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Ana L. Kucelin

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Teacher practices, attitudes, and perceptions about the Decatur Farm to School Program

By

Ana L. Kucelin

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ABSTRACT

Title: Teacher practices, attitudes, and perceptions about the Decatur Farm to School Program

Purpose: Farm to School (F2S) Programs are increasing in number across the United States, yet research on teachers' perceptions and practices about F2S is limited. Teachers are a key component of any F2S program, since their acceptance and support influences program implementation and sustainability. The purpose of this study was to examine teacher practices, attitudes, and perceptions about the Decatur F2S Program.

Methods: City Schools of Decatur teachers completed a questionnaire designed to obtain information concerning their practices, attitudes, and perceptions regarding the Decatur F2S Program. Participants indicated their level of agreement with 18 statements using a Likert scale rating, answered an open-ended question, and recorded both implemented and desired F2S activities. Cumulative frequencies were determined for all questionnaire items, and themes were extracted for the open-ended question.

Results: Seventy percent of K – 12 teachers would like to see F2S activities implemented in their classroom, and 28% of these teachers already implement some F2S activity. The majority of teachers had positive perceptions about the Decatur Farm to School Program's impact on students, the local economy, and the environment. Teachers perceived that the F2S programs encompassed four themes: 1) supplying schools with locally grown foods; 2) educating children on healthy eating, food, and nutrition; 3) educating children on gardening and growing foods; and 4) building a strong connection between local farms, schools, and communities.

Conclusion: There is a high degree of interest and support for the Decatur F2S Program by City Schools of Decatur teachers, which is consistent with efforts to implement F2S Programs across the country. Most teachers were not familiar with the CSD F2S Program but would desire F2S activities in their schools.

TEACHER PRACTICES, ATTITUDES, AND PERCEPTIONS ABOUT THE DECATUR FARM TO SCHOOL PROGRAM

By

ANA L. KUCELIN

A Thesis Submitted to the Graduate Committee
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of the
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Table of Contents

Chapter I: Introduction 1
City schools of Decatur 1
Decatur Farm to School Program 1
Research questions 2

Chapter II: Review of Literature 3
Introduction 3
Possible reasons for the development and implementation of F2S programs 3
The farm to school movement 7
What is farm to school? 7
Description of two successful farm to school programs 8
Impact of farm to school programs 10
Farm to school challenges 12
Teacher perceptions of health related school interventions 13
Theoretical framework for the Decatur Farm to School Program 18

Chapter III: Methods 23
Subjects 23
Instrument 24
Data collection 24
Data analysis 25

Chapter IV: Results 26
Introduction 26
Study population 26
The attitudes and perceptions of CSD teachers about the F2S programs in general and the Decatur F2S Program in particular 26
General perceptions about F2S 27
Familiarity and perceptions about CSD F2S program 28
Perceptions about CSD F2S program's impact on the students 28
Perceptions about CSD F2S program's impact on the environment 30
Perceptions about the students 31
F2S practices implemented by CSD teachers in different grade levels 31
F2S practices desired by CSD teachers in different grade levels 32

Chapter V: Discussion 34
Methodology 34

Discussion on results **34**
The attitudes and perceptions of city schools of Decatur (CSD) teachers about the farm to school (F2S) programs in general and the Decatur F2S Program in particular. 34
F2S practices implemented by CSD teachers in different grade levels 38
F2S practices desired by CSD teachers in different grade levels 40
Limitations **43**
Implications for practice and recommendations for future research **44**
Conclusion **45**
References **47**
Tables **51**
Figures **54**
Appendices **61**

Abbreviations

CSD	City Schools of Decatur
F2S	Farm to School
GSU	Georgia State University
NE	Nutrition Education
NHANES	National Health and Nutrition Examination Survey
NSLP	National School Lunch Program
RDA	Recommended Daily/Dietary Allowances
SBP	School Breakfast Program
USDA	United States Department of Agriculture
WIC	Special Supplemental Nutrition Program for Women, Infants, and Children

Chapter I

Introduction

City schools of Decatur

City Schools of Decatur (CSD) is an independent public school district that serves the children within the four square mile area of Decatur, Georgia. The City of Decatur is located 15 minutes east of downtown Atlanta in DeKalb County and has approximately 18,000 residents. City Schools of Decatur has a total enrollment of 2,826 students and operates seven schools: one Early Childhood Learning Center, three Kindergarten through 3rd grade primary schools, one 4th through 5th grade academy, one middle school, and one high school (1). The Early Childhood Learning Center offers programs for Decatur children ages 0-4. The primary schools have fewer than 375 students and are located within residential neighborhoods throughout Decatur. Glennwood Academy, Renfroe Middle School, and Decatur High School serve all of the children in the district and are centrally located in the city. Seventy-seven percent of CSD teachers hold advanced degrees, most have multiple years of classroom experience, and a number of them hold multiple certifications. The average experience among teachers across the district is 15 years.

Decatur Farm to School Program

The CSD district implemented the Decatur Farm to School (F2S) Program at the beginning of the 2010/2011 school year in all seven CSD schools. The CSD F2S

Initiative was started by parents with strong support from community members, including Georgia Organics, Oakhurst Community Garden, and the CSD School Board. Teachers are a key component of any F2S Program, since their acceptance and support influences program implementation and sustainability. However, CSD teachers' attitudes, knowledge, and perceptions about the Decatur F2S Program were missing as key baseline data information. In addition, current implementation of F2S practices by CSD teachers and future activities that the teachers would like to see implemented have not yet been documented.

Research questions

This study attempts to answer the following research questions: 1) What were the attitudes and perceptions of CSD teachers about F2S programs in general and the Decatur F2S Program in particular; 2) What F2S practices have been implemented by CSD teachers in different grade levels; and 3) What F2S practices were desired by CSD teachers at different grade levels. Information from these data will be used to plan the Decatur F2S Program implementation steps for the 2011/2012 school year.

Chapter II

Review of Literature

Introduction

This literature review will explore the broader context surrounding the health of children in relation to the school food environment. More specifically, the review will consider possible reasons for the development of and increase in Farm to School (F2S) Programs across the country, including the national rise in childhood obesity, and it will describe the historical context of the school nutrition program. The study will review the F2S movement, as well as teacher perceptions of school health related interventions. Finally, the author will propose a theoretical framework for the Decatur F2S Program.

Possible reasons for the development and implementation of F2S programs

Childhood obesity. Over the last 30 years, childhood obesity has become a serious national health concern. Results from the 2007-2008 National Health and Nutrition Examination Survey (NHANES), using measured heights and weights, indicated that an estimated 17 percent of children and adolescents ages 2-19 years were obese. Between 1976-1980 and 2007-2008 incidence of obesity increased among children ages 2-5 years from 5.0 to 10.4% and among 6-11 year olds from 6.5 to 19.6% (2). Among adolescents aged 12-19, incidence of obesity increased from 5.0 to 18.1% during the same period (2). Obese children and adolescents are at risk for health problems associated with cardiovascular diseases, such as high blood pressure and high serum

cholesterol, and for Type 2 diabetes during their youth and as adults, and they are also more likely to become obese as adults (2). Because more than 30 million children eat school lunch five times a week, the importance of the school food environment in the fight against childhood obesity cannot be overlooked (3).

As a result of these trends, government and community public policy advocates have taken action to improve the school environment and aid in the fight against childhood obesity. On June 30, 2004, the Child Nutrition and WIC Reauthorization Act of 2004 was signed into law (4). This law required each school to establish a local school wellness policy by School Year 2006 (4). The Act requires each wellness policy to include goals for nutrition education, physical activity, and other school-based programs designed to promote student wellness; nutrition guidelines for all foods available on each school campus; guidelines for reimbursable school meals; a plan for measuring implementation of the local wellness policy; and, finally, community involvement (4). In addition, this law amended the National School Lunch Act and Child Nutrition Act of 1966 to, among other things, encourage improved access to local foods in schools through school gardens and farm-to-cafeteria activities (5).

Another government effort to help schools create healthy school environments was the Healthy, Hunger-Free Kids Act of 2010, which was signed into law on December 13, 2010 (6). This law's focus is to improve nutrition and reduce childhood obesity by: 1) giving USDA authority to set nutritional standards for all foods sold in schools; 2) providing additional funding to schools that meet updated nutritional standards for federally subsized lunches; 3) providing USDA with funding to provide technical assistance and farm-to-school grants to schools; 4) improving nutritional quality of

commodity foods that schools receive from USDA; 5) expanding access to drinking water; 6) setting basic standards for school wellness policies; 7) promoting nutrition and wellness in child care settings; and 8) expanding support for breastfeeding through the Women, Infants, and Children (WIC) program (6). In addition, this law has the potential to increase the number of children participating in school meal program by using Medicaid data to directly certify children who meet income requirements and to increase program mentoring and integrity through training, technical assistance, and audits (6). The effectivness of these new laws with respect to school environments and childhood obesity remains to be seen.

History of school nutrition program. The National School Lunch Act was passed in 1946 and was initially intended to fight hunger and feed low-income children. The role of the federal government has evolved since the inception of this Act, and today the USDA establishes guidelines for food served in schools for student lunches. Schools that participate in the National School Lunch Program (NSLP) must meet USDA's nutritional guidelines, specifically by limiting fat to 30 percent of total calories (with maximum 10 percent saturated fat) and by providing at least one third of the recommended daily allowances (RDA) for calories, protein, calcium, iron, and vitamins A and C. School districts are required to offer lunch to qualified students at a reduced price or free, and in return school districts are reimbursed with cash subsidies and receive free surplus USDA commodities.

