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Perceptions of middle school students on gardening

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The purpose of this study was to describe the perceptions middle school students had about agriculture and gardening as part of the GrOW (Gardening and Overall Wellness) Program. This included multiple constructs, including students' gardening efficacy, perceptions of those who had already completed the GrOW Program, perceptions of those who had not completed the GrOW Program, and students' future interests in gardening. The population for this study was sixth-grade students at the Partnership Middle School in Starkville, Mississippi. A quantitative instrument was used to assess the perceptions of the students (n = 222).

Overall, students had positive perceptions about the GrOW Program. They believed it would help them in being able to assist their families in raising a garden. Students understood that watering and weeding were important in keeping a garden healthy, and they liked being outdoors. Several recommendations for future research were revealed through this study. Surveying other middle schools that also have gardening programs with similar and different demographics would provide a complete evaluation of gardening perceptions. For future studies on this program, having sixth-grade students complete the survey at the beginning and end of the school year would provide a more detailed view of what the students perceptions of the GrOW Program were for that school year. Finally, since students' views tend to change over time, a

longitudinal study to better explain student perceptions of agriculture and gardening. The GrOW program has potential in serving as a model and providing resources for other schools wanting to develop a curriculum-based gardening program.

DEDICATION

I would like to dedicate this work to my family and friends who have helped make this possible.

To my husband, William, and my children Matthew and Morgan, this has been a labor of love and endurance for all of us. You are the driving force behind this and I forever grateful for the three of you!

To my parents Vivian and Mary Broussard, the two of you believed I could do whatever I put my mind to and have encouraged me and supported me always. Mom, thanks for your unwavering support and encouragement! Dad, this was something you always wanted to see me finish and I know you are watching from above and cheering me on each step of the way.

To my best friend, Amy Walsh, thanks for always being a listening ear! You always being a phone call away, allowing me to vent or bounce ideas off you, has helped me get to this point and I am grateful for you.

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CHAPTER I

INTRODUCTION

"Our collective definition of a 'good job' has evolved into something that no longer resembles work, and that has detached us from a great many things, including our food, and the people who provide it" (Rowe, 2010, para. 11). This quote from Mike Rowe describes the status of American agriculture. Today, less than 2% of the United States (U.S.) population is involved in agriculture and the majority of the remaining 98% are at least three to four generations removed from farm life (American Farm Bureau, 2021). The problem now is that many stereotypes and misconceptions about agriculture have become commonplace. Since agriculture impacts the lives of all humans when it comes to food, fiber, and fuel, it has become increasingly important for the agricultural community to promote agricultural literacy in various ways.

The agricultural community has spent lots of time and money developing fun and engaging ways for school-aged children to learn about agriculture. Agricultural literacy, both in and out of the classroom, provides a method of teaching students about agriculture without preparing them for work in the field of agriculture (Vallera & Bodzin, 2016). Providing opportunities for individuals to understand how their food, fiber, and fuel are grown and produced assists them in making more educated choices as consumers, policy makers and citizens (Boatner, 2004).

The need to educate Americans about agriculture is not really a new concept, but one that is continually evolving. In 1981, the United States Department of Agriculture (USDA) created a

national program called “Agriculture in the Classroom,” which initiated a movement to involve agriculture in many curriculum areas (National Agriculture in the Classroom, 2006). Today, Agriculture in the Classroom (AITC) is present across the United States and provides a wide range of resources for educators to use.

One way to teach elementary and middle school students about agriculture is with school gardens. In years past, school gardens showed students how to provide for themselves and others, especially during World War I and World War II when Victory Gardens were used to provide food for local communities (Duncan, et al., 2016). Recently, school gardens have focused on teaching agricultural literacy through hands-on experiential learning approaches. Even though research has shown that most school gardening curricula and programming are geared toward elementary age students, middle school students are at a point developmentally where curiosity and experiential learning activities are pleasing (Duncan et al., 2016).

Utilizing school gardens in educational settings is endorsed by two prominent educational theories supporting the developmental needs of youth. Kolb’s (1984) Experiential Learning Theory promotes the need for youth to acquire knowledge gained through practical, hands-on experience. This theory combines experience, perception, cognition, and behavior as an approach to lifelong learning (Kolb, 1984). Bandura’s (1986) Social Cognitive Theory indicates that learning is more social than individual, including behavior modeling and confidence building when working with teachers or peers. Each theory relates directly back to school gardens as students interact with classmates through new hands-on experiences.

One such program that combines hands-on activities and social interactions for middle school students is the Gardening and Overall Wellness (GrOW) Program. This unique program is designed to bring gardening, nutrition, and wellness altogether in one classroom. The GrOW

Program provides students with the opportunities to grow different types of horticultural plants, including vegetables, which are then used in teaching students about food preparation, cooking, and nutrition. Students also incorporate different types of wellness activities into their daily class routines.

Statement of Problem

The GrOW Program was implemented at the Partnership Middle School for the 2020-2021 school year. As a part of this program, periodic assessments must be conducted to determine the effectiveness of the program to the overall goals of the GrOW Program. Since students today have little knowledge of the important role agriculture and gardening play in their daily lives, it is important for the agricultural community to provide opportunities for students to experience agriculture at their fingertips. Through the GrOW Program, students are given this opportunity. However, it is important to know and understand students' perceptions of the program and how they feel about agriculture and gardening so instruction can be tailored to the students' knowledge base.

Purpose & Objectives

The purpose of this study was to describe the perceptions middle school students had about agriculture and gardening as a part of the GrOW Program. Specific objectives of the study were as follows:

1. Assess middle school students' perceptions of agriculture and gardening.
2. Describe how middle school students believe the GrOW Program will change their perception of agriculture and gardening.

3. Identify demographic characteristics that significantly impact how middle school students view gardening.

Significance of the Program

Current research on agriculture and school gardening programs reports many positive changes in students who participate in such hands-on experiences (Rossetti & McCaslin, 1994; Collins & Duncan, 2015). Measuring students' perceptions can inform school administrators of the benefits of the GrOW program and will further illustrate the educational impact of the program. Information gained can be used to update curricula to enhance student perceptions of agriculture and gardening. Results from the study could also aid the school system in program fundraising and reporting, which are essential to making the program sustainable.

Limitations

1. This study was limited to the sixth-grade students who took the GrOW Program at the Partnership Middle School in Starkville, Mississippi, so results could not be generalized to other schools nationwide that have school gardens.
2. Due to this study being conducted on middle school students, the sample size may have been affected by the following: Students having parental consent as well as child assent, the questionnaire response rate, and the researcher having to depend on other school faculty to distribute the letter and survey to the students.

Assumptions

There are several things that were to be assumed in the study of middle school students.

1. All students in grade level were similar in cognitive abilities.
2. Respondents would answer truthfully and completely.

3. Since the questionnaire was not a graded assignment, it was assumed that students were motivated to do their best.

Definition of Terms

- Agricultural Literacy – "An agriculturally literate person understands and can communicate the source and value of agriculture as it affects our quality of life" (NAITC, 2021)
- Agriculture in the Classroom (AITC)– AITC is a program that strives to *i*ncrease agricultural literacy through K-12 education by providing a flexible educational program designed to supplement and enhance the teacher's existing curriculum (NATIC, 2021)
- GrOW – Gardening and Overall Wellness Program being offered at the Partnership Middle School which is part of the Starkville Oktibbeha County School District in Starkville, Mississippi. This program includes topics such as introduction to agriculture, plant science, soil science, food science, and health/wellness. (Starkville Oktibbeha County School District, 2021).
- Experiential Learning – "A process by which knowledge is created through the grasping and transformation of experience" (Kolb, 1984).
- School Garden – A space at the school for the purpose of growing plants to enhance the students learning (Blair, 2009).

