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Teacher perceptions of the educational goals of the Education and Resiliency Through Horticulture program

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**Teacher perceptions of the educational goals of the Education and Resiliency Through
Horticulture program**

by

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A thesis submitted to the graduate faculty
in partial fulfillment of the requirements for the degree of

MASTER OF SCIENCE

Major: Agricultural Education

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ABSTRACT

A review of literature revealed a lack of research related to teacher involvement in school gardens. This research study provides more information to build on the body of knowledge pertaining to school gardens and more specifically the teacher involvement. The research study took place at Giffit Hill School, a private school, on St. John, USVI. The purpose of the study was to determine the extent to which two of the Education and Resiliency Through Horticulture (EARTH) program goals are being met from the perspective of the teachers directly involved with the program. The specific objectives of the study were:

- Determine the extent to which the school curriculum has been integrated to include horticulture and place-based environmental science;
- Identify how the outdoor classroom has been utilized by the teachers and students; and
- Identify possible program modifications that could help the teachers carry out their part of the EARTH program more successfully.

The main data collection method of this qualitative research study was face-to-face interviews with the teachers of Giffit Hill School involved with the EARTH program. The involvement and extent to which the goals of the EARTH program are being met vary widely by subject taught and the teacher. Some reduced involvement was due to lack of time while others use the EARTH program to drive their classroom learning and activities. Unforeseen benefits are also emerging as the program becomes a staple to the GHS school community. There is room for improvement to use the outdoor classroom by the teachers outside of the scheduled EARTH classes. Beyond that time, it is used minimally by the teachers. The teachers provided recommendations that could improve their involvement with the program as well as other general recommendations for the program.

CHAPTER 1: INTRODUCTION

This chapter will provide background on school gardens, the island of St. John, and the EARTH program goals from which this research stems. The chapter then outlines the need for this research project, the purpose and objectives, and significance of the study. Selected definitions are provided at the end of the chapter.

Introduction and Background

School gardens are becoming more widespread each year as the importance they play in student learning is better understood. Gardens help beautify the landscape, provide a hands-on learning environment, and have shown to increase students' interpersonal relationships (Waliczek, Bradley, & Zajicek, 2011). When children are actively involved in a garden program which allows them to have hands-on garden education, they benefit in multiple ways; not only do they have an increased knowledge base compared to those without this education, they also tend to consume higher amounts of vegetables (Lautenschlager, 2008). With the obesity problems facing today's children, increasing student knowledge of food availability and consumption is important. Even growing just a few types of vegetables opened up the students to willingly try different kinds of vegetables, even when they were different varieties than the ones they grew, as compared to a group of students that did not have the experience of growing vegetables (Morris, Neustadter, & Zidenberg-Cherr, 2002).

Promoting a healthy lifestyle for children is important, since many fatalities in children are attributed to inadequate fruit and vegetable consumption (Pomerleau et al., 2005). Pomerleau et al. also point out that by increasing the amount of fruits and vegetables consumed in ones diet, the risks of many major health problems, such as heart disease and

multiple types of cancer, are decreased. At a World Health Organization (WHO) and Food and Agriculture Organization (FAO) workshop, people gave many “reasons” why they have a limited intake of vegetables. Blame fell in a range from the price of the product to personal dislike of them. People that take part in a vegetable program covering production to consumption increased their vegetable intake and also the variety of vegetables consumed (WHO/FAO, 2004).

Implementing a school garden program has more benefits than introducing students to vegetables and increasing their vegetable intake. For some students, participating in a school garden program may have a psychological impact (Waliczek et al., 2001). Completing tasks and responsibilities in the garden can help boost self-confidence and improve necessary life skills for involved students (Robinson & Zajicek, 2005).

This research study pertains to a school gardening and horticulture program on the island of St. John in the United States Virgin Islands (USVI). The USVI consists of three islands, St. Croix, St. Thomas, and St. John, with St. John being the smallest of the three (NOAA, 2011) at approximately seven miles long and three miles wide (VINow, 2012). USVI is located east of Puerto Rico and has a combined land mass of just over 737 square miles. The main trade for the islands is tourism, which makes up more than 80% of the industry for the islands, with manufacturing as the second highest industry (Central Intelligence Agency, 2012). In 2000, the population for the three islands was 108,612, with St. John only making up about four percent of that or just over 4,300 people (NOAA, 2011)..

The island of St. John is much less urbanized than the other two U.S. islands and over half of the island is protected national park land. Much of the island is tropical forest, staying undeveloped and containing structural remains from past societies. The protected

area extends beyond the land and includes beaches, waters, and reefs. The land has been protected since 1956, and four years later the underwater portion was added. Historic ruins of sugar cane plantations and villages can be found on many of the hiking trails throughout the Virgin Islands National Park (VINP) (National Park Service, 2012).