According to a USDA survey, the biggest problem found with school lunches was an excess of total fat and saturated fat (7). USDA responded to this survey by providing technical and educational resources as part of the School Meals Initiative for Healthy

Children, which helped schools reduce the amount of fat in school lunches and comply with national dietary guidelines (7). The latest USDA survey, conducted in 2004-2006, found school meals to be high in sodium and low in fiber (8). These concerns were addressed by the Institute of Medicine's 2009 report, *School Meals: Building Blocks for Healthy Children,* which provides recommendations to revise standards and requirements in an effort to make school meals more healthful (9). School food service and nutrition directors are faced with challenges of minimizing costs, meeting the nutritional requirements of meals, and maximizing student participation and acceptability of meals (10).

Another issue facing the school lunch environment is that of "competitive foods" available in schools. The total school food environment consists first of foods sold as part of the national school meals programs and second of competitive foods found in vending machines and school stores, at fundraisers, and as à la carte items. Students also encounter foods served in classrooms and in-school food and beverage marketing and advertising. The final element to the school food environment is the policies and practices of the individual school district and school regarding availability of competitive foods (11). Competitive foods may be of minimal nutritional value, which means that they provide less than 5% of the Reference Daily Intake for any of eight specified nutrients (protein, vitamin A, vitamin C, niacin, riboflavin, thiamin, calcium, and iron) per serving (12). Furthermore, as long as there is no classification of competitive foods based on scientific evidence and strict regulations on students' access to them, clashes will inevitably arise between the food industry and the USDA and other public health groups (11).

The farm to school movement

F2S Programs are increasing in number and popularity across the country (13). This section will consider what F2S Programs are, their challenges, and the literature reviewing the impact of F2S Programs, as well as describe the successful F2S Programs of two early-adoption states.

What is farm to school?

According to the USDA the F2S initiative is "an effort to connect schools (K – 12) with regional or local farms in order to serve healthy meals using locally produced foods" (14). F2S Programs aim to connect students to nutritious food while simultaneously benefiting communities and local farmers (3). The application of F2S can vary between schools and F2S Programs. For some schools F2S means having a school garden and taste testing in the classroom of the food grown in the garden. To another school it may mean field trips to a local farm and local apples from the same farm in the cafeteria. The National F2S Network states that "in addition to supplying nourishing, locally grown and produced food in schools, F2S Programs offer nutrition and agriculture education through taste tests, school gardens, composting programs, and farm tours" (3). In reality, very few F2S Programs have locally grown foods offered in cafeterias, a school garden, taste tests, farm tours, and composting programs, but most programs have one or more of these components. This does not mean that the benefits of the Program are diminished, but rather it shows the complexity of the implementation and sustainability of F2S Programs in schools.

There are many reasons why people across the country are starting to eat more local produce and working to incorporate it into school lunches. There is no consensus

on a definition of "local" or "local food systems" in terms of the geographic distance between production and consumption, but, according to the Farm Bill, "locally-produced agricultural food product" is defined as one that is "raised, produced, and distributed within a locality or region and is transported less than 400 miles from its origin" (15, 16). Purchasing local produce supports local farmers. Additionally, anecdotal evidence implies that, since local produce may picked closer to ripeness, it tastes better, leading to a greater chance that adults and children will eat it.

The idea behind the F2S movement is simply encouraging children to become more familiar with the sources of their food and to learn about growing food, which may increase their willingness to eat fruits and vegetables. The ultimate goal of the F2S movement is that fruits and vegetables will replace less nutrient dense foods, such as highly processed grains and refined sugars, leading to healthier eating choices and helping in the fight against childhood obesity. No clear research evidence exists that F2S Programs reduce obesity in children, but there is evidence that they increase preferences and willingness to try fruits and vegetables (17-22). More research is needed to determine the impact of F2S Programs on children's weight and its connection to childhood obesity.

Description of two successful farm to school programs

Two U.S. states, California and Vermont, provide solid examples of how F2S Programs can be implemented and maintained successfully. The Santa Monica Malibu Unified School District F2S Program in California is one of the pioneers in the F2S movement. Its Farmers Market Salad Bar began in 1997 at one elementary school and within four years expanded to include all 14 schools in the district (23). Other F2S

components include school gardens on each campus, nutrition education in the classroom, and trips to the Santa Monica Farmers' Market. The original funding for the program came from a Department of Health Services Nutrition Network grant and donations from the Parent Teacher Association. After ten years in operation the salad bar is part of the lunch option for children and is selected by about one third of the students each day (23). The school district has established relationships with several farmers at the local farmers market with whom it places orders twice a week. Farmers harvest and pack up the produce ready for pick up by Food and Nutrition Services driver on each Wednesday and Saturday morning. Drivers sort the produce and deliver it to schools, where the Salad Bar Coordinator prepares the salad bar each day. One of the Vermont's model F2S Programs is The Burlington School Food Project, the state's largest farm to school program. Its mission is "to connect students and their families with whole, fresh, and local foods to improve the health of the community" (24). The program started with the help of a USDA Community Food Project Grant in 2003 and has been able to sustain its operations beyond the end of the grant in 2006. The district employs a F2S coordinator who works with the food service department and maintains relationships with multiple partners in the community. The F2S coordinator buys local produce directly from the farmers and indirectly from its distributors and processes seasonal produce so that it can be stored in order for schools to have a supply of local produce throughout the school year. Per a conversation with the Burlington School Food Service Director seasonal produce such as berries, broccoli, green beans, and zucchini are frozen for later use (25). Berries are frozen raw, and vegetables are blanched and frozen. Some vegetables are also used in baked goods, such as zucchini bread, and frozen as well (25).

Vermont's food service department also leads a food purchasing group, which gives smaller schools greater buying power, and has expanded the local foods market through a district-based community supportive agriculture model (CSA).

Today, F2S Programs are steadily increasing in number across the country (13). There are estimated 2,352 F2S Programs nationwide involving 9,756 schools in 48 states (13). School gardens, as part of the F2S Programs, are especially growing in number (26). Interest in the use of gardens as a teaching tool in all aspects of child's life is increasing among school administrators, health advocates, and parents (26).

Impact of farm to school programs

Despite an overall lack of large-scale research in this area, a few studies have evaluated the effects of garden-based interventions in schools or communities. Two review studies of articles published on the effects of F2S Programs and garden-based education found that no conclusions could be made yet about the impact of these programs and that more rigorous research is needed in order to evaluate these programs.

A review of eleven peer-reviewed studies published from 1990 to 2007 examined the impact of garden-based nutrition education on fruit and/or vegetable intake, willingness to taste fruits and vegetables, preferences for fruits and vegetables, and other nutrition-related outcomes (21). This review reported that the effectiveness of garden-based nutrition education initiatives is encouraging but that it is difficult to make conclusions based on the limited number of well-designed, methodologically peer-reviewed research studies available.

A second review, this one of fifteen studies published between 2003 and 2007, examined the impact of F2S Programs on behavioral outcomes, student and teacher

participation in school meal programs, food sales by farmers, and frequency of home-cooking by parents (27). The researchers found mainly positive outcomes as a result of F2S Programs implementation, but they recognized several limitations of the reviewed studies, which included lack of rigor in evaluation design, minimal assessment of long-term health indicators, lack of control groups and inadequate statistical analyses of results. Furthermore, only one study was peer-reviewed and published in an academic journal (27).

One study, not included in the two reviews, examined the effectiveness of nutrition education plus gardening in comparison to nutrition education alone or no intervention on children's fruit and vegetable knowledge, preference and consumption in 115 second-grade students (28). This researcher found a greater willingness to try fruits and vegetables in the treatment groups (28). In addition, students in the nutrition education plus gardening group reported eating significantly more vegetables at the posttest as compared to the pretest, while students in the no intervention group reported eating significantly fewer vegetables at the posttest, and the nutrition education alone group reported no difference in vegetable consumption (28).

These studies imply that garden-based nutrition education might increase children's fruit and vegetable preference and/or consumption, but the topic requires more studies with well-defined research designs and larger sample sizes to provide the knowledge base, direction, and guidelines for future interventions (26). These researchers urge more rigorous research design and evaluation methodologies for studies on F2S Programs. With an increasing number of F2S Programs across the nation, there is a serious need for more high-quality research on longer-term outcomes of F2S Programs.

Farm to school challenges

Several challenges face schools and communities as they work to implement F2S Programs – cost of the programs, produce supply, food service resources, and curricular time. The implementation process for many schools is a slow and gradual process that requires support and energy from the community, parents, teachers, and school administration.

The largest obstacle for most schools to embrace F2S concepts and activities is their cost (29). Who should pay for F2S Programs: parents, local school districts, or states? Currently, local school districts are expected to find resources to fund these programs through grants or reallocations, and, because F2S Programs are considered "operations" in the school district, they do not qualify for any educational resources the school district might have (29). Primarily due to tight school budgets, F2S Programs are difficult to implement and, importantly, to sustain.