CHAPTER II

LITERATURE REVIEW

This chapter provides an overview of the related literature on agricultural literacy and school gardens. It begins with a look at agricultural literacy and the importance of educating the public about agriculture. Next, the literature review examines the history of school gardens and the important role that school gardens play in teaching youth about agriculture. Following the section on school gardens, the literature review discusses the GrOW Program, a unique school gardening program jointly operated by a large land grant university and a school system in the southern United States. Lastly, this chapter describes the theoretical frameworks for this study, which includes Kolb's Experiential Learning Theory and Bandura's Social Cognitive Theory.

Agricultural Literacy

Today, there are many definitions of agricultural literacy. One of the first definitions was written by Frick, Kahler, and Miller (1991), which defined agricultural literacy as "possessing knowledge and understanding of food and fiber systems" (p. 52). A more recent definition, developed by American Farm Bureau Foundation for Agriculture (2013), states "a person who understands all of the industries and processes involved in the production and delivery of food, fiber and fuel that humans need to survive and thrive" (p. 2).

No matter which definition you choose, it is important for individuals to understand the source of their food. Providing opportunities for individuals to understand how their food, fiber, and fuel are grown and produced assist them in making more educated choices as consumers,

policy makers and citizens (Boatner, 2004). Agricultural literacy education, both in and out of the classroom, provides a method of teaching students about agriculture without preparing them for work in the field of agriculture (Vallera & Bodzin, 2016). Rossetti et al., (1994) also found that educating students about agriculture in middle school promotes students' awareness about agriculture and agricultural careers. These students enjoy the hands-on atmosphere of agriculturally based activities. Students at this age are more influential and are starting to look for a career (Sommers, 2010). However, teaching them about agriculture at any age is better than not teaching them about it at all.

The National Research Council (1988) put forth a directive stating that "beginning in kindergarten and continuing through the twelfth grade, all students should receive some systematic instruction about agriculture" (p. 10). This was due to the importance of agriculture and the fact that over 90 percent of the population was at least three generations removed from the farm. The directive also encouraged land grant universities to get involved in curriculum reform and development. To help create a more organized method for curriculum development and reform, the agricultural literacy framework was developed by Frick, Kahler, and Miller (1992), which included 11 subject areas and numerous concepts that should be included in agriculture literacy efforts.

Another framework, Pillars of Agricultural Literacy (see Figure 1), was developed by the American Farm Bureau Foundation for Agriculture (2013). This framework encompasses similar subject areas as the framework developed by Frick, Kahler and Miller (1992). However, the pillars divide knowledge and expectations into four groups based on age (child to adult) with the end goal being consumers who are informed about the important role agriculture plays in their daily lives. The base level is geared towards the early childhood through 3rd grade learner and is

where they develop an awareness of the connection they have with agriculture. The second level focuses on 4th through 8th grade learners discovering how tasks are accomplished in agriculture, which would be the level of the GrOW students. The next level encourages 9th through 12th grade learners to build knowledge upon the discoveries that they made in the previous level. The final level expects early adult learners to evaluate the impact farmers make on their everyday lives and use this knowledge to assist them in making everyday decisions.

Figure 1

Pillars of Agricultural Literacy

School Gardens

Today's elementary and middle school students, in general, are not being exposed to agriculture in school due to school districts' focus on subjects in state standards and testing (Mericer, 2015). However, some teachers are finding ways to integrate agriculture into their classrooms. One way teachers, along with the agricultural community, have found to teach students about agriculture is with school gardens.

School gardens teach agricultural literacy through hands-on experimental learning approaches (Collins & Duncan, 2015). School growing spaces allow teachers to incorporate STEM (Science, Technology, Engineering, and Math) concepts into garden-based learning and expanding the possibilities for teaching real-world applications (Ingram & Keshwani, 2020). Along with real-world applications comes health and nutrition education, which can also be learned through school-based gardens. Research has also shown that gardening classrooms provide a hands-on approach to learning that can also be linked to core classes such as science, math, language, and social studies (Graham et al., 2005).

Collins and Duncan (2015) found that middle school students saw school gardens as a positive aspect of their school experience and that students enjoyed the cultivation portion of the program the most. There were also positive outcomes for culinary and social aspects of the gardens. Looking at middle school students' perceptions on gardening, Childs (2011) found that students with little to no previous gardening experience had more positive attitudes about gardening in the future and were more in tune to plant needs and care. It was noted that students were more positive about growing food at the school than they were about growing food with their families at home (Childs, 2011).

The GrOW Program

GrOW (Gardening and Overall Wellness) is a new program at the Partnership Middle School, operated jointly by the Starkville-Oktibbeha County School District and Mississippi State University. This program includes 24 school gardens and 3 mobile kitchens, allowing students to participate in meaningful, hands-on experiences, including planting, harvesting, cooking, and tasting opportunities. The curriculum developed for GrOW includes topics such as introduction to agriculture, plant science, soil science, food science, and health/wellness.

There are four main goals associated with the GrOW Program. These goals are to adopt health and wellness as an overall goal of the Starkville Oktibbeha County School District, offer wellness classes for all 6th and 7th grade students, teach gardening as part of the core curriculum, and engage students in planting, harvesting, preparing, serving, and tasting foods grown in the school garden, and finally to provide health activities and events for students and families and increase opportunities for physical activity for students, teachers and the community.

The Partnership Middle School houses sixth and seventh grade students. Sixth graders have a choice of two exploratory tracks: Yellow Jacket Exploratory (which includes GrOW, General Music, Art, and Robotics) or Bulldog Exploratory (which includes Makers Space, World Language, Choir, and Theater). In the GrOW Program, sixth graders in the Yellow Jacket Exploratory track take a nine-week GrOW course. Students are in GrOW approximately five hours every two weeks on alternating days. Students take Physical Education or Band on the days they are not in the GrOW.

To understand the community that sends students to the Partnership Middle School, socioeconomic information for Oktibbeha County, Mississippi was collected from the 2020 Census (US Census Bureau, 2020). In 2020, there were 51,788 total residents in Oktibbeha County. Of the total residents, 57.5% were Caucasian and 37.6% were African American (US Census Bureau, 2020). When looking at children, 17.6% of the total were under the age of 18 and 5.3% of were under the age of 5. During the current school year (2021-2022), the Partnership Middle School enrolled 740 6th and 7th grade students. Furthermore, 51% of the students at the Partnership Middle School were male and 49% were female. The racial breakdown showed that 68% were African American, 27% were Caucasian and 5% were other

ethnic groups. Based on the 2020-2021 school year, the student-to-teacher ratio was 14.84 for the school district (National Center for Education Statistics, 2021).

During the 2020-2021 school year, a unique curriculum was created to meet GrOW program goals along with matching national standards. The curriculum was developed through partnerships between the Starkville Oktibbeha County School District, Mississippi State University (Research and Curriculum Unit and Mississippi State University Extension) and the Mississippi Department of Education. A 22-hour curriculum was developed for 6th grade students focusing on Agriscience, Safety, Soil Science, Plant Science, Food Science and Health/Wellness. The 80-hour 7th grade curriculum focused on Agriscience, Lab Safety/Scientific Method, Environmental/Natural Resources/Soil Science, Plant Science, Food Science, Meal Preparation, and Health/Wellness.

Theoretical Framework

Utilizing school gardens in educational settings is supported by two educational theories: Kolb's (1984) Experiential Learning Theory and Bandura's (1986) Social Cognitive Theory. Both theories can be related directly back to the school garden as students interact with classmates through new hands-on experiences.

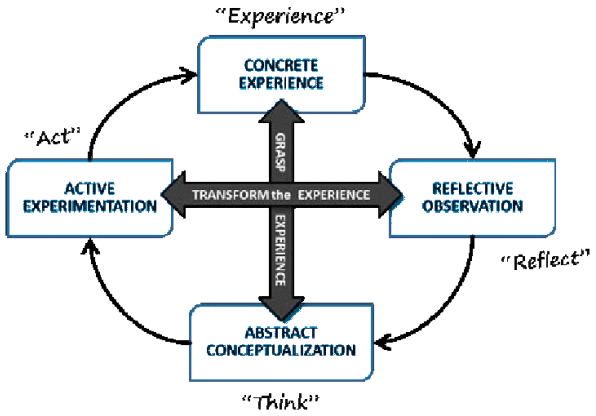
Experiential Learning Theory

Experiential Learning Theory was developed by Kolb (1984) because of the role that experience plays in a student's learning process. Kolb (1984) said, "learning is the process whereby knowledge is created through the transformation of experience" (p. 38). Experiential learning is arguably the most potent form of learning. This theory is symbolized by the

Experiential Learning Cycle (see Figure 2), which consists of four stages: concrete experience, reflective observation, abstract conceptualization, and active experimentation.