Varied backgrounds, socioeconomic statuses, and levels of education contribute to the diverse St. John demographic. The people of St. John are referred to as Virgin Islanders. According to the CIA, (2012), approximately three quarters of the population is black with the remainder being comprised of white, Asian, and other. The principal spoken language is English, but Spanish and French are also spoken on the islands (CIA, 2012). The 2005 US Virgin Island Community Survey (VICS) contains a great deal of information about the three U.S. Virgin Islands as a group as well as the individual islands. When it comes to poverty, 35% of the families on St. John live below the poverty line and 83% of the single-parent families on St. John live below the poverty line (VICS, 2008). The mean family income for 2004 was \$34,311. Thirteen percent of families on St. John had a reported income between \$5,000-\$9,000 and the same percentage had an income between \$50,000-\$75,000 (VICS, 2008). The community survey also provided information about the education attainment of individuals living on St. John. Of those over the age of 25, nearly 33% have a high school diploma or higher, and within that same age group, only 12.7% have obtained a Bachelor's degree or higher (VICS, 2008).

The cost of living in the Virgin Islands is higher than that of the U.S, while the average income of islander families is lower than that of the U.S. The VI Moving Center website reports that the cost of living is approximately 33% higher in the Virgin Islands compared to the U.S. (VI Moving Center, 2012). The reason for the increase in living cost is

that all food and supplies must be shipped in from other areas. Most inhabitants must travel to St. Thomas for the majority of their shopping needs, as St. John does not have any large retail stores.

This study takes place at Giffit Hill School (GHS), a private school on St. John of the U.S. Virgin Islands. The teachers involved with the Education and Resiliency Through Horticulture (EARTH) program were interviewed. The purpose was to obtain their views of topics pertaining to the program goals set in place at the inception of the EARTH program and their perceptions of the program. The EARTH program at GHS is used in the classroom and additionally has outdoor spaces including garden space and an outdoor classroom area. The outdoor classroom area includes a structure where classes and groups of people can gather. The garden spaces include both in-ground fruit and vegetable plantings and a patio area is used for container gardening. The mission of the EARTH program is to “integrate gardening education into the Giffit Hill Middle School’s curriculum and eventual lunch program” (GHS, 2012). The EARTH program is a joint venture between Iowa State University (ISU) and GHS, with ISU students having the opportunity to intern at GHS and assist with the EARTH program.

When the EARTH program was implemented at GHS, six program goals were created. The program goals were 1) design, install, and maintain attractive landscapes for sustainable food production, 2) integrate gardening into the curriculum through horticulture, place-based environmental science, and hands-on learning, 3) provide healthy, delicious, & locally grown food to the GHS community, 4) create & utilize outdoor classroom space for students to learn & connect to natural world in a meaningful way, 5) cultivate a positive

perception of horticulture, a sense of place & a knowledge of the origins of food, 6) connect ISU interns & GHS students through classroom and elective activities (GHS, 2012).

At the time of this study, no research had been done with the teachers to determine the extent to which these goals have been met. This is the overarching research focus. Specifically, the two EARTH program goals the study looks to examine and from which the interview questions were taken from are listed below.

- Integrate hands-on middle school curriculum that includes horticulture and place-based environmental science.
- Create and utilize outdoor classroom space for students to learn and connect to natural world in a meaningful way.

Teaching at GHS is substantially different than a “typical” school in the U.S., from classroom sizes to the educational backgrounds of the teachers. GHS is a small private school with approximately fifteen students or less in each grade level. Each grade level takes their classes together, with the exception being their one elective course in which the students choose their most interesting elective. The number of teachers at the school is dependent upon student enrollment. When enrollment decreases a position may be cut, and with an increase in enrollment a teacher is added. Because of the smaller number of students enrolled at the school, most instructors teach more than one subject. As a private school, the people hired to teach are not required to have a teaching license and only about half of the current teachers at GHS have a teaching license. The teachers that are not licensed may be experts in their field or had a teaching license in the past and let it lapse.

Problem and Need for the Study

With the EARTH program in its third year of operation, it is important to assess the progression of its program goals. The teachers involved in the EARTH program are crucial

to the success of the program, which is why they were chosen as the unit to study for this research. Using individual GHS teacher interviews, this research will assess two of the six program goals that were established to guide the program and look at what needs the teachers express. This research project stems from the recommendation of a researcher who did previous work at GHS with the students involved in the EARTH program. Childs (2011) suggested looking at the incorporation of the EARTH program into classroom curriculum and the teacher involvement in the program.