However, the USDA has recently recognized the growing interest among school districts to incorporate F2S Programs by establishing a USDA Farm to School Team within its Food and Nutrition Services department (14). The F2S Team's role is to meet the diverse needs of school nutrition programs, to support regional and local farmers, and to provide support for health and nutrition education (14). Another important duty of the F2S Team is to provide school districts with F2S Grants, which were authorized and funded by the Healthy, Hunger-Free Children Act of 2010 (30). The funds for these grants will be available in October 2012 and may be used for training, supporting operations, planning, purchasing equipment, developing school gardens, developing partnerships and implementing F2S activities (30). Challenges in establishing F2S

Programs may remain for some time in the future, but, with increasing support for F2S movement from communities, parents, teachers, and government agencies, these challenges may soon prove easier for schools to overcome.

As previously stated, the challenges are not limited to cost. Frequently, another big obstacle to starting a successful F2S Program goes beyond a limited budget to a limited produce supply (31). Small farms often cannot guarantee a steady supply of produce because their harvest depends on the climate and weather conditions (31). Other obstacles include availability and knowledge of the kitchen staff to prepare fresh foods and support of the school administration and teachers to implement nutrition education through school gardens, farm tours, and/or taste tests (31). Most school kitchens are not equipped to prepare large volumes of fresh foods, nor are staffs trained to do so. Many teachers are under pressure to cover the academic curriculum and provide a high passing rate on standardized test by their students (31). Two previous studies that found that teachers perceived to have no time for enrichment activities such as F2S due to overcrowded curriculum (17, 32). Any school considering establishing an F2S Program must consider these challenges and address them well before a program is implemented.

Teacher perceptions of health related school interventions

The role of teachers in implementing F2S programs is crucial because their acceptance and support influences program implementation and sustainability, but data on teachers' knowledge, attitudes, and perceptions about F2S programs is very limited (27). This section will review the existing research on teachers' perceptions about F2S Programs and on research related to teachers' perceptions of similar programs that aim to influence children's eating habits and health behavior.

Research by Graham and Zidenberg-Cherr suggests that most teachers perceive school, gardens to be "somewhat effective" to "very effective" at enhancing academic performance, physical activity, language arts, and healthful eating habits (17). Fourth-grade teachers in California schools that featured gardens (n=592) completed a questionnaire on three topics related to school gardens: current practices, attitudes, and barriers (17). Researchers found that 68% of teachers use gardens for academic instruction such as teaching science, nutrition, environmental studies, language arts, math, and agricultural studies. In addition, most teachers strongly agree that teacher training for gardening, curricular materials linked to academic instruction, and nutrition lessons on teaching in the garden, would assist in academic instruction (17). The greatest barriers to using school gardens, as perceived by teachers, include lack of time; lack of teachers' interest, experience, knowledge, and training in gardening; and lack of curricular materials linked to academic standards. Researchers suggest a need for standardized curriculum materials and teacher training in gardening and nutrition, as well as an improved link between the school meal program, the garden, and healthful eating habits. The results of this study show that, even though half of the surveyed teachers (47%) were already using the garden in academic instruction, they need resources such as curriculum linked to academic instruction and basic training on gardening and nutrition (17).

Knobloch assessed elementary teachers' beliefs related to integration of food, agriculture, and natural resources topics and activities into their classroom in seven counties in Iowa (32). This study found that elementary teachers have positive attitudes about agriculture and see value in incorporating agriculture into their instruction, with

97% of the teachers agreeing that agriculture would enhance the curriculum and 84% agreeing that agriculture could be taught in any subject matter. Knobloch further explored factors that influenced the actual integration of agriculture in the curriculum by teachers, suggesting two to be significant after all factors were entered into a stepwise multiple regression model. However, the two factors explained only fourteen percent of the variance in teachers' practices of integrating agriculture in their instruction (32). The two factors include whether a teacher agrees that the food, agriculture, and natural resources topic fits into the academic subject and whether the teacher sees educational value in integrating the food, agriculture, and natural resources activities into the curriculum (32). The results of this study suggest that teachers' perceptions of the educational benefit and logical fit within academic content are the most important factors in teachers' willingness to incorporate food, agriculture, and natural resources topics and activities into their classroom.

The following three studies assessed teacher perceptions about student participation in the school breakfast program (SBP) (33-35). These studies (Lambert and colleagues, Conklin and Bordi, and Burgess-Champoux and colleagues) find that teachers generally have unfavorable impressions of the quality of the school breakfast. However, despite concerns about the perceived high-sugar, low nutritional value of school breakfasts, these studies conclude that teachers think that the SBP is a good option for those students who are unable to eat at home before school and that SBP participation should be increased in general and especially for those students receiving no breakfast at home (33-35).

Lambert and colleagues found that teachers perceive low nutritional value foods and poor quality foods being served in the SBP as primary disadvantages in student participation in SBP, even though these foods met the SBP's nutritional goals. Teachers perceive SBP as meals with no variety, limited food choices, and with inclusion of "cheap, no brand name" foods of poor quality (35). Primary advantages of student participation in SBP identified by teachers are a positive eating environment, social interactions, and improved academic performance and attendance (35). However, teachers perceive SBP as a good alternative to no food if children were getting no breakfast at home, and they think that it is important to increase SBP participation, especially for those students eating no breakfast at home. Conklin and Bordi found that the majority (62.2%) of teachers think that breakfast consumption belongs at home but that the majority of teachers support SBP if children receive no morning meal at home. The study found that 28% of teachers use a new "grab 'n go" school breakfast service as an opportunity to teach nutrition and the value of eating breakfast but that the majority of teachers (74%) did not teach nutrition in their classes (34). Teachers are uncertain or neutral about the effects of "grab 'n go" breakfast service on children's behavior, attendance, and visits to the school nurse (34). Burgess-Champoux and colleagues explored teachers' perceptions about whole-grain foods. The study found that teachers perceive many grain-based school breakfast foods such as cereals, waffles, and pancakes with syrup, to be high in sugar (33). Teachers' perceptions about quality of school meals are, in general, negative, but the majority of teachers have positive perceptions about incorporating more whole-grain foods into school meals (33). Overall, both teachers and parents suggest a gradual incorporation of whole-grain foods into school meals combined

with creative marketing strategies, such as tasting activities, to increase acceptability of whole-grain foods on the school menu (33).

Collectively, these three studies suggest that teachers are supportive of SBP because they think that eating breakfast at school in comparison to eating no breakfast at home will improve students' academic performance (33-35). Furthermore, these studies suggest that teachers can be seen as potential partners in promoting SBP for children who do not receive breakfast at home and that gaining teacher support can be valuable in increasing school meal participation (33-35).

Lastly, Lambert and Carr assessed teachers' perceptions and practices in regard to providing nutrition education (NE) to elementary students. Study participants included 482 elementary teachers randomly selected from 140 elementary schools in Arkansas and Idaho (36). The study found that 66% of teachers provide one to ten hours of NE per school year, with 27% of those teachers providing NE as a separate subject and 66% providing NE as an integrated subject. The major barriers to providing NE perceived by teachers are lack of time; lack of adequate school funds allocated to support NE; and higher priority of other subjects such as math, reading, and language (36). The majority of teachers think that they were adequately trained and feel confident (63% and 73%, respectively) in providing NE to students (36). The authors of this study suggest that, in order for NE to be effective as a part of the school wellness policy, it must first be seen as a worthy component of the curriculum and incorporated into all grade level guidelines. Furthermore, continuing education and NE training should be available for teachers and supported by school administrators, school boards, and principals. Lastly, adequate time in the classroom to provide this nutritional education should be guaranteed (36).

Theoretical framework for the Decatur Farm to School Program

A suggested theoretical framework for the F2S Program at the City Schools of Decatur (CSD) is Diffusion of Innovations or Diffusion Theory (37). Diffusion Theory can be defined as "an idea, practice or object that is perceived as new by an individual or other unit of adoption" (37). Diffusion theory suggests that new ideas or interventions are initiated by a small group of key opinion leaders who serve as role models in their social environments (38). Two school-based studies are among those that support this framework. In the first, Atkins and colleagues examined the influence of key opinion leader teachers on low-income urban schools' teachers' use of school-based mental health programs. The researchers found that teachers were more likely to adopt the use of mental health programs if they received support from the key opinion leader teachers (38). The support from the mental health providers did not make any difference in teachers' adoption of the new program, suggesting that key opinion leader teachers are a better resource in diffusion of school-based mental health programs in urban schools (38). In the second study, researchers examined the amount of support "agents of change" or computer coordinators had on student computer use in academic subjects in grades 5 and 11 (39). One interesting finding was that computer coordinators in 5th grade were able to facilitate higher adoption of student computer use by supporting teachers, though that was not the case in the 11th grade (39). This disconnect can be explained by diffusion theory, which suggests that the most effective communication occurs between individuals who are the most similar (39). Teachers in 5th grade were very similar and relied on each other, which was not the case in 11th grade (39). Both studies confirm that the new idea or intervention is more likely to be diffused if there is support from key

opinion leaders or agents of change and if these agents of change are also teachers similar to the teachers whose behavior they are trying to influence (38, 39).

Diffusion theory was suggested because Decatur F2S is a new idea or practice in the CSD that requires its stakeholders, primarily teachers, to adopt it. The Diffusion Theory includes five stages: innovation development, dissemination, adoption, implementation, and maintenance.