Figure 2

Kolb's (1984) Experiential Learning Cycle



The four modes of learning can be divided in to two different types of experiences. An individual's ability to take in information or grasp experience happens during the stages of concrete experience and abstract conceptualization. Concrete experience is when a person has experienced something before, but then experiences it in a new setting which gives them an opportunity to learn from the experience. Abstract conceptualization is how an individual analyzes or thinks about their experience and forms their own concepts to explain the experience. After an experience, individuals process and develop an action plan for the information received. This transformation experience takes place during the stages of reflective observation and active experimentation. Reflective observation is when an individual reflects on the new experience and compares it to previous experiences to find the meaning. In active experimentation the individual

applies lessons learned from the experience to other experiences and acts on the decisions and concepts developed as part of the process (Kolb, 1984).

This cycle can be described as having an experience, reflecting on the experience, learning from the experience, and then trying or applying what you have learned. Experiential learning looks deeper into the learning process and how experiences change thoughts from previous experiences. Kolb (1984) said, "it's a holistic integrative perspective on learning that combines experience, perception, cognition and behavior" (p. 31).

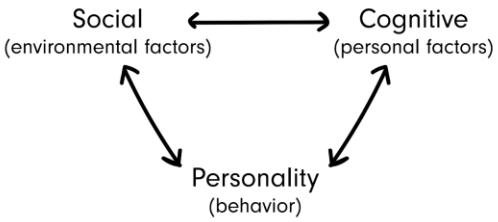
Experiential learning has been associated with agriculture for many years because of its varying educational settings which include both formal and informal teaching methods (Roberts, 2006). Seaman Knapp is noted for saying it best, "What a man hears, he may doubt; what he sees, he may also doubt; but what he does, he cannot doubt" (Pigg, 1983). Experiential learning and agriculture allow students to have learn by doing or hands-on experiences that enhance their knowledge and skills.

Social Cognitive Theory

Bandura's (1986) Social Cognitive Theory (see Figure 3) has been used in many science and agricultural education classrooms because it encourages modeling, observation, self-efficacy, and motivation. This model is "triadic reciprocal" in that it explains how a person's environment, behavior and personal factors work together to create change in individuals (Bandura, 1986). However, the differences will depend on the individual.

Figure 3

Bandura's (1986) Social Cognitive Theory



Social (environmental factors) refers to the physical environment students are in along with the social environment students are in which could include the students' peers and teacher. Cognitive (personal factors) refers to the individual's motivation and self-efficacy, while personality (behaviors) refers to the response to a modeled behavior. Students will not act the same, set the same goals, or be motivated by the same things. Ultimately, students determine what they get out of the classroom. When teachers include elements of Bandura's Social Cognitive Theory in the classroom, students can enhance their inner well-being and skills in a trial-and-error fashion (Bandura, 2005). Based on research, school gardens provide students with the opportunity to apply the different constructs of the social cognitive theory (Ratcliffe et al., 2011).

CHAPTER III

METHODS

The purpose of this study was to describe the perceptions middle school students had about agriculture and gardening as a part of the GrOW Program. Specific objectives of the study were as follows:

1. Assess middle school students' perceptions of agriculture and gardening.
2. Describe how the middle school students believe the GrOW Program will change their perception of agriculture and gardening.
3. Identify demographic characteristics that significantly impact how middle school students view gardening.

Research Design

To determine middle school students' perceptions toward gardening and agriculture, a descriptive survey design was used. Descriptive survey design defines the characteristics of a population sample, identifies problems that exist within the population sample, and looks at differences in characteristics amongst students (Loeb et al., 2017). This design lends itself to a quantitative method of data collection with a survey instrument that was developed accordingly. A disadvantage to this design is that the subjects in the study might not answer honestly or may choose to not answer at all.

Population and Sample

The population for this study was the 379 sixth grade students at the Partnership Middle School in Starkville, MS during the 2021-2022 school year. The accessible population for this study consisted of the 323 sixth grade students who were in the Yellow Jacket Exploratory and Bulldog Exploratory rotations during the 2021-2022 school year. The overall response rate for this study was 70.9% (229 out of 323).

Students were divided into three groups based on their responses to these two questions: "Is the GrOW class on your schedule for this year?" and "Have you already completed GrOW?" Groups were identified as follows: (1) those who had GrOW on their schedule and had already completed the course this school year (32 out of 42 responded for a 76% response rate), (2) those who had GrOW on their schedule but had not completed the course this school year (87 out of 126 responded for a 69% response rate), and (3) those who would not take GrOW this school year (102 out of 155 responded for a 66% response rate). The response rates for each of the three groups were similar, indicating there were no issues with non-response.

Instrumentation

After a review of the literature, few instruments measuring student opinions on gardening and agriculture were found. The survey for the GrOW Program was adapted with permission from Collins and Duncan's (2015) survey on School Gardens and Urban Youth and Child's (2011) survey on Impact of School Gardens on Student Attitudes and Beliefs. These studies were similar in purpose and focused on middle school students.

An instrument was developed that included Likert-type response scale questions focusing on students' gardening efficacy, GrOW perceptions (except for those students who would not take GrOW), and future interest in gardening. Skip logic was used to determine which sections

of the instrument students completed. These questions were formatted to include response categories of Strongly Disagree (1), Disagree (2), Agree (3), and Strongly Agree (4). The instrument also contained five demographic questions that focused on students' involvement in gardening and 4-H, along with where they lived, race, and gender.

The validity of these instruments was reviewed by a committee of university professors familiar with agricultural literacy and GrOW program coordinators from the school district. This review focused on the appropriateness of questions and content. The committee determined that the instrument had face validity.

Reliability of the survey was tested through a pilot test by sixth-grade students at another local school that did not have the GrOW Program and seventh-grade students at the Partnership Middle School who had completed the 6th Grade GrOW Program during the 2020-2021 school year. The gardening efficacy portion consisted of 13 statements, and the Cronbach's Alpha reliability coefficient for this section was $\alpha = .85$. The GrOW perceptions for those who had completed the GrOW Program consisted of seven statements, with a Cronbach's Alpha reliability coefficient of $\alpha = .84$. The GrOW perceptions for those who had not completed the GrOW Program consisted of seven statements, and the Cronbach's Alpha reliability coefficient was $\alpha = .82$. Finally, the future interests in gardening consisted of five statements, and the Cronbach's Alpha reliability coefficient was $\alpha = .80$.

Procedures/Data Collection

Since students were middle school age, the IRB process was followed. A waiver of parental consent was used along with child assent for students to participate in the study. These forms were sent home with students through the Yellow Jackets and Bulldog Exploratory Teachers. Parents also received an email through PowerSchool about the survey with the needed

forms attached. The Qualtrics survey link was provided to students through the student's school Canvas page in the GrOW Survey module. Notifications were sent through Canvas to the students with parental consent that the survey link was active and would only be open during a designated time frame. Student assent was the first question on the survey. Follow-up reminders were sent through Canvas to students to remind students to complete the survey with-in the designated time frame.

Data were collected over four days, giving students two exploratory class periods to complete the survey. Emails were sent to the Exploratory teachers explaining the survey and the length of time for their students to take it. The researcher made personal visits with the Exploratory teachers to answer any questions they may have. Exploratory teachers were asked to have their students complete the survey as a part of their daily bellringer on the first two days. Students received a reminder message in their Canvas messenger on the second two days. The final response rate for this survey was 70.9%.