The completion of this research will help guide the EARTH program in future decisions through the ideas and experiences shared by the teachers directly involved with the program. The EARTH program at GHS was initially funded for five years, starting with the 2010-2011 school year.

The findings of the study and future considerations for the program will be communicated to the EARTH program committee at the semi-annual meeting in 2013. The two specific EARTH program goals to examine and from which two of the research objectives are connected to are listed below.

- Integrate hands-on middle school curriculum that includes horticulture and place-based environmental science.
- Create and utilize outdoor classroom space for students to learn and connect to natural world in a meaningful way.

Purpose and Objectives

The purpose of this study was to determine the extent to which the EARTH program goals are being met from the perspective of the teachers directly involved with the program.

The specific objectives of the study are:

- Determine the extent to which the school curriculum has been integrated to include horticulture and place-based environmental science;
- Identify how the outdoor classroom has been utilized by the teachers and students; and
- Identify possible program modifications that could help the teachers carry out their part of the EARTH program more successfully.

Significance of Study

Completion of this research study will benefit the EARTH program as well as contribute to the growing amount of school garden research. The research study will document the extent to which two of the six program goals, related to teacher involvement and curriculum integration, are currently being met. Needs and recommendations expressed by the teachers and future research considerations for the program will be provided.

Selected Definitions

- Education and Resiliency Through Horticulture (EARTH): A school gardening and service learning program between GHS and Iowa State University
- Teachers / EARTH teachers: The teachers at Giffit Hill School who are actively involved in the EARTH program.
- Giffit Hill School (GHS): A private school on the island of St. John. It is the only high school on the island of St. John, USVI.
- Integration: The process of including EARTH program material into classroom curriculum.
- Outdoor Classroom: The outdoor area at GHS used for the EARTH program. This includes the outdoor patio, composting area, and terrace gardens with accompanying structures.
- EARTH time: Once a week class period each middle school class spends with the program director in the outdoor classroom.

CHAPTER 2: REVIEW OF LITERATURE

This chapter will provide a review of literature related to school garden programs. The chapter will start by defining what a garden is and the importance gardens have in the home. Then the research review will move to school gardens in relation to their benefits and impacts on students in different ways. One area of benefit is academically, and how school gardens can improve student understanding and enrich classroom learning. School gardens can have a positive impact on student psychological aspects and garden experiences can also lead to a readiness to try different foods. Finally, teaching methods related to agricultural education and experiential learning and its ties to school gardens will be explored.

Gardens

Starting with the basic concept, a garden is considered 1) a plot of ground where herbs, fruits, flowers, or vegetables are cultivated, 2) a rich well-cultivated region, and 3) a container (as a window box) planted with usually a variety of small plants (Merriam-Webster, 2012). In the past, home gardens or backyard gardens were very common and important for families. In the context of food security, home gardens provided a reliable source of nutritious food for families (Marsh, 1998). Results from a study by Schupp and Sharp (2012) reported that income and location had an impact on the likelihood of having a home garden; living in the countryside or on a farm greatly increased the odds of maintaining a home garden. Besides the location of housing, economic hardships and local food movement involvement both correlated with the presence of a home garden. As the amount of economic hardship increased the likelihood of a home garden also increased, similarly, the involvement with a local food system increased the odds of having a home garden (Schupp & Sharp, 2012).

Vegetable acceptance

Active participation in a garden and exposing children to different types of vegetables can lead to positive life changes for the child. Children often do not choose to eat vegetables, but gardening can help improve their curiosity and allowance to consume vegetables. When children are actively involved in a garden program, they benefit in multiple ways; not only do they have an increased knowledge base compared to those without this education, they also tend to consume higher amounts of vegetables (Lautenschlager, 2008).

First graders that participated in an elementary school garden program were more willing to try different vegetables, even different types of vegetables than what was grown in the school garden (Morris, Neustadter, & Zidenberg-Cherr, 2001). Similarly, in a garden program with fourth graders, the researchers found the students willing to try types of vegetables beyond what was grown in the school garden (Morris & Zidenberg-Cherr, 2002). Lineberger and Zajicek found that students replied that they liked vegetables more after participating in garden- related activities compared to before the involvement, and they were also more likely to choose a fruit or vegetable snack item (2000). The same study found that younger students may be more open to trying different fruits and vegetables for snacks as the younger students were more accepting of the fruit and vegetable snacks over other snack options (Lineberger & Zajicek, 2000).