Diffusion theory suggests that the Innovation Development (Decatur F2S Program) is an idea or practice that is considered new to a group of people or organization that is adopting the idea or practice (37). The F2S Steering Committee, which includes mainly parents and community stakeholders, was responsible for innovation development. The Committee introduced the F2S Program idea to the CSD Board of Education, marketed the concept, and asked for approval for implementation. Parents and other local organizations, such as Georgia Organics and Oakhurst Community Garden, joined forces to offer guidance to help introduce the new idea to the CSD and also to integrate it, determine its mission and vision, and develop implementation strategies. The F2S Steering Committee formed subcommittees in order to better develop the new idea and better serve all of the needs of integrating this new program into the CSD. The committees meet once a month or according to need and include Curriculum Integration, School Menu and Procurement, Fundraising and Grants, Communication and Outreach, and Research and Evaluation.

The Dissemination Stage involves making the new idea known across the organization. After the Board's approval, the F2S Committee disseminated the idea to teachers, parents, students, and school administration staff through informal channels

such as the F2S website, F2S meetings, e-mail, word of mouth, and through formal channels such as an F2S presentation at the CSD Learning Day, teachers workshops, taste tests, and e-mails from the CSD Assistant Superintendant. The Communications and Outreach Committee's responsibility was to keep the CSD community current on all the news about the upcoming F2S Program through the Decatur F2S Facebook page, newsletter updates, email blasts, the Parent Teacher Association listserv, and other communication avenues.

The F2S Program is currently in the Adoption Stage of the process, which refers to "the uptake of the program by the target audience, which requires moving through the stages of knowledge of the innovation, persuasion or attitude development, decision, implementation, and confirmation" (37). This is a key stage of the process because at this time the target audience (teachers, school and food service staff, and students) will either adopt or reject the new idea. Teachers are identified as a key target audience because teachers will be responsible for implementing the F2S Program and interacting with students. In this stage the key obstacles to adoption will be identified as well as needs, current attitudes, and values of the target audience. The decision to adopt the innovation is influenced by three types of knowledge: awareness, procedural, and principles knowledge (37). The awareness knowledge applies to teachers' knowledge of the F2S Program's existence. Procedural knowledge applies to teachers' knowledge of how to use the F2S Program in their curriculums and classrooms. Principles knowledge applies to teachers' knowledge of understanding how the F2S Program works. The F2S Committee plans to do a post-program teacher questionnaire to determine whether teachers have adopted this new idea.

The Implementation Stage refers to the initial use of the program in practice. The F2S Program was implemented in the fall of 2010 at the beginning of the 2010/2011 school year. A key role in the smooth program implementation was played by a "linkage agent" that provided training, troubleshooting, and question-answering. The linkage agent in F2S Program implementation was the F2S Steering Committee and community stakeholders, Georgia Organics and Oakhurst Community Garden, which provided training to teachers and answered any questions and concerns. Oakhurst Community Garden performed two F2S teacher-training workshops in the spring and fall of 2010, where teachers were trained on how to incorporate F2S activities into their curricula. Further support from the linkage agents will be essential in a successful implementation of the F2S Program.

The Maintenance Stage refers to continuous use of the program and its ongoing implementation. In this stage, the new idea is fully adopted by all members of the organization and it is fully integrated in the organizational structure. The F2S Steering Committee's goal is to be in this stage in 2015.

The success of the F2S Program and its continuous use will depend on the support from all stakeholders, including teachers, parents, school administration, students, community partners, and nutrition and food service staff. Furthermore, the adoption success will depend on an ideal fit between the innovation (F2S Program) and the user (teachers). In order to achieve that ideal fit, innovation developers and promoters (F2S Steering Committee and community stakeholders) need to understand and use the best communication channels to deliver the F2S Program (innovation), initiate well established collaboration between developers and users of the systems (linkage agents),

and examine organizational and environmental characteristics in which the F2S Program takes place (diffusion context). The environment in which F2S Program takes place involves not only the school system, but also nearby farms, gardens, and the CSD community. This environment and its relevant social system are very dynamic and unpredictable. It is very important for the linkage agents to fully understand this environment in order to integrate the program and its needs with all the stakeholders.

Another consideration for the program's success might be gatekeepers for the delivery system of the innovation (CSD Board of Education, superintendant, and principals). Without the proper support from these gatekeepers, the success of the F2S Program will probably be greatly diminished. During the fall of 2011 the F2S Steering Committee plans to gain support from the principals of each of the seven CSD schools by individually meeting with each principal and presenting some of the F2S Program's successes. The gatekeepers' full support in delivering the innovation could make F2S Program move to the Implementation Stage, while the lack of principals' support could make F2S Program stay in the Adoption Stage. The proposed study will attempt to determine the perceptions about F2S program and needs of teachers (users) as key players in the success of Decatur F2S Program.

Chapter III

Methods

The purpose of the study was to examine perceptions, attitudes, and practices of City Schools of Decatur (CSD) teachers about Farm to School (F2S) Programs. The research design for this study was cross-sectional and descriptive. Teachers completed a questionnaire, which was used to collect qualitative and quantitative data. Quantitative data consisted of closed-ended items such as Likert scale responses, and qualitative data consisted of an open-ended question. Research questions were mapped to designated questionnaire questions and results were presented in this manner (Figure 1). This study was given exempt status by the Institutional Review Board of Georgia State University (GSU).

Subjects

The 272 participants consisted of all CSD teachers that participated in the CSD Learning Day, which is a mandatory continuing education event for all CSD teachers that took place on January 5th, 2010, at the Decatur High School. The sample was a convenience sample, and the CSD Learning Day was chosen as the venue to collect the data because all of CSD teachers (pre-K to high school) were supposed to be present at the Learning Day. However, pre-K teachers did not attend the event and, therefore, were not included in the study. The teachers were recruited with the assistance of the CSD Associate Superintendent, who sent an e-mail to all of the participants of the CSD

Learning Day explaining the purpose of the questionnaire and when the questionnaire would be completed. Before the questionnaire was given out, the Decatur F2S Committee Chair introduced the Decatur F2S Program and thanked participants for completing the questionnaire.

Instrument

A researcher-designed questionnaire was used in this study (Appendix A). The questionnaire consisted of five sections. Section one asked for information on the role and grade(s) the participant served at the CSD. Section two included 18 Likert scale statements measuring teachers' attitudes toward the F2S Program. The Likert scale was a 5-point scale that included strongly disagree, disagree, neutral, agree, and strongly agree columns. Section three consisted of one open-ended question about teachers' perceptions on what a F2S Program is. Section four included a table with seven F2S activities measuring F2S activities already implemented by CSD teachers. Section five included a table with nine F2S activities measuring F2S activities that CSD teachers would like to see implemented in CSD. The use of a questionnaire was selected because it allowed for data collection in a short amount of time during the lunch break. The questionnaire was validated by experts, including the Georgia Organics F2S Coordinator, the Decatur F2S Committee Chair, the CSD Associate Superintendant, and GSU faculty members.

Data collection

Questionnaires were distributed to all CSD employees and staff members present at the Learning Day event but only those questionnaires that indicated the role of a teacher and grade level served were included in the analysis. The questionnaires that had missing responses were also included in the study for the questions that were answered, if

they had the role and grades served completed. At the beginning of the lunch break, the Decatur F2S Initiative Committee Chair spoke to the staff and teachers and briefly introduced Decatur F2S Program and the purpose of the questionnaire. During that time, Decatur F2S Initiative volunteers distributed the questionnaires to each individual table where teachers and staff were sitting. Subjects had about 30 minutes to complete the questionnaire. Volunteers collected the completed questionnaires at the end of the lunch break. A total of 272 questionnaires were collected.

Data analysis

The questionnaire responses were analyzed using a combination of qualitative and quantitative methods. Qualitative analysis of the open-ended question, "Based on what you heard, briefly describe a Farm to School Program", was conducted by examining themes. To determine themes, transcripts of the answers to the open-ended question were read by two individuals, a GSU faculty member and a GSU graduate student, who independently extracted themes related to the research question. Scale responses from the questionnaire (Appendix A) were tabulated in a Microsoft Office Excel 2008 spreadsheet and divided into four groups based on the grade level served. The four groups included: K-3, 4-5, 6-8, and 9-12 grades. Frequencies for each possible response were quantified using Microsoft Office Excel 2008. Frequencies were then used to calculate percentages for responses based on the number of participants answering the questions/statements for each specific group (Figure 1). Responses to strongly disagree and disagree and responses to strongly agree and agree were added together and presented together in the results section.

Chapter IV

Results

Introduction

This chapter will describe the findings. Findings are presented according to the three research questions: 1) What are the attitudes and perceptions of City Schools of Decatur (CSD) teachers about the Farm to School (F2S) Programs in general and the Decatur F2S Program in particular; 2) What F2S practices have been implemented by CSD teachers in different grade levels; and 3) What F2S practices are desired by CSD teachers in different grade levels? Research questions were mapped to designated questionnaire questions and results were presented in this manner (Figure 1).

Study population

A total of 272 teachers completed the questionnaires. The questionnaires that were missing the role served or grades served by the teachers were excluded from the analysis (n=31). The questionnaires with roles other than teacher were also excluded from the analysis (n=77). A total of 164 teachers were included in this study analysis. Pre-K teachers did not attend the event and, therefore, were not included in the study. K-3 teachers represented 34% of the sample, while 4-5, 6-8, and 9-12 teachers represented 13%, 26%, and 27% of the sample, respectively.