Data Analysis

The responses collected from the completed questionnaires were entered into SPSS (Version 28.0) for data analysis using descriptive statistics including means, frequency, standard deviation, and inferential statistics including *t*-test, and ANOVA. Multiple constructs were used, and scores were calculated for each construct. Gardening Efficacy scores could range from 13 – 52. GrOW Perception scores for those who had completed GrOW could range from 7 – 28. GrOW Perception scores for those who had not completed GrOW could range from 7 – 28. Future Interests in Gardening scores could range from 5 – 20.

CHAPTER IV

RESULTS

The purpose of this study was to describe the perceptions middle school students had about agriculture and gardening as part of the GrOW Program. The four aspects of the descriptive survey were gardening efficacy, GrOW perceptions, future interests in gardening, and demographics of the students completing the survey. Specific objectives of this study were (1) assess middle students' perceptions of agriculture and gardening (2) describe how the middle school students believe the GrOW Program will change their perception of agriculture and gardening and (3) identify demographic characteristics that significantly impacted how middle school students view gardening.

Demographics

This section describes the demographic characteristics of middle school students at the Partnership Middle School who completed the GrOW survey. This survey was administered to 323 sixth-grade students at the Partnership Middle School. Survey items assessed students' involvement with a family garden and 4-H, as well as where they lived, race, and gender.

Students were asked to define their gender as Male, Female or Other. Based on the student responses, 93 (48.9%) indicated they were female while 85 (44.7%) indicated they were male and 12 (6.3%) indicated their gender as other (See Table 4.1).

Students were asked "What is your race?" and had choices of African American, Asian/Pacific Islander, Hispanic/Latino, Native American, White/Caucasian, or Other. Based on

their responses, 102 (54.0%) of the students were African American, 54 (28.6%) identified themselves as White/Caucasian, 12 (6.3%) indicated their race as other, 9 (4.8%) identified as Native American, 7 (3.7%) identified themselves as Asian/Pacific Islander, and 5 (2.6%) identified as Hispanic/Latino.

Students were asked to describe where they lived using one of the following categories: farm, rural area or town (less than 10,000 people), or Town or City (10,000 to 50,000). Based on student responses, 56% (f = 106) of the students lived in a Town or City (10,000-50,000 people), 39% (f = 74) of the students lived in a rural area or town (less than 10,000 people), while only 4.8% (f = 9) lived on a farm.

Students were asked "Has your family ever planted a garden?" From the total respondents (n = 222) over 64% (f = 122) of them had planted some type of garden with their family. 15% (f = 29) had not planted a garden with their family and 20 % (f = 38) were not sure if they had ever planted a garden with their family.

Lastly, students were asked to indicate if they were a member of 4-H (Yes or No). As shown in Table 1, students' responses indicted that only 17 (9.0%) were involved in 4-H while 172 (91%) were not involved in 4-H.

Table 1

Demographic Characteristics of Survey Respondents (n = 189)

Demographic Characteristic		*f*	%
*Gender	Male	85	44.7
	Female	93	49.0
	Other	12	6.3
Race	African American	102	54.0
	Asian/Pacific Islander	7	3.7
	Hispanic/Latino	5	2.6
	Native American	9	4.8
	White/Caucasian	54	28.6
	Other	12	6.3
Where Students Live	Farm	9	4.8
	Rural Area or Town (Less than 10,000 People)	74	39.2
	Town or City (10,000 to 50,000 people)	106	56.0
Family Garden	Yes	122	64.6
	No	29	15.3
	Not Sure	38	20.1
4-H Member	Yes	17	9.0
	No	172	91.0

***** Note: gender was based on *n* = 190

Objective 1

Assess Middle School Students' Perceptions of Agriculture and Gardening

Gardening Efficacy

All students (n = 222) were asked to rate their level of agreement with 13 statements to explore gardening efficacy. Students rated each question using the scale of Strongly Disagree (1), Disagree (2), Agree (3), and Strongly Agree (4).

The statement "Watering is important to keep a garden healthy" was the highest-rated statement by middle school students (M = 3.47; SD = .74). "Weeding is important to keep a garden healthy" was the next highest-rated statement (M = 3.22; SD = .84). As shown in Table 2, the two lowest-rated statements were "I have never liked anything about gardening" (M = 1.95; SD = 1.00) along with "I don't like to garden because it is hard work" (M = 1.98; SD = .82).

For respondents who completed all gardening efficacy questions (n = 208), an overall efficacy score was computed. Four statements ("I think planting fruits and vegetables takes too much time", "I don't like getting my hands dirty in the soil", "I don't like to garden because it is hard work", and "I have never like anything about gardening") were reverse coded before calculating the overall gardening efficacy score. Gardening efficacy scores ranged from 18 to 51 (out of 52) with the mean being 37.76 (SD = 6.81). These scores exhibited a normal distribution.

Table 2

Means and Standard Deviations of Students' Responses on Gardening Efficacy

Statement	*f*	Mean	SD
I am interested in gardening.	216	2.60	.89
I like spending time outdoors.	216	3.19	.86
I enjoy taking care of plants.	216	2.75	.81
*I think planting fruits and vegetables takes too much time.	216	2.35	1.02
*I don't like getting my hands dirty in the soil.	216	2.03	1.03
I like to watch seeds grow into plants.	216	2.71	.98
I like eating fruits and vegetables.	208	3.17	.83
*I don't like to garden because it is hard work.	208	1.98	.82
Weeding is important to keep a garden healthy.	208	3.22	.84
Watering is important to keep a garden healthy.	208	3.47	.74
Learning how to garden is important to me.	208	2.63	.89
Working in the garden helps me feel better about myself.	208	2.34	.91
*I have never liked anything about gardening.	208	1.95	1.00

Note. Scale: 1 = Strongly Disagree, 2 = Disagree, 3 = Agree, 4 = Strongly Agree

Note: * indicates score that were recoded before calculating the overall gardening efficacy score.

Note. Gardening efficacy scores ranged from 18 to 51 (M = 37.76; SD = 6.81)

Future Interests in Gardening

To look at future interests in gardening, all students were asked to rate five statements about their future interests in gardening. Students rated each statement using the scale of Strongly Disagree (1), Disagree (2), Agree (3), and Strongly Agree (4).

The statement "I want to learn more about planting a garden" was the highest-rated statement (M = 2.55; SD = .96), as shown in Table 3. "When I am an adult, I would like to plant a garden" was the next highest-rated statement (M = 2.49; SD = .92). The two lowest-rated statements were "I am interested in a career in agriculture" (M = 2.11; SD = .85) and "I believe it would be easy to raise a garden" (M = 2.27; SD =.93).

For respondents that completed all questions about future interests in gardening (n = 190), an overall future interest score was computed. The scores ranged from 5 to 20 (out of 20). The mean was 11.75 and the standard deviation was 3.28. These scores were distributed normally.

Table 3

Mean and Standard Deviation of Student Responses on Future Interests in Gardening (n = 190)

Statement	Mean	SD
It is important to me that my family grows food in a garden.	2.33	.94
When I am an adult, I would like to plant a garden.	2.49	.92
I am interested in a career in agriculture.	2.11	.85
I believe it would be easy to raise a garden.	2.27	.93
I want to learn more about planting a garden.	2.55	.96

Note. Scale: 1 = Strongly Disagree, 2 = Disagree, 3 = Agree, 4 = Strongly Agree
Note. Future interests in gardening scores ranged from 5 to 20 (M = 11.75; SD = 3.28)

Objective 2

Describe How Middle School Students Believe the GrOW Program Will Change Their Perceptions of Agriculture and Gardening

GrOW Perceptions for Completed Students

To assess the perceptions students had about the GrOW program, students who had GrOW on their schedule this school year (n = 120) were asked to rate their level of agreement with seven statements about the GrOW Program. Students rated each statement using the scale Strongly Disagree (1), Disagree (2), Agree (3), Strongly Agree (4). Students were divided into two groups, those who had completed GrOW already this school year (f = 26) and those who had not completed GrOW this school year (f = 80).