At a World Health Organization (WHO) and Food and Agriculture Organization (FAO) workshop, many “reasons” were given why people said they have a limited vegetable intake, ranging from the price of the product to personal dislike of them. People that took part in a vegetable program covering production to consumption, increased their vegetable intake and also increased the variety of vegetables consumed (WHO/FAO, 2004).

Consuming a diet that includes a variety of fruits and vegetables is important to one's health. Promoting a healthy lifestyle for children is important, as many fatalities in children are attributed to not enough fruit and vegetable consumption (Pomerleau et al., 2005). Pomerleau et al. also point out that by increasing the amount of fruits and vegetables consumed in one's diet, it has been shown to reduce the risks of many major health problems such as heart disease and multiple types of cancer.

School Gardens

The importance school garden programs play in student learning, as well as in other aspects of their life, is evident. Gardens help beautify the landscape, provide a hands-on learning environment, and have shown to increase student's interpersonal relationships (Waliczek, Bradley, & Zajicek, 2011). There are a number of reasons a school garden program may be implemented at a school, but one of the foremost reasons is to supplement student instruction (Graham, Beall, Lussier, McLaughlin, & Zidenberg-Cherr, 2005). School gardens have been referred to as "living laboratories" that allow for use and observation (Smith & Motsenbocker, 2005). The National Gardening Association (2012) website refers to school gardens as something that,

Engages students by providing a dynamic environment to observe, discover, experiment, nurture, and learn. School Gardens are living laboratories where interdisciplinary lessons are drawn from real life experiences, encouraging students to become active participants in the learning process.

The laboratory for impacting student learning can also be used as a nutritional snack bar, since throughout the growing season, the plants continue to produce fruits and vegetables. Students may visit the gardens to pick a snack or the produce may be used for

other nutritional purposes. Depending on the program, produce is used for school lunches, as a fundraising opportunity, or a way to give back to their community (Morris, Briggs, & Zidenberg-Cherr, 2002).

Academic impact.

School garden programs provide increased learning opportunities for students, align with many school subject areas being taught, and can be incorporated into many classes and subject areas, with science having the greatest connection (Graham et al., 2005). Many topics and units covered in science classes correspond with garden practices, and the garden plots provide an outdoor laboratory space for class labs and experiments. Efforts executed in the garden help teach students about their environment (Waliczek, Bradley, Lineberger, & Zajicek, 2000). Plants are the main feature associated with school gardens and are a very important part of life. The evaluation of one garden program found that by the end of the program, third grade students realized that they cannot survive without plants (Dirks & Orvis, 2005). Student involvement in a school garden program can also pique the interest of the students to the science which can lessen the false impression that science is a difficult and dry subject (Dirks & Orvis, 2005).

Math is another subject that can easily be linked with school garden program curricula. An example is utilizing math skills during fundraising activities; in one program that conducts a yearly seedling sale, students are taught how to use the cash register and how to calculate profit and loss (Krywko, 2008). Studies have shown an increase in student science scores after participating in hands-on garden activities, compared to students without this instruction (Klemmer, Waliczek, & Zajicek, 2005), and improvement has been shown

when the class instructors had little preparation in teaching methods associated with gardening sessions (Smith & Motsenbocker, 2005).

Psychological impact.

School gardens are initiated principally for academic reasons, but gardening programs also have other positive impacts and can help students grow on a personal level. For some students, participating in a school garden program may have an impact on psychological aspects; these positive improvements have been shown in both interpersonal relationships and attitudes towards school (Waliczek et al., 2001). Similarly, after completing just one year of a gardening program, one study found that students had an increase in self-understanding and life skills such as teamwork (Robinson & Zajicek, 2005).

The psychological impacts for students have also been observed by those directly involved with the students participating in a school garden program. Adults involved with a garden program reportedly observed that stress levels were reduced and self esteem boosted in the children working in the gardens (Waliczek et al., 2000). Along with the lower amount of stress, students also gain a sense of accomplishment. Completing tasks and responsibilities in the garden can help boost self-confidence and improve necessary life skills for involved students (Robinson & Zajicek, 2005). Students involved see the success from “inception to fruition” come from the labor contributions they put into the garden program (Krywko, 2008).

Teacher Involvement.

Several factors inhibit the inclusion of garden topics in classroom instruction. The main obstacle was limited time but lack of interest, experience, and materials connected to state standards were also noted (Graham & Zidenberg-Cherr, 2005). The need for teacher

education materials and training to help guide teachers to incorporate garden related materials is apparent (Graham et al., 2005). This was also noted in a teacher survey where 67% of teachers noted that providing curriculum materials for classroom instruction and related garden activities would increase the use of the school garden for academic instruction (Graham & Zidenberg-Cherr, 2005).