The attitudes and perceptions of CSD teachers about the F2S Programs in general and the Decatur F2S Program in particular

This section presents the findings from the following subtopics: general perceptions about F2S, familiarity and perceptions about CSD F2S Program, perceptions about CSD F2S Program's impact on the students, perceptions about F2S Program's impact on environment, and perceptions about the students (Figure 1).

General perceptions about F2S. Questions 1, 4, and 19 were examined for this topic area (Figure 1). Seventy percent of the teachers thought that they understood what F2S meant (Q1). However, 28% of the teachers disagreed, were neutral, or did not know if they understood what F2S meant (Q1), and 66% of the teachers were unfamiliar with the F2S resources (Q4).

Responses from the open-ended question corroborated these responses. Theme 1 "Supply of locally grown foods in school cafeteria" found that 50% of the teachers described F2S Program as a vehicle to acquire fresh, locally grown produce for the school-prepared meals. The opinions varied from increasing, supplementing, and promoting local produce to providing, using, and serving local produce in the school cafeteria. Locally grown produce was identified as fresh, organic, and healthy. The F2S Program was identified as a bridge between local farmers and the school nutrition and cafeteria program. Some examples from participants who understood the F2S Program included: "Providing locally grown food for school meals"; "Schools attempt as much as possible to incorporate locally grown products into their nutrition program"; "Bring local fresh produce into school"; "School cafeterias acquiring fresh, organic and nearby food". There were responses from teachers who did not understand or know what F2S meant: "Still a little unclear"; "I would only be guessing at this point. However, the image I have in my head sounds intriguing and like something I'd want my school to pursue"; "I

want to know more"; "I am totally undereducated about Farm to School". Half of the teachers thought that F2S meant supply of local produce to schools with one third not being familiar with the concept at all.

Familiarity and perceptions about CSD F2S program. Questions 2, 6, 7, and 10 were examined for this topic area (Figure 1). Thirty-one percent of the teachers were familiar with the CSD F2S Program, but a larger percentage, 39%, was not familiar with the Program (Q6). Furthermore, 43% of the teachers disagreed or strongly disagreed that they were familiar with F2S practices that their school/workplace had implemented, and 35% of the teachers did not know or were neutral to the statement (Q2). Only 20% of the teachers were familiar with F2S activities implemented in their school (Q2). Eighty-two percent of the teachers thought that CSD F2S Program could have a positive impact on local business, farmers, and economy (Q7). Seventy-two percent of the teachers agreed or strongly agreed that it was possible to integrate the CSD F2S Program with the current curriculum and meet existing school standards, but 22% of the teachers were neutral or did not know if this were possible (Q10). Overall, teachers were not familiar with the CSD F2S Program or with the F2S practices implemented in their school but thought that F2S Program integration with the current curriculum was possible and that CSD F2S Program would be beneficial for local business, farmers, and economy.

Perceptions about CSD F2S program's impact on the students. Questions 8, 9, 12, 13, 16, 17, 18, and 19 were examined for this topic area (Figure 1). In Q8 and Q9, teachers thought that CSD F2S Program could influence children's preferences for fresh fruits and vegetables and increase student willingness to try new foods and choose healthier food options (87% and 84%, respectively). This result is confirmed by Q17

where 76% agreed or strongly agreed that CSD F2S Program would increase students' preferences for fresh fruits and vegetables. Overall, 83% of the teachers thought that their students would benefit from learning about F2S concepts during the day (Q12). Q16 and Q13 indicate that the majority of teachers agreed or strongly agreed that nutritious school meals are an important part of the day and that school meals have a direct impact on student performance (90% and 89%, respectively). These results are confirmed in responses to Q18 where 93% of the teachers thought that concepts taught at school can positively affect children's lives outside of school and at home. Responses from the open-ended question corroborated these responses. Theme 2 "Educating students about healthy eating, food, and nutrition" found that 25% of the teachers described the F2S Program as a means of educating students about healthy eating, food, and nutrition. The teachers saw the F2S Program as the opportunity to educate students about where the food comes from, the importance of nutrition, and the impact that eating locally grown produce has on the economy and health. Some examples of participants' answers included: "A program to help fight childhood obesity and educate students to pick healthier choices"; "Learning about better nutrition"; "Encouraging the understanding of where food comes from to our tables"; "Trying to educate communities about the impact of eating locally". Eating locally grown produce was perceived as healthy and leading to making better food choices and having better nutrition. "The importance of eating locally grown foods" was mentioned several times as a response and the overall perception was that this was important because it enabled children to pick healthier foods in the future.

Furthermore, theme 3 “Educating children on gardening/ growing food” found that 25% of the teachers described the F2S Program as an opportunity to educate children on how to grow produce in the school garden. Gardening on the school grounds was seen as a way to provide produce for the school meals, an educational experience, and the way to learn how to cook. Some examples of participants’ answers included: “Students grow food. This food is used in school nutrition program”; “Gardening on school grounds to provide meals for students-kids are heavily involved in the planting/upkeep of the garden”; “Farm to School allows students to learn how to grow their own fruits and veggies at school. Culinary art students learn how to prepare the food. Food is organic and healthy”; “Grow, learn, and eat”. Gardening was also seen as a group or community effort where children, teachers, kitchen staff, and volunteers would be involved in the raising and care/up-keep of the school garden. The process of learning how to grow produce was perceived as the most important component of having a school garden. Overall, teachers had positive perceptions about the CSD F2S Program’s impact on the students where half of the teachers perceived F2S Program as a tool to educate students about nutrition and gardening.

Perceptions about CSD F2S program’s impact on the environment. Questions 5 and 19 were examined for this topic area (Figure 1). Overall, 81% of the teachers had positive perceptions on the influence of the F2S Program on the environment (Q5). Responses from the open-ended question corroborated these responses. Theme 4 in “Connection between local farms, schools, and communities” found that 10% of the teachers described F2S Program as a connection between local farmers, schools, and communities. F2S Program was seen as a part of the bigger picture

where the connection between nutrition, economy, and community would be restored. Some examples of participants' answers included: "Create and emphasize connection between producers and consumers"; "Restoring connections between farm, nutritious food and schools"; "Using local organics to support nutrition, economy, and community"; "Linking the local community w/healthy food resources, educating the community about healthy". The connection between the local farmers, schools, and community was perceived as essential in creating healthy communities and economies. The connection between producers and consumers was seen as essential in building healthy communities. Overall, teachers thought that the CSD F2S Program had a positive impact on the environment, and 10% of teachers perceived F2S Program as a connection between local farmers, schools, and communities.

Perceptions about the students. Questions 14 and 15 were examined for this topic area (Figure 1). Fifty-nine percent of the teachers did not think that their students made healthy meal choices (Q14), and 43% of the teachers did not think that their students knew where food comes from (Q15).

F2S practices implemented by CSD teachers in different grade levels

This section presents the findings from the questionnaire where teachers were asked to indicate F2S activities already implemented in their classroom. Questions 3 and 21 were examined for this topic area (Figure 1).

Overall, 28% of the teachers reported implementing at least one F2S activity in their classrooms (Table 1). This result is confirmed by Q3, where seventy-six percent of the teachers disagreed or strongly disagreed that they are currently using F2S concepts in their curriculum.

The most F2S activities have been implemented in K-3 grades, with 33% of teachers implementing gardening, 27% of teachers implementing field trips to local farms/gardens, and 35% of teachers implementing fruit/vegetable taste tests (Table 1). Twenty-two percent and 20% of the teachers implemented cooking classes and nutrition education, respectively (Table 1). The least F2S activities were seen in 4th and 5th grades with only two teachers (5%) reporting implementing either fruit/vegetable taste tests or nutrition education (Table 1). Very few F2S activities were also seen in 6th-8th grades, with only 12% of teachers implementing at least one F2S activity (Table 1). Field trips to local farms/gardens were the most implemented F2S activity by 6th-8th grade teachers with no nutrition education or locally grown produce in the cafeteria used as a F2S activity (Table 1). 9th-12th grade teachers were the second most active group and have implemented all of the F2S activities. Gardening and fruits/vegetables taste tests were the most used F2S activity by 9th-12th grade teachers (Table 1).

Teachers were also asked to fill in a F2S activity that they were using if it was not listed in the table. Recycling was the most common "other" F2S activity listed and it was used the most by teachers in the 6th-8th grades. Teachers in 4th-5th and 9th-12th grades did not report using recycling and 1.8% of K-3 teachers used recycling as F2S activity.

F2S practices desired by CSD teachers in different grade levels

This section presents the findings from the questionnaire where teachers were asked to indicate F2S activities they wanted to see implemented at their school. Questions 11 and 22 were examined for this topic area (Figure 1).

Overall, 70% of the teachers would like to see F2S activities implemented in their school with local produce in the cafeteria being the most desired F2S activity (Table 2).

The top three F2S activities desired by K-3 grade teachers were local produce in school meals, fruit/vegetable taste tests, and environmental education, with cooking classes being the least desired F2S activity (Table 2). The top three F2S activities desired by 4th-5th grade teachers were local produce in school meals, fruit/vegetable taste tests, and field trips to local farms/gardens, with cooking classes being the least desired F2S activity (Table 2). The top three F2S activities desired by 6th-8th grade teachers were environmental education, gardening, and fruit/vegetable taste tests, with class visits from farmers being the least desired F2S activity (Table 2). The top three F2S activities desired by 9th-12th grade teachers were environmental education, local produce in cafeteria, and gardening, with field trips to local farms/gardens being the least desired F2S activity (Table 2).