For students who had already completed the GrOW Program (*f* = 26), the statements "Working in the school gardens was my favorite part of the GrOW class" (*M* = 2.92; *SD* = .85) and "After completing the GrOW class, I feel I can help my family raise a garden" (*M* = 2.92; *SD* = .94) were the highest-rated statements. "Completing the GrOW class helps me make healthier fitness choices" was the next highest-rated statement (*M* = 2.81; *SD* = .80). As shown in Table 4, the lowest-rated statement was "Completing the GrOW class has helped me earn a higher grade in my math class" (*M* = 1.88; *SD* = .91). "Completing the GrOW class has helped me make healthier food choices" was the next lowest-rated statement (*M* = 2.54; *SD* = .95).

For respondents that had completed GrOW (*f* = 26), an overall perception score was calculated. The scores for the completed group ranged from 11 to 27 (out of 28) with the mean being 18.46 (*SD* = 3.71).

Table 4

Mean and Standard Deviations of GrOW perceptions for Students Who Had Completed GrOW (f = 26)

Statement	Mean	SD
After completing the GrOW class, I feel I can help my family raise a garden.	2.92	.94
Completing the GrOW class has helped me make healthier food choices.	2.54	.95
Completing the GrOW class has helped me make healthier fitness choices.	2.81	.80
Completing the GrOW class has helped me earn a higher grade in my science class.	2.77	.91
Completing the GrOW class has helped me earn a higher grade in my math class.	1.88	.91
Working in the school gardens was my favorite part of the GrOW class.	2.92	.85
I was interested in gardening before I took the GrOW class.	2.62	.75

Note. Scale: 1 = Strongly Disagree, 2 = Disagree, 3 = Agree, 4 = Strongly Agree
Note: GrOW perceptions scores for students who had completed GrOW ranged from 11 to 27 (M = 18.46; SD = 3.71)

GrOW Perceptions for Non-Completed Students

For the students who had not completed the GrOW Program this year (f = 80), the statement "The GrOW class will change how I feel about gardening" (M = 2.71; SD = .86) was the highest-rated statement. "I feel like I will be able to help my family raise a garden after completing the GrOW class" was the next highest-rated statement (M = 2.70; SD = 1.04) (see Table 5). The statements "The GrOW class will help me earn a higher grade in my math class"

(*M* = 2.10; *SD* = .95) and "The GrOW class will help me make healthier food choices" (*M* = 2.56; *SD* = .99) were the lowest-rated statements.

The range of scores for those who had not completed GrOW (*f* = 80) was 7 to 28 (out of 28). The mean was 17.95 and the standard deviation was 4.53. The distribution of all these scores were normal.

Table 5

Mean and Standard Deviations of GrOW Perceptions by Students Who Had Not Completed GrOW (f = 80)

Statement	Mean	SD
The GrOW class will change how I feel about gardening.	2.71	.86
I feel like I will be able to help my family raise a garden after completing the GrOW class.	2.70	1.04
The GrOW class will help me make healthier food choices.	2.56	.99
The GrOW class will help me make healthier fitness choices.	2.69	.98
The GrOW class will help me earn a higher grade in my science class.	2.61	.89
The GrOW class will help me earn a higher grade in my math class.	2.10	.95
I was interested in gardening before I took the GrOW class.	2.58	1.03

Note. Scale: 1 = Strongly Disagree, 2 = Disagree, 3 = Agree, 4 = Strongly Agree
Note: GrOW perceptions scores for non-completed students ranged from 7 to 28 (*M* = 17.95; *SD* = 4.53).

Objective 3

Identify Demographic Characteristics that Significantly Impact How Middle School Students View Gardening

Gender

An independent samples *t*-test was utilized to determine if there was a significant difference in gardening efficacy based on gender (see Table 6). There was not a significant difference between gender and gardening efficacy (t (176) = -1.096, p = .275, d = -.16).

An independent samples *t*-test was utilized to determine if there was a significant difference in GrOW perceptions of students who have completed GrOW this school year based on gender. As shown in Table 6, there was not a significant difference between gender and GrOW perceptions of completed students (t (22) = -1.641, p = .115, d = -.68).

An independent samples *t*-test was utilized to determine if there was a significant difference in GrOW perceptions of students who have not completed GrOW this school year based on gender. There was not a significant difference between gender and GrOW perceptions for students who had not completed GrOW (t (71) = -.761, p = .449, d = -.18) (see Table 6).

Lastly, an independent samples *t*-test was utilized to determine if there was a significant difference in future interests in gardening based on gender (see Table 6). There was not a significant difference between gender and future interests in gardening (t (176) = -1.253, p = .212, d = -.19).

Table 6

Independent Samples t-test for Gardening Efficacy, GrOW Perceptions, and Future Interests in Gardening by Gender

	Gender	*F*	*M*	*SD*	*t*	*df*	*p*	*Cohen's d*
Gardening Efficacy	Male	85	37.38	6.28	-1.096	176	.275	-.164
	Female	93	38.46	6.88				
GrOW Perceptions Completed	Male	14	17.21	3.56	-1.641	22	.115	-.68
	Female	10	19.70	3.80				
GrOW Perceptions Non-Completed	Male	35	17.71	4.23	-.761	71	.449	-.18
	Female	38	18.47	4.29				
Future Interests	Male	85	11.49	3.38	-1.253	176	.212	-.19
	Female	93	12.09	2.92				

Race

The demographic characteristic of race was initially divided into six categories. Based on student responses, the smaller categories (below 20%) were all grouped into one (other) giving three categories for comparisons: African American (*f* = 102), White/Caucasian (*f* = 54), and Other (*f* = 33).

To determine if there was a significant difference between race and gardening efficacy, a one-way ANOVA was used. There was not a significant difference between race and gardening efficacy (F (2,186) = 1.589, p = .207, η^2 = .02) (see Table 7).

To determine if there was a significant difference between race and GrOW perceptions of students who had completed GrOW this school year, a one-way ANOVA was used. There was

not a significant difference between race and GrOW perceptions of students who had completed GrOW (F (2,21) = .798, p = .463, η^2 = .07) (see Table 7).

To determine if there was a significant difference between race and GrOW perceptions of students who have not completed GrOW this school year, a one-way ANOVA was used (see Table 7). There was not a significant difference between race and GrOW perceptions for students who had not completed GrOW (F (2, 74) = 1.910, p = .155, η^2 = .05)

Lastly, to determine if there was a significant difference between race and future interest in gardening, a one-way ANOVA was used. There was not a significant difference between race and future interest in gardening (F (2,186) = 2.114, p = .124, η^2 = .02) (see Table 7).

Table 7

ANOVA Results for Gardening Efficacy, GrOW Perceptions, and Future Interests in Gardening by Race

Measure	African American		White Caucasian		Other		F	η^2
	M	*SD*	*M*	*SD*	*M*	*SD*		
Gardening Efficacy	37.1	6.34	39.1	6.84	38.0	8.05	1.589	.02
GrOW Perceptions Completed	17.5	4.50	18.5	4.14	20.0	1.10	.798	.07
GrOW Perceptions Not Completed	17.2	4.83	19.1	3.20	19.1	4.80	1.910	.05
Future Interest	11.5	3.31	11.6	2.90	12.8	3.70	2.114	.02

Where Students Lived

Students were asked to describe where they lived as part of the demographic information. To determine if there was a significant difference between where students lived and gardening efficacy, a one-way ANOVA was used (see Table 8). A significant difference did exist between gardening efficacy and students who lived on a farm and students who lived in a rural area or town (less than 10,000 people) (F (2,186) = 3.223), p = .042, η^2 = .03).

To determine if there was a significant difference between where students lived and GrOW perceptions of students who had completed GrOW this school year, a one-way ANOVA was used. There was not a significant difference between where students lived and GrOW perceptions of completed students (F (2,21) = .553, p = .584, η^2 = .05) (see Table 8).

