.488	-1.230	-.350	-.840	1.587

structure of the food system									
8 (now) Teaching others about issues of food insecurity	7	2	4	3.00	.577	.000	.336	3.000	1.587
9 (now) Teaching about health and nutrition	7	2	4	3.00	.577	.000	3.000	3.000	1.587
10 (now) Incorporating FTS into the school cafeteria	7	1	3	2.00	.577	.000	2.361	3.000	1.587
11 (now) Incorporating FTS into your classroom	7	2	4	3.00	.690	-.174	-.057	.336	1.587
12 (now) Using a school garden to teach your	7	2	4	3.00	.756	-.595	-1.200	-.350	1.587

required curriculum									
13 (now) Using food-based learning to teach your required curriculum	7	2	4	3.00	.756	-.595	-1.817	-.350	1.587
14 (now) Adapting FTS related activities or lesson to your required curriculum	7	2	4	3.00	.816	.000	.042	-1.200	1.587
15 (now) Locating resources for your FTS school program	7	2	4	3.00	.690	-.174	.336	.336	1.587
16 (now) Getting your school community involved	7	2	4	3.00	.577	.000	-.350	3.000	1.587

alid N (listwise)	7								

HOW LIKELY ARE YOU TO IMPLEMENT THE FOLLOWING TOPICS OR ACTIVITIES FROM THE TRAINING	FREQUENCY	PERCENT
SOIL HEALTH		
NIETHER UNLIKELY OR LIKELY	3	42.9%
SOMEWHAT LIKELY	1	14.3%
LIKELY	3	42.9%
TOTAL	7	
GARDENING PLANNING		
NIETHER UNLIKELY OR LIKELY	1	14.3%
LIKELY	4	57.1%
VERY LIKELY	2	28.6%
TOTAL	7	
TRANSPLANTING SEEDS		
LIKELY	5	71.4%
VERY LIKELY	2	28.6%
TOTAL	7	
FOOD SAFETY		
SOMEWHAT UNLIKELY	1	14.3%
NIETHER UNLIKELY OR LIKELY	1	14.3%
SOMEWHAT LIKELY	2	28.6%
LIKELY	2	28.6%
VERY LIKELY	1	14.3%
TOTAL	7	
FOOD SYSTEMS EDUCATION		
NIETHER UNLIKELY OR LIKELY	1	14.3%
SOMEWHAT LIKELY	3	42.9%
LIKELY	3	42.9%
TOTAL	7	
HEALTH & NUTRITION		
SOMEWHAT UNLIKELY	3	42.9%
NIETHER UNLIKELY OR LIKELY	1	14.3%
SOMEWHAT LIKELY	1	14.3%
LIKELY	1	14.3%
VERY LIKELY	1	14.3%
TOTAL	7	
FOOD WASTE		
SOMEWHAT UNLIKELY	1	14.3%
SOMEWHAT LIKELY	4	57.1%
LIKELY	2	28.6%
TOTAL	7	
COOKING LABS, DEMONSTRATIONS, & TASTE TESTS		

SOMEWHAT UNLIKELY	1	14.3%
NIETHER UNLIKELY OR LIKELY	1	14.3%
LIKELY	2	28.6%
VERY LIKELY	3	42.9%
TOTAL	7	

Qualitative Analysis

Participant	Performance Accomplishment	Physiological/ Emotional Indexes	Social / Verbal Persuasion	Vicarious Experiences
BW	(3) "...we did the sustainable ag models...this is permaculture, which was new to me using the natural environment - to let it be integrated into a landscape design plan...There was no-till agriculture where students used popsicle sticks and, and showed like, what is no-till? What does that mean? So we're able to teach, Hey, we're not breaking the ground. So if you don't break the ground, when it rains, what, what doesn't happen? This was something I found but also I knew it, the reason I sent the photo, it fit the Grow It Know It model..." (BW, Interview).	(2) "This is a project I can implement every quarter w/ new students. We could build upon the project by using these models to construct real life-sized "sustainable Ag" processes on campus" (BW, interviewPHOTO)		(2) "...making sure that the compost actually cooks and doesn't just sit there. That's kind of what I saw. I saw it actually happen...at the workshop I saw it actually work, you know?" (BW_Interview).
Participant	**Performance Accomplishment**	**Physiological/ Emotional Indexes**	**Social / Verbal Persuasion**	**Vicarious Experiences**
CS		(1) "I feel comfortable dealing with planning lessons in the garden, getting students out there, working with students…" (CS_Interview)		(1)"I think the biggest thing that helped me, although I loved every part of the grow it know it Training, but it was inspiring to tour The super well established programs that we toured in Athens I can't remember the name of that…Is it Clark Middle? Yeah, touring that was super inspiring to me.

				But then also having the dedicated work time to become a student and in professional development spaces and watch A lesson unfold, and the variety of lessons the science, the Science, the history, connections that were available" (CS_Interview)