Chapter V

Discussion

Methodology

Questionnaires, though most effective in obtaining a large sample size in a short period of time, may not most accurately represent teacher perceptions and attitudes about the F2S Program (40). Some questionnaire items were very similar in meaning, and most questionnaire items were written as positive statements about F2S, which could possibly influence participants' responses. Furthermore, the Likert scale contained "neutral" and "do not know" columns, which can be difficult to interpret. Finally, teacher focus groups in addition to the questionnaire might enhance the study's comprehensiveness and more accurately capture teachers' perceptions and attitudes about F2S Program due to group discussion that might provide more in-depth feedback on the topic. In addition, researcher can use non-verbal communication and behavior as a research input on the topic.

Discussion on results

The attitudes and perceptions of city schools of Decatur (CSD) teachers about the farm to school (F2S) programs in general and the Decatur F2S Program in particular.

General perceptions about F2S. The results of this study showed that most CSD teachers were familiar with what F2S means. The open-ended question findings confirmed that the majority of teachers were familiar that F2S Program could mean something different to each school. The teachers provided written examples of what F2S Program meant to them. Four themes emerged from the open-ended question, including: 1) supplying schools with locally grown foods, 2) educating children on healthy eating, food, and nutrition, 3) educating children on gardening and growing foods and 4) importance of connection between local farms, schools, and communities. Previous studies showed that F2S Programs could mean one or more of the above-described themes (18-20, 23, 26-28, 41-43).

It is important to note that theme 1 represented the opinion about F2S Program for half of the teachers. Teachers found supplying school lunches with local produce to be more healthy and desirable. Even though scientific evidence is lacking to prove that local produce has a higher nutritional value than conventional produce, the advantages of buying local produce are numerous (44). The nutritional quality of fresh produce is affected by many factors including crop variety, production method, post-harvest handling, storage, and processing and packaging (44). Local farmers are more likely to chose varieties of produce that have better taste instead of varieties that handle shipping better, which will influence the taste and variety of produce available on the market. Local produce is more likely to be harvested within 24 hours of sale, which will influence its freshness and flavor and minimize any possible damage due to packaging, shipping, and storage (44). Furthermore, because of the shorter distances that local produce travels between the harvest and the consumer in comparison to conventional produce, it is more

likely that it will be handled by fewer people and spend less time on the road, possibly reducing loss of nutrients and integrity of produce that naturally occurs over time (44). Another advantage of buying local produce is the possibility of truly knowing where our food is coming from. Getting to know local farmers and their agricultural practices can only increase consumers' knowledge about the produce they are buying. This can enable consumers to be familiar with the way the produce has been grown and help consumers in deciding which produce to buy. CSD teachers perceive bringing local produce to school lunch tables to be a primary definition of F2S Program.

However, it is not surprising that nearly a third of the teachers were not familiar with the meaning of F2S and that the majority of teachers were not familiar with F2S resources. The logical inference is that F2S is a novel idea at the CSD and that the new idea has not yet completely diffused across all the schools and classrooms. F2S concepts and programs are still considered new to most school districts across the country, and most schools still do not embrace the program regardless of the increasing interest for F2S over the last decade (27).

Familiarity with CSD F2S program. Because many of the teachers were not familiar with CSD F2S Program, perhaps additional marketing of the program and F2S resources to schools would help in exposing teachers and school staff to necessary tools in starting F2S activities in their classroom (17). Familiarity with the CSD F2S Program might help the teachers in deciding if they wanted to implement the Program or not and provide them with the necessary information necessary for that decision-making. In addition, development of curriculum materials and teacher training for gardening and nutrition would help in facilitating easier implementation of F2S activities in schools (17,

45). Additionally, training on F2S resources and how to find them could enhance existing curriculum materials linked to garden-based education and help teachers come up with ideas on how to implement F2S concepts for certain subject matters.

One surprising finding was that the majority of the teachers in our study agreed that it was possible to integrate the CSD F2S Program with the current curriculum and to continue to meet existing school standards. This finding is in contrast to two previous studies that found that teachers perceived to have no time for enrichment activities such as F2S due to overcrowded curriculum (17, 32).

In addition, the majority of teachers thought that the CSD F2S Program could have a positive impact on local businesses, farmers, and economies, which is in agreement with Knobloch (32). Local farmers typically report 5-10% of their income from F2S Programs, and, if F2S Programs purchased some of their fresh produce from the local farmers, they would benefit not only local farms, but also local economy (46).

Perceptions about CSD F2S program's impact on students. Overall, the teachers thought that F2S Program had a positive impact on the students. This finding is most likely to aid in teachers' adoption of F2S concepts in their curricula because they perceive the educational value of integrating F2S concepts in their classrooms (32). F2S concepts could be seen as a part of nutrition education. Previous studies have found that teachers thought that nutrition education should be a part of elementary students' curriculum and that schools should play an important role in the education about agriculture, food, fiber, and natural resources (36, 47).

Teachers' beliefs that the CSD F2S Program could influence children's preferences for fresh fruits and vegetables and increase student willingness to try new

foods and choose healthier food options is confirmed by previous studies of different nutrition-related school interventions, such as school gardens, in improving children's preferences for fresh fruits and vegetables and affecting students' food choices (18, 19, 21, 26-28).

Themes 2 and 3 from the open-ended question support the findings that the teachers already have positive perceptions about F2S Program outcomes. The fact that the teachers see the F2S Program as an opportunity to educate children about healthy foods and better nutrition will help in gaining the gatekeepers' support in further implementing F2S Program in CSD.

Perceptions about CSD F2S program's impact on the environment. Teachers thought that F2S activities and practices had a positive effect on the environment, which is in agreement with two previous studies (17, 32). Theme 4 from the open-ended question confirms the finding that teachers perceived F2S Program as an opportunity to restore connections between the nutrition, economy, and community. These perceptions confirm the philosophy behind buying local produce and supporting local farmers. The "local" movement empowers consumers to get to know local farmers and to know the source of their food. By supporting local farmers and sustainable agricultural practices consumers support what is the best for the environment while supporting local economy.

Perceptions about the students. It is not surprising that the teachers did not think that their students make healthy meal choices and did not think that their students know the source of their food. Previous studies have shown that teachers have generally unfavorable opinions about the quality of school meals, which could contribute to their attitudes about their students making unhealthy meal choices (33, 35). Another study

also found that elementary and middle school teachers do not think that their students understand where their food comes from and do not care how it arrives at their table (47).

F2S practices implemented by CSD teachers in different grade levels. Across all grades, only a very small percentage of the teachers implemented F2S activities in their classrooms, with the fruits/vegetables taste tests being the most implemented F2S activity. It is important to look at possible reasons why such a small group implemented F2S activity. Aside from the F2S activities and concepts being new to the CSD teachers, there are several other reasons why teachers possibly did not choose to implement enrichment activities such as F2S. The reasons include: overcrowded curriculum, increased accountability through standardized testing, being uncomfortable with the content, and not seeing benefits of integrating the activity in their classroom (32). A previous study of elementary teachers showed that two factors that influenced teachers to integrate some sort of food, agricultural, and natural resources topic into their classroom included: teacher agreement that these topics would fit in with academic subjects, and whether the teacher saw the educational value of integrating them into the school curriculum (32).

Another study found that the greatest barrier for teachers to use the garden for academic instruction was time (17). Other barriers to using school garden in academic instruction included lack of teachers' interest, knowledge, and experience with gardening, lack of curricular materials linked to academic standards, and lack of teacher training in relation to gardening (17).

It is equally important to consider why there were considerable differences between the grade levels in the amount of F2S activities implemented. One would not

expect almost no F2S activities implemented by teachers in 4-5th and 6-8th grades and more than expected F2S activities implemented by K-3rd and 9-12th grade teachers. What could be the possible reasons for these findings? Could it be the lack of champions in 4-8th grade levels and an existence of one in K-3rd and 9-12th grades? MacLlellan and colleagues identified principals as important champions for change in developing school nutrition policies after interviewing principals, teachers, and members of the policy working group in elementary schools in Canada (48). Principals can be considered gatekeepers for the delivery system of the innovation, such as an F2S Program, and, without their support and policy changes, any new programs might be harder to implement and be adopted by school staff and teachers (37, 49). Is there a difference in perceptions about F2S Program by principals in different CSD schools? This information is not yet available, but it will be crucial to acquire it in order to further diffuse and implement F2S Program across all of the CSD schools. One important champion recognized in the 9-12th grades was a student who was very passionate about starting a school garden in Decatur High School. At first the student did not get a support from the school administration, but, with persistence and community support, the student was able to start the school garden, which was the first step in implementing F2S activities in the Decatur High School. Identifying champions for change in each school, in addition to gaining the support from the gatekeepers, is warranted for the success of the CSD F2S Program.

F2S practices desired by CSD teachers in different grade levels. The majority of the teachers would like to incorporate F2S concepts into their work, which shows that they are ready to adopt the new idea of using F2S activities in their classrooms and

academic instruction. The most desired F2S activity by all teachers was incorporating local produce in school meals. These findings are encouraging since the main goal of CSD F2S Program is to incorporate locally grown foods into the school cafeteria and meals. In addition, most students might try new locally grown produce introduced by CSD F2S Program because fruit/vegetable taste tests is one of the most implemented F2S activities in the classrooms.