To determine if there was a significant difference between where students lived and GrOW perceptions of students who had not completed GrOW this school year, a one-way ANOVA was used. There was not a significant difference between where students lived and GrOW perceptions for students who had not completed GrOW (F (2,74) = 1.550, p = .219, η^2 = .04) (see Table 8).

Lastly, to determine if there was a significant difference between where students live and future interests in gardening, a one-way ANOVA was used (see Table 8). There was not a significant difference between where students lived and their future interests in gardening (F (2,186) = 2.619, p = .076, η^2 = .03).

Table 8

ANOVA Results for Gardening Efficacy, GrOW Perceptions, and Future Interests in Gardening by Where Students Lived

Measure	Farm		Rural Area		City		F	η^2
	M	*SD*	*M*	*SD*	*M*	*SD*		
Gardening Efficacy	43.2	7.50	37.2	7.20	37.8	6.34	3.223*	.03
GrOW Perceptions Completed	20.5	.71	18.7	3.24	17.5	5.04	.553	.05
GrOW Perceptions Not Completed	21.3	.58	17.2	5.60	18.4	4.11	1.550	.04
Future Interests	14.0	3.87	11.4	3.35	11.8	3.13	2.619	.03

Note: * $p < .05$

Family Garden

An independent samples *t*-test was used to determine if there was a significant difference between having a family garden and gardening efficacy. There was a significant difference between family garden and gardening efficacy (t (149) = 2.385, p = .018, d = .49) (see Table 9).

An independent samples *t*-test was used to determine if there was a significant difference between having a family garden and GrOW perceptions of students who had completed GrOW this school year. There was a significant difference (see Table 4.9) between having a family garden and GrOW perceptions of completed students (t (16) = 2.248, p = .039, d = 1.42).

An independent samples *t*-test was used to determine if there was a significant difference between having a family garden and GrOW perceptions of students who had not completed

GrOW this school year (see Table 9). There was a significant difference between having a family garden and GrOW perceptions for students who had not completed GrOW (t (62) = 2.261, p = .027, d = .78).

Lastly, an independent samples t-test was used to determine if there was a significant difference between having a family garden and future interests in gardening. There was a significant difference between having a family garden and future interest in gardening (t (149) = 3.274), p = .001, d = .68) (see Table 9).

Table 9

Independent Samples t-test for Gardening Efficacy, GrOW Perceptions, and Future Interests in Gardening by Having a Family Garden

	Family Garden	*F*	*M*	*SD*	*t*	*df*	*p*	*Cohen's d*
Gardening Efficacy	Yes	122	38.72	6.80	2.385	149	.018	.49
	No	29	35.31	7.44				
GrOW Perceptions Completed	Yes	15	19.45	3.40	2.248	16	.039	1.42
	No	3	14.67	3.21				
GrOW Perceptions Not Completed	Yes	54	18.85	4.38	2.261	62	.027	.78
	No	10	15.50	3.81				
Future Interests	Yes	122	12.32	3.28	3.274	149	.001	.68
	No	29	10.10	3.28				

4-H Membership

An independent sample t-test was conducted to determine if there was a significant difference between 4-H membership and gardening efficacy (see Table 10). There was not a significant difference between 4-H membership and gardening efficacy (t (187) = .909, p = .365, d = .23).

An independent sample t-test was conducted to determine if there was a significant difference between 4-H membership and GrOW perceptions of students who had completed GrOW this school year. Differences could not be determined between 4-H membership and GrOW perceptions of completed students, because no students that had completed GrOW this school year were also a member of 4-H (see Table 10).

An independent sample t-test was conducted to determine if there was a significant difference between 4-H membership and GrOW perceptions of students who had not completed GrOW this school year (see Table 10). There was not a significant difference between 4-H membership and GrOW perceptions of students who had not completed GrOW (t (75) = 1.980, p = .051, d = .74).

Finally, an independent sample t-test was conducted to determine if there was a significant difference (see Table 10) between 4-H membership and future interests in gardening. There was a significant difference found between 4-H membership and future interests in gardening (t (187) = 2.040, p = .043, d = .52).

Table 10

Independent Samples t-test for Gardening Efficacy, GrOW Perceptions, and Future Interests in Gardening by 4-H Membership

	4-H Membership	*f*	*M*	*SD*	*t*	*df*	*p*	*Cohen's d*
Gardening Efficacy	Yes	17	39.24	7.08	.909	187	.365	.23
	No	172	37.66	6.81				
GrOW Perceptions Completed	Yes	0						
	No	24	18.46	3.80				
GrOW Perceptions Non-Completed	Yes	8	21.00	3.30	1.980	75	.051	.74
	No	69	17.78	4.45				
Future Interests	Yes	17	13.29	4.16	2.040	187	.043	.52
	No	172	11.60	3.16				

CHAPTER V

DISCUSSIONS AND RECOMMENDATIONS

Purpose and Objectives

The purpose of this study was to describe the perceptions middle school students had about agriculture and gardening as a part of the GrOW Program. Specific objectives of the study were as follows:

1. Assess middle school students' perceptions of agriculture and gardening.
2. Describe how middle school students believe the GrOW Program will change their perception of agriculture and gardening.
3. Identify demographic characteristics that significantly impact how middle school students view gardening.

Review of Methods

To determine middle school students' perceptions toward gardening and agriculture, a descriptive survey design was used. The researcher developed an instrument for this project that included Likert-type statements focusing on gardening efficacy, GrOW perceptions (except for those students who would not take GrOW at all), and future interest in gardening. In Qualtrics, skip logic was used to determine which sections students completed. The instrument also contained five demographic questions that focused on the students' involvement in gardening and 4-H, along with where they lived, race and gender.

The validity of these instruments was reviewed by a committee of university professors familiar with agricultural literacy as well as GrOW program coordinators from the school district. This review focused on the appropriateness of questions and content. Reliability of the survey was tested through a pilot test by sixth-grade students at another local school who have not had the GrOW Program and seventh-grade students at the Partnership Middle School who had completed the GrOW Program during the 2020-2021 school year. Cronbach's Alpha was used to determine the reliability scores for the four different portions of the instrument. The scores were as follows: gardening efficacy $\alpha = .85$, GrOW perceptions completed $\alpha = .84$, GrOW perceptions non-completed $\alpha = .82$, and future interests in gardening $\alpha = .80$.

Since students were middle school age, the IRB process was followed. Parental consent letters were sent home with the students through the Yellow Jackets and Bulldog Exploratory Teachers. Parents also received an email through PowerSchool about the survey with the letter attached. The Qualtrics survey was provided as a link through the student's exploratory course Canvas page. Notifications were sent through Canvas to the students that the survey link was active and would be open for a designated time frame. Follow-up reminders were sent through Canvas by the teachers to remind students to complete the survey with-in the designated time frame. Student assent was conducted with the first question of the survey. The responses (n = 222) collected were be entered into SPSS for data analysis using descriptive statistics including means, frequency, standard deviation, and inferential statistics including t-test and ANOVA.

Conclusion and Discussion

Objective 1 – *Assess students' perceptions of agriculture and gardening*

In gardening efficacy, "Watering is important to keep the garden healthy" and "Weeding is important to keep a garden health" had the highest means, which indicated that students agreed

more with these statements than the others. The positive means revealed that students understood the importance of watering and weeding to a garden's health.

Students' future interests in gardening were shown in the statements "I want to learn more about planting a garden" and "When I am an adult, I would like to plant a garden." These two statements had the highest-rated mean scores, indicating students agreed with these statements. The positive ratings of these two statements show that students are interested in gardening and would be interested in gardening in the future. These results were similar to what Childs (2011) found, indicating that students had positive attitudes about gardening in the future.