Although the majority of activities take place directly in the gardens, school garden topics can be brought into the classroom through other avenues. The use of supporting texts to create student work and assessments is one way to incorporate the garden topics into the class (Dirks & Orvis, 2005). As the number of school garden programs increase, online materials can help teachers get started. Mayes (2011) provides a compilation of both online and print resources to help beginners get a better grasp of what can be done with school gardens.

Teaching methods are an important aspect of all classrooms and can play a large factor in student involvement and learning. There are a variety of different teaching methods used and each offers different learning opportunities for students. Morris, Briggs, and Zidenberg-Cherr (2012) make a very valid point that, “Teachers need to have new ways to teach the same subjects, as opposed to entirely new subjects to teach.” They used garden curriculum in core classes, following the state’s content standards, and used the garden area as the “environment” in which to teach the garden activities (Morris et al., 2002). When presenting information about the way agriculture is offered to students in class, Martin & Odubiya (1991) wrote about the importance of how materials are presented (i.e. methods).

Education must be more than presenting material. It must stimulate student motivation into directions which will provide positive guidance for action. It is an

activity which is essentially alive and inspiring, not simply a transfer of information.

The only real value of knowledge is when students can use it in a meaningful way. (p.

1)

Agricultural Education

Agricultural education can be defined in different ways, and The National Association of Agricultural Educators website (NAAE, 2012) explains that it teaches, “students a wide variety of skills, including science, math, communications, leadership, management and technology.” It is imperative that youth have an understanding of agriculture and the importance it has on everyday life as “the future of American agriculture rests in the hands of ninety-eight percent of the United States population who do not reside on a farm and may have little to no understanding of agriculture” (Doerfert, 2011, p. 11). The involvement of students in activities that increase their understanding of agriculture is important to the future of agriculture. Agriculture education is often seen in high schools, but is also offered in middle and elementary schools (Talbert, Vaughn, Croom, & Lee, 2007).

School gardening is very interconnected with agricultural education both in topics taught and methods used to teach the material. Plant and animal production, biological and physical science, horticulture, natural resources, and food processing are some of the subjects included (Talbert et al., 2007). The American Association for Agricultural Education’s *National Research Agenda*, is one document that contains beneficial information not only for agricultural education teachers, but for anyone who is incorporating agriculture related material for instruction. The agenda is split into six areas deemed “priority” areas for continued research as well as provides descriptions of the major issues agricultural education is facing (Doerfert, 2011).

Experiential learning.

“Learning by doing,” as suggested by Dewey not only allows students have a hands on experience with classroom activities, but also puts the initiative to complete the work on the students (Dewey & Dewey, 1915). The teacher is there to facilitate and to let students know what they are doing and more importantly why they are doing it (Dewey & Dewey, 1915). Kolb and Kolb (2005) explain that the work of Dewey, Lewin, Piaget, and other 20th century scholars helped mold experiential learning theory, namely, the plan of Lewin “for the creation of scientific knowledge by conceptualizing phenomena through formal, explicit, testable theory” (p. 195). Kolb & Kolb (2005) describe the theory as consisting of six propositions which are, 1) learning is best conceived as a process with feedback provided, 2) the process should bring out the beliefs of the students so they can be examined and integrated, 3) the learning process is motivated by conflict with reflection and action as ways to move forward in learning, 4) thinking, feeling, perceiving, and behaving are all functions of the learning process, 5) the intertwining of new experiences and existing concepts leads to learning, and 6) the process of creating knowledge leads to learning (p. 194).

Experiential learning is a common method used in agricultural education as well as school garden programs, partially because the topics taught lend themselves well to a hands-on approach as they are the same activities that are applied in the real world (Roberts, 2006). In the results of one survey, experiential learning terms such as hands-on, practical, and real world showed up in 25% of the overall responses related to the school garden program (Waliczek et al., 2003).

Hands-on, experiential activities do not have to take place outside in the garden area. There are plenty of in-class activities that support the concepts used in the outdoor garden,

such as pest identification, worm bottles, and planting seeds into containers, which can all be done indoors (Morris & Zidenberg-Cherr, 2002). At the completion of a ten-week experiential laden instruction related to the food and fiber industry, major differences were seen in the students' responses. When comparing the pre- and post-test, an increase of approximately 40% of the students involved with the programs thought agriculture was interesting, compared to the control group that had a decrease in respondents thinking agriculture was interesting (Marbie & Baker, 1996).

A survey with vocational agriculture teachers related to teaching methods used in the classroom found that teachers tend to mainly use just a couple teaching methods in the classroom; although the teachers did note that other methods are effective, just not often utilized (Martin & Odubiya, 1991). If teachers need assistance with experiential learning activities, there are resources available. Research suggests that qualified State Extension personnel could be one source to assist in bringing experiential activities into the class curriculum (Mabie & Baker, 1996).