The most desired F2S activities by K-3rd and 4-5th grade teachers were local produce in school meals and fruit/vegetable taste tests, with cooking being the least desired F2S activity. Since fruit/vegetable taste tests are the most implemented F2S activity in K-5th grades, this may document teachers' preference for this F2S activity or confidence in implementation of this F2S activity in their curriculum. The possible reasons for low desire for cooking activities by teachers could be lack of cooking skills, perception of cooking as time-consuming, lack of equipment, and lack of interest.

The most desired F2S activities by 6-8th and 9-12th grade teachers were environmental education and gardening, with trips to local farms/gardens and class visits the least desired F2S activities by 9-12th grade teachers and cooking classes and class visits from farmers being the least desired F2S activities by 6-8th grade teachers. It is not surprising that environmental education such as recycling and composting was the most desired F2S activity by 6-12th grades because a small percentage of teachers already have started to implement these activities in their classrooms, especially at the 6-8th grades. Gardening being one of the most implemented and desired activities by 9-12th teachers could possibly demonstrate that teachers really enjoy using the school garden in academic instruction, which is in agreement with two previous studies (17, 45). In addition, it

could demonstrate that F2S activities are diffused more smoothly when teachers learn from other teachers that are champions or "agents of change", who successfully have implemented gardening in their curricula (39).

These results present two important opportunities for a successful diffusion of CSD F2S Program. One opportunity is presented in the cafeteria where one of the lowest implemented F2S activities, local produce served in cafeteria, is also the most desired F2S activity by the teachers. The second opportunity is presented in the classroom where one of the most implemented F2S activities, fruits/vegetables taste tests, is the second most desired F2S activity by the teachers. These are great opportunities because they will help integrate the F2S Program in the cafeteria and in the classroom at the same time and help to better diffuse the F2S concepts and activities throughout the schools. In order to make the diffusion work successfully, there will need to be support from gatekeepers (principals), food service staff, teachers, and parents (Parent Teacher Association). Principals can provide support through leadership, communication, and policy improvement on the issue, such as participate themselves in certain F2S activities or support F2S efforts in meetings and media. Food service staff can provide support through willingness to get necessary training and skills to implement new recipes and new food preparation, such as learning new techniques to prepare large amounts of fresh produce. Teachers can provide support through willingness to learn new ways of implementing F2S activities in their classroom and curriculum. Teachers can also communicate and learn from other teachers who are champions and are already successful in implementing F2S activities in their classroom. Parents can provide support by providing time to volunteer in F2S activities and in raising funds, such as organizing

community events that would benefit CSD F2S Program through the Parent Teacher Association. These two opportunities can also be integrated to better diffuse the F2S Program. For example, during the week that cafeteria will be serving kale from the gardens for school lunch, teachers can serve kale vegetable taste tests in the classroom and already expose the students to kale. Teachers can provide a short nutrition education lesson on kale during the vegetable taste tests, which would provide students some knowledge and familiarity with kale when they see it served in the cafeteria. Teachers can work together with food service staff in coordinating these events throughout the school year in order for children to get repeated messages in the classroom and in the cafeteria. Integrating F2S activities in the classroom and in the cafeteria will help diffuse F2S concepts through out the schools, and continuous parents' support through raising funds and providing volunteer time, as well as support from principals, food service staff, and teachers will be crucial in further diffusion and sustainability of the CSD F2S Program.

Limitations

Three main limitations were identified for this study. The first was the method of validating the questionnaire. The questionnaire developed for this study, although reviewed and validated by a panel of experts, was not tested for clarity or readability. The second limitation was the sample used for this study. Pre-K teachers were not included due to their absence at the time and location when the questionnaire was distributed; thus the analysis did not include the full teacher body of the CSD. Also, results are limited only to the CSD school district. The third limitation was the timing of the questionnaire distribution. It was distributed during lunchtime, and participants had a

limited time to complete it. Possible distractions during the lunch break such as eating, talking, bathroom breaks, and socializing, could have influenced participants to not fully complete the survey.

Implications for practice and recommendations for future research

The findings of this study suggest several implications for practice. First, there are multiple ways by which the F2S Program was perceived by CSD teachers, with one third of the teachers being completely unfamiliar with the concept. A comprehensive education and/or marketing of CSD F2S program with a clear message of what the CSD F2S Program is will be needed in order for all teachers to perceive the CSD F2S Program in the same way and be familiar with it. Second, because only a small percentage of the teachers had implemented some form of F2S activity, further research to uncover perceived and/or actual barriers to teacher implementation of F2S activities is warranted, especially at the 4-8th grades where F2S activity is very limited. In addition, further research is needed on gatekeepers' (principals, superintendant, school board) perceptions about F2S Program, including perceived and/or actual barriers to F2S Program implementation. Third, because the most desired F2S activity by all teachers was incorporating locally grown foods in cafeteria and school meals, it is important to develop ways for teachers to be involved in this process. Involving them in the process of planning and adopting F2S concepts and activities will further diffuse the idea of F2S and will help in teachers' knowledge, experience, and interest in F2S activities. Furthermore, providing training for teachers on nutrition, gardening, and how to incorporate F2S activities into their curriculum will be essential in a successful implementation of F2S activities by teachers. Fourth, it may prove effective to determine

food service staff members' and parents' perceptions and attitudes about F2S Programs. Food service staff, who will be preparing food and might have increased workloads and experience increased cost of foods, may require extra training to perform increased food preparation, as well as more funds to cover the cost of local produce. Their support and willingness to learn will be essential in the successful implementation of F2S Programs. Parents' perceptions about F2S Programs are equally important because children will need to have F2S concepts reinforced at home, and without parental support, this will be difficult. Parents are also most likely to volunteer with F2S activities and are going to be crucial in raising funds for the Program through Parent-teacher association and fundraising events.

Conclusion

The results from this study illustrate that there is a high degree of interest and support for F2S Program by CSD teachers, which is consistent with efforts to implement F2S Programs across the country (27). Teachers and principals were earlier identified as key players in adoption of the F2S Program (38, 39, 48, 49). Focus groups and in-depth interviews with the teachers and principals might provide researchers with data on perceived and/or actual barriers to implementing F2S activities in their classrooms and schools. In addition to guidance from teachers and principals, comprehensive support from parents and community is vital to adoption, implementation, and continuous operation of F2S programs. Implementation and sustainability of F2S Programs will depend on how well challenges are addressed and overcome. Cost, consistent food supply, and teacher constraints are some of the major issues that need to be addressed. Well-designed research to determine the best ways to integrate F2S Programs, as well as

to demonstrate clear evidence of their success, may help pave the way to more widespread adoption.

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List of Tables

Tables		Page
1.	Farm to School Activities Implemented by City Schools of Decatur Teachers……..	53
2.	Farm to School Activities Desired by City Schools of Decatur Teachers…….	54

Table 1

Farm to School Activities Implemented by City Schools of Decatur Teachers

Grade	Gardening (%)	Cooking classes/demonstrations (%)	Field trips to local farms/gardens (%)	Fruit/Vegetable taste tests (%)	Nutrition education (%)	Local produce served in school cafeteria (%)	At least one F2S activity (%)
K – 3	33	22	27	35	20	6	53
4 – 5	0	0	0	5	5	0	14
6 – 8	2	2	5	2	0	0	12
9 – 12	11	9	11	9	9	9	20
Total	15	10	13	15	10	4	28

Note 1. Pre-K teachers were not included because they did not attend the event during which data was collected.
Note 2. Total number of K – 3 teachers = 55, total number of 4 – 5 teachers = 22, total number of 6 – 8 teachers = 42, total number of 9 – 12 teachers = 45, total number of teachers = 164.

Table 2

Farm to School Activities Desired by City Schools of Decatur Teachers

Grade	Gardening (%)	Cooking classes/ Demonstrations (%)	Field trips to local farms/gardens (%)	Fruits/Vegetables taste tests (%)	Nutrition education (%)	Local produce served in school cafeteria (%)	Environmental education (%)	Class visits from farmers/gardeners (%)	I would like to incorporate CSD F2S concepts into my work (%)
K – 3	69	47	51	78	69	84	71	58	78
4 – 5	68	55	73	77	64	77	68	64	64
6 – 8	81	64	74	79	67	76	83	62	69
9 – 12	62	53	44	58	56	62	67	51	67
Total	70	54	58	73	64	75	73	58	70

Note 1. Pre-K teachers were not included because they did not attend the event during which data was collected.
Note 2. Total number of K – 3 teachers = 55, total number of 4 – 5 teachers = 22, total number of 6 – 8 teachers = 42, total number of 9 – 12 teachers = 45, total number of teachers = 164.

List of Figures

Figures Page

1. Research Questions Mapped to Designated Questionnaire Questions……... 55

Figure 1

Research Questions Mapped to Designated Questionnaire Questions

Research Question 1: What were the attitudes and perceptions of City Schools of Decatur teachers about the Farm to School programs in general and the Decatur Farm to School program in particular?

General Perceptions about Farm to School

Q1) I understand what Farm to School means.
1. 3.0% (Strongly disagree)
2. 10.4% (Disagree)
3. 12.2% (Neutral)
4. 53.0% (Agree)
5. 17.1% (Strongly Agree)
6. 2.4% (Do not know)

Q4) I am familiar with Farm to School resources available.
1. 23.2% (Strongly disagree)
2. 42.7% (Disagree)
3. 17.7% (Neutral)
4. 5.5% (Agree)
5. 1.2% (Strongly Agree)
6. 6.1% (Do not know)

Q19) Based on what you heard, briefly describe a Farm to School Program-
Theme 1: Supply of locally grown foods in school cafeteria.