Objective 2 – *Describe how the students feel the GrOW Program will change their perceptions of agriculture and gardening*

Students' perceptions of the GrOW program depended on whether they had completed the GrOW Program. Students who had already completed the GrOW Program rated "Working in the school gardens was my favorite part of the GrOW class" the highest, indicating that working in the gardens was a highlight of the class. Collins and Duncan (2015) also found that students saw the gardens as a positive aspect of their school experience. Those students who had not completed the GrOW Program ranked "The GrOW class will change how I feel about gardening" the highest, indicating that students' who will take GrOW have a willingness to learn new things. This is supported in the study by Duncan et al., (2016), which stated that middle school students are at a point where curiosity and experiential learning are pleasing.

Objective 3 – *Identify which demographic characteristics significantly impact how middle school students view gardening.*

There was a significant difference found between where the students lived and gardening efficacy. Students who lived on a farm had higher scores indicating a higher perception of

gardening efficacy than those who lived in a rural area or town (less than 10,000) or those who lived in town or city (10,000 – 50,000 people). However, caution should be taken due to the small sample size of those who lived on a farm.

A significant difference was found between the perceptions of gardening efficacy of students who had or had not planted a garden with their family. Students who had planted a garden with their family had a higher perception of gardening efficacy than those who had not. Social cognitive theory explains how a person's environment, behavior, and personal factory create change in individuals (Bandura, 1986).

Students who completed GrOW were impacted by whether they had planted a garden with their family. Students who had helped with a family garden had higher perceptions of the GrOW Program than those students who had not helped with a family garden. This impact could be due to most of the student's previous involvement in a family garden. This is supported by the experiential learning cycle where the student builds on something they have already experienced when they experience it in a new setting (Kolb, 1984).

GrOW perceptions of students who had not completed GrOW were also impacted by whether they had planted a garden with their family. The GrOW perceptions of students who had helped with a family garden had a higher perception of the GrOW Program.

Students' future interests in gardening were impacted by whether they had helped their family plant a garden. Those who had helped with a family garden had a higher perception of their future interests in gardening indicating that the students were interested in gardening in the future. Childs (2011) had found that students with little to no gardening experience had more positive attitudes about gardening in the future.

Students' membership in 4-H significantly impacted their future interests in gardening. Those who were a member of 4-H had a higher perception of their future interests in gardening. Again, this is a small sample size and caution should be used. However, experiential learning has been used in agriculture for many years (Roberts, 2006), and 4-H is known for its learning by doing methods of education.

Recommendations for Practice

This research revealed that students felt positive about the GrOW Program. They believed it would help them in being able to assist their families in raising a garden. Students understood that watering and weeding were important in keeping a garden healthy, and they liked being outdoors. However, it also showed that students didn't feel like the GrOW Program helped them make healthier food choices. Since nutrition is a part of the curriculum, more time needs to be spent in this area for students to gain the knowledge to make healthier food choices. The GrOW program has potential in serving as a model and providing resources for other schools wanting to develop a curriculum-based gardening program. The initiative also includes plans for a greenhouse, school farmers' market, family cooking nights, and fitness classes.

Recommendations for Future Research

Several recommendations for future research were revealed in through this study to determine perceptions students have on gardening. This study focused on one middle school with a gardening program. Surveying other middle schools that also have gardening programs with similar and different demographics would provide a complete evaluation of gardening perceptions.

For future studies, having sixth-grade students complete the survey at the beginning and end of the school year would provide a more detailed view of what the students perceptions of the GrOW Program were for that school year. This would allow for the school system to readjust the curriculum to achieve the desired outcomes.

Since students' views tend to change over time, a longitudinal study to better explain student perceptions of agriculture and gardening. This explanation would identify the perceptions that have a greater impact on the students.

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APPENDIX A

SURVEY INSTRUMENT

Perceptions on Gardening Survey

Q1

You are being asked to participate in a research project on the school gardens at the Partnership Middle School. Your parents/guardians know that we are asking you to be a part of this study.

We are asking you to complete a short survey. It will take 15 minutes of your time to complete it. Your name will not be anywhere on the survey. No one will know that you were a part of this study. If you don't want to participate, you can stop at any time. There will be no bad feelings if you don't want to do this. You can ask questions if you do not know what we are asking you to do as a part of this study.

Do you understand?

Yes (1)

No (2)

Q2 Is the GrOW class on your schedule this year?

Yes (1)

No (2)

Display This Question:

If Is the GrOW class on your schedule this year? = Yes

Q3 Have you already completed GrOW this school year?

- ○ Yes (1)
- ○ No (2)

Q4 Please read each statement carefully then select the one you think is most like how you feel about each statement. There are not any right or wrong answers.

	Strongly Disagree (1)	Disagree (2)	Agree (3)	Strongly Agree (4)
I am interested in gardening. (1)	○	○	○	○
I like spending time outdoors. (2)	○	○	○	○
I enjoy taking care of plants. (3)	○	○	○	○
I think planting fruits and vegetables takes too much time. (4)	○	○	○	○
I don't like getting my hands dirty in the soil. (7)	○	○	○	○
I like to watch seeds grow into plants. (8)	○	○	○	○

Q5 Please read each statement carefully then select the one you think is most like how you feel about each statement. There are not any right or wrong answers.

	Strongly Disagree (1)	Disagree (2)	Agree (3)	Strongly Agree (4)
I like eating fruits and vegetables. (1)	○	○	○	○
I don't like to garden because it is hard work. (2)	○	○	○	○
Weeding is important to keep a garden healthy. (3)	○	○	○	○
Watering is important to keep a garden healthy. (4)	○	○	○	○
Learning how to garden is important to me. (5)	○	○	○	○
Working in the garden helps me feel better about myself. (6)	○	○	○	○
I have never liked anything about gardening. (7)	○	○	○	○

Display This Question:

If Is the GrOW class on your schedule this year? = Yes

And Have you already completed GrOW this school year? = Yes

Q6 Please read each statement carefully then select the one you think is most like how you feel about each statement. There are not any right or wrong answers.

	Strongly Disagree (1)	Disagree (2)	Agree (3)	Strongly Agree (4)
After completing the GrOW class, I feel I can help my family raise a garden. (1)	○	○	○	○
Completing the GrOW class has helped me make healthier food choices. (2)	○	○	○	○
Completing the GrOW class has helped me make healthier fitness choices. (3)	○	○	○	○
Completing the GrOW class has helped me earn a higher grade in my science class. (4)	○	○	○	○
Completing the GrOW class has helped me earn a higher grade in my math class. (5)	○	○	○	○
Working in the school gardens was my favorite part of the GrOW class. (6)	○	○	○	○
I was interested in gardening before I took the GrOW class. (7)	○	○	○	○

Display This Question:

If Is the GrOW class on your schedule this year? = Yes

And Have you already completed GrOW this school year? = No

Q7 Please read each statement carefully then select the one you think is most like how you feel about each statement. There are not any right or wrong answers.

	Strongly Disagree (1)	Disagree (2)	Agree (3)	Strongly Agree (4)
The GrOW class will change how I feel about gardening. (1)	○	○	○	○
I feel like I will be able to help my family raise a garden after completing the GrOW class. (2)	○	○	○	○
The GrOW class will help me make healthier food choices. (3)	○	○	○	○
The GrOW class will help me make healthier fitness choices. (4)	○	○	○	○
The GrOW class will help me earn a higher grade in my science class. (5)	○	○	○	○
The GrOW class will help me earn a higher grade in my math class. (6)	○	○	○	○
I was interested in gardening before I took the GrOW class. (7)	○	○	○	○

Q8 Please read each statement carefully then select the one you think is most like how you feel about each statement. There are not any right or wrong answers.

	Strongly Disagree (1)	Disagree (2)	Agree (3)	Strongly Agree (4)
It is important to me that my family grows food in a garden. (1)	○	○	○	○
When I am an adult, I would like to plant a garden. (2)	○	○	○	○
I am interested in a career in agriculture. (3)	○	○	○	○
I believe it would be easy to raise a garden. (4)	○	○	○	○
I want to learn more about planting a garden. (5)	○	○	○	○

Q9 What is your gender?

- ○ Male (1)
- ○ Female (2)
- ○ Prefer not to answer (3)

Q10 What is your race?