Summary

The review of literature expresses the benefits that active participation in a garden program can have for students and conveys the need for more research to be done about school gardens. As school gardens increase in popularity and numbers, providing new information is necessary to build on the foundation of research already completed. Even later in life, people who lived near a garden participated in "nature or environmental education", or who cared for plants growing up, were more likely to take part in a gardening program (Lohr & Pearson-Mims, 2005). Learning life skills, building academic experiences and nurturing positive psychological benefits are just some advantages of being involved in a

school garden program. As the number of school gardens continues to increase, continued research is needed to examine the impacts and benefits they provide for the students and schools that participate in such a program.

The research available on school gardens is abundant for elementary aged students, but lacking in the older grades. However, research linked to teacher involvement is not well established. As the ones presenting and overseeing the extent to which the students are involved with the program, it is crucial that more research be done in this area. This research study at GHS will help add one more piece of research data on the involvement of teachers with a middle school garden program.

CHAPTER 3: METHODS

Chapter three will describe the methods of the research study. The design of the study and the production of the instrument for the study are explained. Data collection protocols for the study follow. Those people most important to the success of this study, the participants, will then be introduced. Next, the data analysis procedure and the goodness and trustworthiness of the study are explained. The chapter concludes by providing an insight to the researcher's background and what effect it may have on the study.

The purpose of this study was to determine the extent to which the EARTH program goals are being met from the perspective of the teachers directly involved with the program.

The specific objectives were to:

- Determine to what extent teachers have integrated EARTH program topics and materials into their curriculum;
- Identify how teachers are using the outdoor classroom; and
- Identify possible program modifications that could help the teachers carry out their part of the EARTH program more successfully.

Research Design

To accomplish the goals of this study, focus was placed on the perceptions of those teachers at GHS associated with the EARTH program curriculum. A qualitative research method was chosen as an appropriate evaluation technique to meet the research objectives. Qualitative research as stated by Stake (2010) “relies primarily on human perception and understanding” (p. 11).

This research study was completed using a constructivist epistemological approach. Constructivism as described by Crotty (1998) is where people construct their own meaning through the interactions they have with their world; in other words, an individual's meaning

is constructed, not discovered. When qualitative research is done through a constructivist approach, the use of interviews and observation by the researcher are the most common ways of learning about the subject's experience (Given, 2008). The themes become apparent when compiling the data (Manning & Stage, 2003).

The basic interpretive approach was used as the theoretical approach in this study. The essence of the basic interpretive theoretical approach was described by Ary, Jacobs, and Sorenen (2010) as, "describe and attempt to interpret experience" (p.453). Common data collection methods used in basic interpretive research includes interviews, observation, and document analysis (Merriam, 2002). This form of qualitative research is one of the most commonly used methods in education related research, but is also found in all other fields (Merriam, 2002). This approach was chosen as the purpose was to describe how the teachers involved with the EARTH program at GHS are making meaning of their experiences in the program along with understanding possible programmatic changes that would help the teachers further bring EARTH topics into the classroom.

The teachers of interest for this study were those incorporating the EARTH program materials into their classroom teaching. Understanding the teacher's views and experiences, along with any barriers keeping them from further including relevant materials will help to establish the current state of the EARTH program in relation to the preset program goals. This research will also reveal ways the program can be improved to more successfully include EARTH materials.

A case study method was used to gain in-depth perspectives of a specific group of teachers; those actively involved with the EARTH program at GHS. The case study method is used to allow researchers and others to gain a better understanding of the unit of interest.

The unit in a case study is not necessarily a single person, rather it may refer to a single occurrence that is being researched (Ary et al. 2010). In this case, the teachers directly involved with the EARTH program make up the “unit” being studied. The integration of EARTH program materials and topics to classroom learning is the focus of the research study. The teachers interviewed determine the extent to which they integrate their curriculum. Stake (1995) points out that a “case is a specific, complex, functioning thing” (p. 2). Stake (1995) continues by stating “We take a particular case and come to know it well, not primarily as to how it is different from others but what it is and what it does” (p. 8). To carry out this case study, individual teacher interviews, observations, and field notes were chosen for the method of data collection.

Instrumentation

The purpose of the case study was to look at two of the six EARTH program goals set in place at the start of the program in 2010, determine if those goals were met through the perspective of the teachers involved, and identify barriers that are keeping those teachers from effectively incorporating EARTH materials into the classroom. A research instrument was developed for this study, as the EARTH program is a unique program and there is currently no instrument or methodology that encompasses what was to be researched.