Participant	Performance Accomplishment	Physiological/ Emotional Indexes	Social / Verbal Persuasion	Vicarious Experiences
JJ	(2) "...one thing I loved about Grow it Know it was it was very hands on for us…like you hear the expression all the time, like teachers, make the worst students like they don't listen instructions you got to get their focus like it's true we are the worst. But y'all like brought us in and it wasn't just like Oh, if you throw up the PowerPoint to tell you how you're supposed to be doing it, you were like here's your like actual ingredients go cook like here's what you're supposed to do. And then we went back and reflect so through grow it know it, like the little gluing the seeds on like to paper strip. That was a cool activity that I incorporated in the classroom just to teach the kids like this is how far out, they need to be..." (JJ_Interview)	(1) "I would say I've come a long way before grow it know it, I was like if someone looked at me and said oh you're going to do, farm to school i've been Like I don't even know where to go with that, but with grow and know it, I feel like at least the first couple of steps to like get me started, or at least get the ball rolling on it, so I, I would say, I went from like a solid like three to maybe like a solid seven" (JJ_Interview)		(1) "...seeing other people's experiences...this person was scared too, and they went through it...just kind of really helped ease a lot of major questions I had..." (JJ, Interview)
Participant	**Performance Accomplishment**	**Physiological/ Emotional Indexes**	**Social / Verbal Persuasion**	**Vicarious Experiences**
RE	(1)"We were following the garden plan of planting we made last summer" (RE, FG_PHOTO)	(3) "...we've not been ready for any of the things that have happened, but we've problem solved really fast" (RE_Interview)	(1) "...the sweet potatoes, my kids till the last day of school literally talked about sweet potatoes. I mean Monica talked about how awesome that was gonna be,	(2) "...seeing that other people in the same shoes have been able to do it. And that they've goin' in different directions, different ways. There's not really a roadmap. You kind of make your own road

			and so she planted in the big bed over here. We did plant some sweet [potatoes], we planted, I wanted to say 200, two something. And then we planted 50, more, 50 to 75 more this year" (RE_Interview).	map to get where you wanna be. So, it's okay" (RE_ Interview).

Participant	**Performance Accomplishment**	**Physiological/ Emotional Indexes**	**Social / Verbal Persuasion**	**Vicarious Experiences**
RD	(1) "Using the knowledge we learned about nutrition and label reading, students were encouraged to bring in food donations that meet nutritional needs people need to sustain"(RD, FG_PHOTO) - at some point he also shares that GIKI made FTS so much more than gardening, which I think is important to include when talking about this particular project.	(1)"I think that's the thing is I've always been willing to help everybody else do something and like, you just wanna like, ah, you know, and so to have that confidence be like, oh yeah, we'll do a can drive. Let's see what we got. Right. We'll do this for mini academy" In We'll talk about nutrition..." (RD_FG).	(1)"...they were like every day, 'can we check 'em?', Not today. 'Can we check 'em?', Like, and, and then when they were ready, they're like, 'they're ready'!" (RD_FG)	(1)"that was one of the first things like working with Wick and them when they would come in and do the lessons. That was one, like they came in with all these carrots…and the kids loved it"; "wick could come in and he was like, I have this great vision for it. We're gonna do all of these. We're gonna do winter garden. There're gonna be all of these different wedges of plants. And like, he wasn't scared to give it a shot and like, let's just try it and do that. And I think that's always something I've struggled with. Like, I don't like to do it unless I know it's gonna be successful. And so I think this year there was a lot more of that for me. And I think that's why I said in my pictures, like, I'm just, I'm learning a lot more to, to let go of that control and just let it be organic and kind of happen the way it's supposed to happen and kind of do those teachable moments, like have the plan in my head, what I want, but it doesn't have to look like that necessarily. And so that's been a lot easier this year" (RD_Interview)

Participant	Performance Accomplishment	Physiological/ Emotional Indexes	Social / Verbal Persuasion	Vicarious Experiences
SG	(2) “...the times where we’ve set goals for the year ahead, we’ve sketched out ideas. We’ve planned, we’ve made priority lists. We’ve talked about where we’re gonna get resources. What do we need to do? Those things have been good and helpful, and I’ve acted on that” (SG, Interview).	(2) "you know, even things that didn't come to fruition or work is planned or whatever, you know, that's okay. I learned from that I come at it from a different angle, you know, and, and I think everybody said that, you know that what you envision and what ends up happening or sometimes fairly far apart. But that isn't a failure. It's just the nature of the beast. You know, you're, there are a lot of constraints on doing what we're doing and, and things, you know, a lot of variables that can come up and you just have to adapt and make the best of it" (SG_Interview).	(5) "I got to say, good job, buddy. Like, thank you. You worked so hard. I'm so proud of you. And I'm so glad we had positive time today. I get to tell mom that you worked really hard in after school and I'm just so proud of you and you know, that sort of thing. Um, to sometimes that was the only positive experience I had with a kid that could not keep it together in the classroom, but they could keep it together in the garden" (SG_Interview)	

Participant	Performance Accomplishment	Physiological/ Emotional Indexes	Social / Verbal Persuasion	Vicarious Experiences
TG	(1)“...if you’re not doing it for a purpose, you probably need not do it cause likely you’re spending resources [and] a ton of time. That’s what I realized in reflecting on that…it needs to be quality time spent to a positive end, not just kind of spent, because you can waste time out there really quickly” (TG_FG - this is a response after asking about the photo reflection, BUT this feels more encompassing of the GIKI program as a whole, not just the 15 minutes spent reflecting on fall photos).	(1)"One of the things that I've learned through the process is that even though it may not be one of my goals, my goals are gonna have to shift a little bit" (TG_FG)	(1) "I had some middle school students that needed some summer hours and they owed Mr. Walker some time… the cherry tomatoes [were] just rocking by this time. And they were out there, and they were like, 'oh, these are so sweet. They're so good. You could put these...'. And they're just, their little minds just went, "you could put it on this. You could put on this, you put on this". And they were thinking through where that tomato was gonna go into	(2) “I definitely have the ‘grow it’ side down. I can grow food. One thing that I would look more forward to is how to incorporate the harvested products into some of those really interactive, like now what do we do?...What I really enjoyed most about the program was making our own salad dressing and doing those kinds of things. So that’s what I think these pictures kind of represent…” (TG_Interview)

			their food…They were all healthy things. And I'm like, well, if you can get 'em out here and get 'em invested in what they're growing, maybe they'd be more invested…making better choices. Maybe you would eat five or six cherry tomatoes for a snack than a snickers bar…I think that would be a good thing to start to incorporate year after year" (TG, Interview)	