Familiarity and Perceptions about City Schools of Decatur Farm to School Program

Q2) I am familiar with Farm to School practices that my school/workplace has implemented.
1. 7.3% (Strongly disagree)
2. 35.4% (Disagree)
3. 25.6% (Neutral)
4. 15.9% (Agree)
5. 4.3% (Strongly Agree)
6. 9.1% (Do not know)

Q6) I am familiar with the City Schools of Decatur Farm to School Program.

Research Questions Mapped to Designated Questionnaire Questions (continued)

1. 9.8% (Strongly disagree)
2. 29.3% (Disagree)
3. 23.8% (Neutral)
4. 26.2% (Agree)
5. 4.3% (Strongly Agree)
6. 3.7% (Do not know)

Q7) City Schools of Decatur Farm to School Program can have a positive impact on local business, farmers, and economy.

1. 3.7% (Strongly disagree)
2. 0.6% (Disagree)
3. 8.5% (Neutral)
4. 29.3% (Agree)
5. 52.4% (Strongly Agree)
6. 4.3% (Do not know)

Q10) It is possible to integrate City Schools of Decatur Farm to School Program with the current curriculum and meet existing school standards.

1. 3.0% (Strongly disagree)
2. 1.8% (Disagree)
3. 12.2% (Neutral)
4. 37.2% (Agree)
5. 34.8% (Strongly Agree)
6. 9.8% (Do not know)

<u>Perceptions about City Schools of Decatur Farm to School Program's impact on the students</u>

Q8) City Schools of Decatur Farm to School Program can influence children's preferences for fresh fruits and vegetables.

1. 3.0% (Strongly disagree)
2. 0.0% (Disagree)
3. 5.5% (Neutral)
4. 35.4% (Agree)
5. 51.8% (Strongly Agree)
6. 3.0% (Do not know)

Research Questions Mapped to Designated Questionnaire Questions (continued)

Q9) City Schools of Decatur Farm to School Program can increase student willingness to try new foods and choose healthier food options.

1. 3.0% (Strongly disagree)
2. 0.0% (Disagree)
3. 7.9% (Neutral)
4. 32.9% (Agree)
5. 51.2% (Strongly Agree)
6. 3.0% (Do not know)

Q12) My students would benefit from learning about Farm to School concepts during the day.

1. 1.2% (Strongly disagree)
2. 1.2% (Disagree)
3. 7.9% (Neutral)
4. 44.5% (Agree)
5. 38.4% (Strongly Agree)
6. 4.3% (Do not know)

Q13) School meals have a direct impact on student performance.

1. 1.8% (Strongly disagree)
2. 0.6% (Disagree)
3. 4.3% (Neutral)
4. 26.8% (Agree)
5. 62.2% (Strongly Agree)
6. 1.8% (Do not know)

Q16) Nutritious school meals are an important part of the day.

1. 1.2% (Strongly disagree)
2. 0.6% (Disagree)
3. 2.4% (Neutral)
4. 23.2% (Agree)
5. 67.1% (Strongly Agree)
6. 1.8% (Do not know)

Q17) City Schools of Decatur Farm to School Program will increase my students' preferences for fresh fruits and vegetables.

1. 1.8% (Strongly disagree)
2. 2.4% (Disagree)

Research Questions Mapped to Designated Questionnaire Questions (continued)

3. 7.9% (Neutral)
4. 29.3% (Agree)
5. 47.0% (Strongly Agree)
6. 9.1% (Do not know)

Q18) Concepts taught at school can positively affect children's lives outside of school and at home.
1. 1.8% (Strongly disagree)
2. 0.0% (Disagree)
3. 1.2% (Neutral)
4. 30.5% (Agree)
5. 62.8% (Strongly Agree)
6. 2.4% (Do not know)

Q19) Based on what you heard, briefly describe a Farm to School Program-Theme 2: Educating students about healthy eating, food, and nutrition and Theme 3: Educating children on gardening/growing food.

<u>Perceptions about Farm to School Program's impact on the environment</u>

Q5) Farm to School practices have a positive effect on the environment.
1. 3.7% (Strongly disagree)
2. 2.4% (Disagree)
3. 6.1% (Neutral)
4. 26.2% (Agree)
5. 54.3% (Strongly Agree)
6. 5.5% (Do not know)

Q19) Based on what you heard, briefly describe a Farm to School Program-Theme 4: Connection between local farms, schools, and communities

<u>Perceptions about the students</u>

Q14) My students make healthy meal choices.
1. 18.9% (Strongly disagree)
2. 40.2% (Disagree)
3. 22.6% (Neutral)
4. 5.5% (Agree)
5. 4.9% (Strongly Agree)
6. 5.5% (Do not know)

Research Questions Mapped to Designated Questionnaire Questions (continued)

Q15) My students understand where food comes from.

1. 8.5% (Strongly disagree)
2. 34.1% (Disagree)
3. 17.7% (Neutral)
4. 22.0% (Agree)
5. 7.3% (Strongly Agree)
6. 5.5% (Do not know)

Research Question 2. What Farm to School practices have been implemented by City Schools of Decatur teachers in different grade levels?

Q3) I am currently using Farm to School concepts in my curriculum.

1. 31.1% (Strongly disagree)
2. 44.5% (Disagree)
3. 10.4% (Neutral)
4. 4.9% (Agree)
5. 1.8% (Strongly Agree)
6. 3.0% (Do not know)

Q21) Please indicate any Farm to School concepts or activities you have implemented in your classroom or seen implemented in your school/workplace: gardening, cooking classes/demonstrations, field trips to local gardens or farms, taste tests of fruits and vegetables, nutrition education, local produce served in school cafeteria and/or for snacks, other: please list.

Research Question 3. What Farm to School practices were desired by City Schools of Decatur teachers at different grade levels?

Q11) I would like to incorporate City Schools of Decatur Farm to School concepts into my work.

1. 2% (Strongly disagree)
2. 2% (Disagree)
3. 19% (Neutral)
4. 43% (Agree)
5. 27% (Strongly Agree)
6. 3% (Do not know)

Research Questions Mapped to Designated Questionnaire Questions (continued)

Q22) Which Farm to School activities would you like to see at your school/workplace: gardening, nutrition education, cooking classes/demonstrations, field trips to local gardens or farms, class visits from farmers or gardeners, taste tests of fruits and vegetables, local produce served in school cafeteria, environmental education (recycling, composting etc), other: please list

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Note. Designated questionnaire questions are taken from the original questionnaire found in Appendix A.

Appendices

Appendix A: Farm to School Teachers Questionnaire

City Schools of Decatur
Farm to School Program
Baseline Survey
Thank you for participating in this baseline survey. As the most vital resource of the City Schools of Decatur (CSD), your input is critical to the success of the Decatur Farm to School Program. The information that you provide will assist in further developing the Decatur Farm to School Program and help us better support *your* efforts.
We value and appreciate your time and feedback.
Your role: _____
(E.g. administrator, teacher, counselor, instructional coach, etc.)
Grade(s) served: _____

Please indicate the level to which you agree or disagree with each of the following statements						
	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Do Not Know
GENERAL						
I understand what Farm to School means.						
I am familiar with Farm to School practices that my school has implemented.						
I am currently using Farm to School concepts in my curriculum.						
I am familiar with Farm to School resources available.						
Farm to School practices have a positive effect on the environment.						
CITY SCHOOLS OF DECATURFARM TO SCHOOL PROGRAM						
I am familiar with the CSD Farm to School Program.						
CSD Farm to School Program can have a positive impact on local businesses, farmers, and economy.						
CSD Farm to School Program can influence children's preferences for fresh fruits and vegetables.						
CSD Farm to School Program can increase student willingness to try new foods and choose healthier food options.						
It is possible to integrate CSD Farm to School Program with the current curriculum and meet existing school standards.						
YOUR SCHOOL/WORKPLACE						
I would like to incorporate CSD Farm to School concepts into my teaching.						
My students would benefit from learning about Farm to School concepts during the day.						
School meals have a direct impact on student performance.						
My students make healthy meal choices.						
My students understand where food comes from.						
Nutritious school meals are an important part of the day.						
CSD Farm to School Program will increase my students' preferences for fresh fruits and vegetables						
Concepts taught at school can positively affect children's lives outside of school and at home.						

1. Based on what you have heard, briefly describe a Farm to School Program.

2. Please indicate any Farm to School concepts or activities you have implemented in your classroom or seen implemented in your school, and provide a brief description.

Farm to School activities	**Please mark activities with an (X)**		**Brief description/comments**
	Used in my classroom	**Seen at my school**	
Gardening at my school			
Cooking classes/ demonstrations			
Field trips to local gardens or farms			
Taste tests of fruits and vegetables			
Nutrition education			
Local produce served in school cafeteria and/or for snacks			
Other: please list here:			

3. Which Farm to School activities would you like to see at your school? (please check all that apply)

___Gardening at my school

___Nutrition education

___Cooking classes/demonstrations

___Field trips to local gardens or farms

___Class visits from farmers or gardeners

___Taste tests of fruits and vegetables

___Local produce served in school cafeteria

___ Environmental education (recycling, composting, etc)

___Other: please list here:

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