An interview guide was created to address the purpose of the study and the goals of the EARTH program. The two program goals of interest were used to help guide the questions used in the instrument. Questions were created to gain understanding of what the teacher does with their curriculum and class time and to what extent it relates to a specific EARTH program goal. Semi-structured interviews were conducted so that questions were left open-ended and included a blend of general and more specific questions. While

preparing the interview guide, chapter five of *Qualitative Methods in Social Research* by Esterberg (2002) was used as a reference. Esterberg's (2002) fifth chapter contributed to the creation of an effective interview guide. The five steps Esterberg recommended when preparing to interview are 1) decide whom to interview, 2) prepare an interview guide, 3) decide what types of questions to ask, 4) make questions open-ended, and 5) pretest the interview guide (Esterberg, 2002).

Teachers involved with the EARTH program were chosen as the focus of the research study because they integrate EARTH program materials into the curriculum. An initial interview guide was constructed with questions posed around the two EARTH program goals of interest. Questions pertaining to possible programmatic changes that could help the teachers further integrate EARTH materials into their curriculum were also built into the interview guide. The questions focused on the teachers background, experiences, knowledge, and opinions. Questions allowing for dichotomous answers were avoided to provide a more conversation tone to the interviews. Once completed the interview guide was pretested with the teachers at GHS in May, 2012. The pretest allowed for restructure and modification of the questions before the final interviews in September, 2012.

The validity of the question guide was achieved by developing questions that directly reflected the two program goals. Validity was also obtained through the review of the instrument by those directly involved with the program. The original question guide was implemented in a pilot to pretest the questions and direction of the interviews in May, 2012 (Esterberg, 2002). Following the pilot interviews with the teachers involved with the EARTH program, the protocol and question guide were refined and Institutional Review

Board (IRB) approval was attained for the study to be done in September 2012. The IRB approval can be found in Appendix A.

Data Collection

According to Merriam and associates (2002) interviews, observations, and documents are the three main sources of data collection used in qualitative research (p. 12). In this research study interviews and observations were utilized. The use of personal interviews with the teachers is the best method for this study because it allows for a high response rate due to the fact that the researcher is in the same location as those to be interviewed (Ary, Jacobs, & Sorensen, 2010). Interviews also allow for further explanation of a question and the ability to encourage interviewees to provide a more detailed answer if not provided the first time. Another purpose of face-to-face interviews as an appropriate instrument is that the method allows the interviewer to gain a greater understanding of the EARTH program by means of seeing the facilities available and how they are used (Ary et al., 2010).

Participants were identified through a generated list of teachers involved with the EARTH program at GHS. These individuals were given a letter explaining the interview process and why their input is important to the success of the program. The letter was accompanied by a consent form for the teacher to sign stating they are willing to participate in the interviews and that their responses will be available for others to see, but their individual identities will not be used (Appendix B).

Interviews were conducted over a two-day period and took place in the teacher's primary classroom. The EARTH program coordinator contacted the participants to find a time that worked best with their class schedule. Before each interview was conducted, the participants were informed that the interviews would be audiotaped and the information

provided would be published. To make sure they provide thoughtful and true responses participants were reminded that pseudonyms would be used to keep anonymity (Ary et al., 2010). The participants then read an informed consent letter that outlined the procedure, participant rights, and confidentiality and signed the form if they agreed to continue with the study (Esterberg, 2002).

For data collection during the interviews, notes were taken and each interview was recorded. Each semi-formal interview lasted between fifteen and forty-five minutes in length which allowed seven to ten minutes per question group. A semistructured interview technique was used to allow the teachers to have some freedom in what information they chose to share (Esterberg, 2002). This interview strategy was chosen because the study looked to survey what the teachers thought about the EARTH program and allowed the teachers express their attitudes and ideas in their own words (Esterberg, 2002).

Semistructured interviews allow for a combination of traits from both highly structured to unstructured. This approach allows for structured questions in order to retrieve specific information, but is open enough to allow for participant interaction and freedom in answering (Merriam, 2002). An interview guide was used to ensure the interviews stayed on task and all teachers were asked the same questions (Appendix C).

The interviews took place at the start of the 2012-2013 school year, approximately 100 days after the set of pilot interviews. Over a two-day period, each teacher was interviewed individually and lasted up to 45 minutes. The interviews were tape recorded so the information provided could be assessed. Using these procedures, the views of those teachers new to the school and the EARTH program as well as teachers who have been there multiple years were obtained. The teachers interviewed are involved with the EARTH

program to varying degrees. Some teach program materials and do not use the outdoor classroom, whereas others use it more often.