- African American (1)
- Asian/Pacific Islander (2)
- Hispanic/Latino (3)
- Native American (4)
- White Caucasian (5)
- Other (6) _____

Q11 Where do you live?

- Farm (1)
- Rural Area or Town (Less than 10,000 people) (2)
- Town or City (10,000 to 50,000 people) (3)

Q12 Has your family ever planted a garden?

- Yes (1)
- No (2)
- Not sure (3)

Q13 Have you ever been a member of 4-H?

- ○ Yes (1)
- ○ No (2)

Display This Question:

If Have you ever been a member of 4-H? = Yes

Q14 If yes, when?

_____

APPENDIX B

IRB APPROVAL

MISSISSIPPI STATE UNIVERSITY

Office of Research Compliance

Institutional Review Board for the Protection of Human Subjects in Research
P.O. Box 6223
56 Morgan Avenue
Mississippi State, MS 39762
P. 662.325.3294

www.orc.msstate.edu

NOTICE OF DETERMINATION FROM THE HUMAN RESEARCH PROTECTION PROGRAM

DATE:	November 03, 2021
TO:	Kirk Swortzel, PhD, School of Human Sciences, Laura Downey;Michael Newman;Tommy Phillips Julie White, MS, School of Human Sciences, Laura Downey, School of Human Sciences, Michael Newman, PhD, School of Human Sciences, Tommy Phillips, PhD, School of Human Sciences
PROTOCOL TITLE:	Perceptions of Middle School Students on Gardening
FUNDING SOURCE:	
PROTOCOL NUMBER:	IRB-21-429
APPROVAL PERIOD:	Approval Date: November 03, 2021 Expiration Date: November 02, 2026

Under an expedited review procedure, the research project identified above was approved on November 03, 2021 by the Mississippi State University Institutional Review Board (MSU IRB). The application qualified for expedited review under CFR 46.110, Category 7.

This memorandum is your record of the IRB approval of this study. Please maintain it with your study records.

Please note that the MSU HRPP accreditation for our human subjects protection program requires an approval stamp for consent forms. The approval stamp will assist in ensuring the HRPP approved version of the consent form is used in the actual conduct of research. **If applicable, you must use the stamped consent form for obtaining consent from participants.**

The MSU IRB approval for this project will expire on November 02, 2026. If you expect your project to continue beyond this date, you must submit an application for renewal of this HRPP approval. HRPP approval must be maintained for the entire term of your project.

If, during the course of your project, you intend to make changes to this study, you must obtain approval from the HRPP prior to implementing any changes. Upon becoming aware of an unanticipated problem that suggests participants or others are at greater risk of harm than was previously known or recognized, a problem report must be submitted to the HRPP as soon as possible, but always within 10 days. Serious problems must be reported verbally within one business day, in addition to the submission of the written Problem Report.

You are required to maintain complete records pertaining to the use of humans as participants in your research. This includes all information or materials conveyed to and received from participants as well as signed consent forms, data, analyses, and results. These records must be maintained for at least three years following project completion or termination, and they are subject to inspection and review by the HRPP and other authorized agencies.

Please notify this office when your project is complete. Upon notification, we will close our files pertaining to your project. Reactivation of the HRPP approval will require a new HRPP application.

If you have any questions relating to the protection of human research participants, please contact the HRPP by phone at 662.325.3220 or email irb@research.msstate.edu. We wish you the very best of luck in your research and look forward to working with you again.

Approval Period:	November 03, 2021 through November 02, 2026
Review Type:	EXPEDITED
IRB Number:	IORG0000467

APPENDIX C

WAIVER OF PARENTAL CONSENT

Dear Starkville-Oktibbeha Consolidated School District Parents,

Starkville-Oktibbeha Consolidated School District (SOCSD) is partnering with MSU in a project that will assist in tailoring the GrOW (Gardening and Overall Wellness) program at the Partnership Middle School. In this project, our students' perceptions on gardening are assessed. The project has been approved by the MSU Human Subjects Institutional Review Board (IRB), which reviews all research at MSU to ensure ethical compliance and participant safety, and the faculty guiding this project are working closely with both the IRB and SOCSD to ensure that our children's well-being is our first and foremost consideration for this project. Below we explain a bit more about the project, the value of the study to SOCSD, all the procedures in place to protect the students who participate, and who you can contact if you have any questions or concerns. We value our partnership with you, the parents of SOCSD students, and welcome you into this important conversation.

Why data will be collected: Measuring students' perceptions can inform school administrators of the benefits of the GrOW program and will further illustrate the educational impact of the program.

What data will be collected: All data that will be collected will be **anonymous** and will not be linked to any individual student. Questions will all pertain to agriculture and gardening and should only take approximately 15 minutes to complete.

How will data be used: Information gained can be used to update curricula to enhance student perceptions of agriculture and gardening. Study information could also aid the school system in program fundraising and reporting, which are essential to making the program sustainable.

How will data be shared: A summary of the data will be presented to the teachers and the SOCSD administration.

Who to contact with questions: Parents who would like to learn more are invited to contact the primary investigators on the project, Ms. Julie White at 662-325-8195 (j.white@msstate.edu) or Dr. Kirk Swortzel at 662-325-7837. In addition, parents may contact the MSU Office of Research Compliance, which has reviewed the protocol. Their number is 662-325-3294.

If you would like to preview the survey that your child will be taking, please scan the QR code below.

Parents, if you do not respond by November 10, we will consider it as your support for this project.

Thanks in advance for your support of our project,

Julie B. White

Julie B. White
Extension Associate, School of Human Sciences, MSU Extension Service
Liason to SOCSD GrOW Program
j.white@msstate.edu
662-325-8195

APPENDIX D

APPROVAL LETTER FROM SCHOOL DISTRICT

STARKVILLE OKTIBBEHA CONSOLIDATED SCHOOL DISTRICT
GREENSBORO CENTER, 401 GREENSBORO STREET
STARKVILLE, MS 39759

EDDIE J. PEASANT, Ed.D.
SUPERINTENDENT

TELEPHONE (662) 324-4030
FACSIMILE (662) 324-4068

October 12, 2021

Subject: Approval of Research Project with Mississippi State University

The Starkville-Oktibbeha Consolidated School District approves the request for Julie White and Dr. Kirk Swortzel to conduct the Perceptions of Middle School Students on Gardening research project at the Partnership Middle School. The goal of the project is to inform school administrators of the benefits of the GrOW program, with the results being used to update the curricula to enhance student perceptions of agriculture and gardening.

The Perceptions of Middle School Students on Gardening project will provide support for our GrOW program at the Partnership Middle School. Therefore, we endorse this project, and look forward to this partnership with Mississippi State University.

Sincerely,

Eddie Peasant, Ed.D.
Superintendent
Starkville Oktibbeha Consolidated School District

Expect Excellence Every Day

APPENDIX E

APPROVAL LETTER FROM SCHOOL PRINCIPAL

STARKVILLE OKTIBBEHA CONSOLIDATED SCHOOL DISTRICT

GREENSBORO CENTER, 401 GREENSBORO STREET
STARKVILLE, MS 39759

EDDIE J. PEASANT, ED.D.
SUPERINTENDENT

TELEPHONE (662) 324-4050
FACSIMILE (662) 324-4065

October 12, 2021

Subject: Approval of Research Project with Mississippi State University

The Partnership Middle School approves the request from Julie White and Dr. Kirk Swortzel to conduct the Perceptions of Middle School Students on Gardening research project at the Partnership Middle School. The goal of the project is to inform school administrators of the benefits of the GrOW program, with the results being used to update the curricula to enhance student perceptions of agriculture and gardening.

The Perceptions of Middle School Students on Gardening project will provide support for our GrOW program here at the Partnership Middle School. Therefore, we endorse this project, and look forward to this partnership with Mississippi State University.

Sincerely,

Mrs. Jorine Neal
Principal, Partnership Middle School

Expect Excellence Every Day