A second data collection method used was observation combined with field notes. Co-location of the researcher with the participants at the school allowed for involvement through personal encounters with the students and teachers taking part in the program. The EARTH program is a very hands-on experience which allowed the observer to actively participate in two of the EARTH labs alongside the coordinator and students (Merriam, 2002). Observations took place in both indoor and outdoor classrooms over a period of three days (Esterberg, 2002). Indoor classes enabled observation of the integration of horticulture curriculum into the classes and EARTH lab sessions were observed in the outdoor classroom to see how it connected to the in-class learning.

Participant Demographics

Each of the four teachers with direct involvement in the EARTH program at GHS agreed to participate in the interview process when approached about this research study. Pseudonyms were used in lieu of participants' names to provide anonymity of those involved in the study (Ary et al., 2010). The teachers that were interviewed have mixed backgrounds but all originate from the U.S. and have experience in the field of education. With the elevated teacher turnover rate at GHS, the group of teachers involved with EARTH often changes from year to year. With the addition of a new teacher to GHS since the debut of this research project, it allowed the opportunity to obtain the view of someone new to the EARTH program and GHS as well as those that have been there for a longer period of time.

The 2012-2013 school year is Mr. West's tenth year of teaching and second year teaching at GHS. He grew up on the U.S. Pacific coast and upon completion of graduate

school at the University of Oregon moved to the islands. He started teaching on St. Thomas in the year 2000 and taught there for eight years. After a brief interlude back to the States, he and his wife moved back to the islands to teach at GHS. Missing the islands and wanting a more relaxed environment, they came to GHS on St. John. He loves his job and plans to stay at the school. He has little gardening background and has been taking on more with the EARTH program as he settles into the school. He tries to incorporate EARTH topics as he can in his earth science class. He hopes to continue to be involved with the program and incorporate materials into his classroom. Mr. West teaches science and provides technical support for the school. Mr. West has been involved with the EARTH program since he started at GHS and is very supportive of the program.

Ms. Molly started at GHS in 2000, and has been employed full time at the school since 2007. Before coming to the island, she lived in upstate New York and taught physical education and health as an adjunct faculty member at a community college. Since 2007 Ms. Molly has been teaching health and physical education full time at GHS. This is Ms. Molly's first year directly involved with the EARTH program and is working closely with the program coordinator to incorporate the EARTH material with the nutrition unit. She enjoys the EARTH program because it has had a direct impact on her family.

Mr. Dean is the most recent teacher to GHS and the EARTH program. He moved to the island shortly before the 2012-2013 school year began. He taught for 24 years in Wisconsin and Illinois before coming to GHS. He also has previous experience coaching girls' basketball and being involved with public speaking activities at his previous schools. Though his time at GHS has been limited he is very excited about being a part of the EARTH

program. He feels that he is learning along with the kids about what is grown and what is and is not edible on the island.

Ms. Rae has been teaching at GHS for several years and plans to stay at the school. Her daughter attends GHS which has strengthened her involvement at the school. She serves as the dean of the school and also teaches a few of the English classes. Prior to coming to GHS, Ms. Rae taught at a sailing school. She is very excited about the EARTH program and wants to see it become a bigger part of the school and community of St. John.

Data Analysis

The two EARTH program goals and possible programmatic modification topics explored during the interviews were developed around the objectives of the study and refined after the spring 2012 visit. Upon completion of the interviews, quotes were extracted and notes during the interviews were typed. The answers to each of the three interview sections were analyzed separately, comparing the answers given from the teachers to look for repeated themes. A two step strategy was used to explore at the collected data. The researchers were involved in the coding of the data. Open coding was used first to expose recurring ideas and themes. Open coding compartmentalizes the recurring ideas from the interviews into categories (Ary et al., 2010). These repeated ideas were compiled into a list of possible themes. The list of themes was further narrowed down through focused coding which allowed for recurring themes to be condensed and further examined. Aside from looking at overall themes that emerged, observational field notes and the varying amounts of time the teachers spend using the outdoor classroom were also taken into account.

Goodness and Trustworthiness

Multiple strategies were used to achieve goodness and trustworthiness for this research. The approaches used in this research were triangulation, peer review, and rich, thick description. Triangulation is an important part of qualitative research to help substantiate the findings. For this study, triangulation was accomplished through conducting interviews with the teachers, observing EARTH program meeting times, taking detailed field notes, and having two investigators (Merriam, 2002). Rich, thick descriptions were provided through observations coinciding with detailed field notes. Peer reviewers were used to confirm the direction of the research and to discuss the findings taken from the raw data.

The trustworthiness of the questions used in the interview guide was inspected after the interviews. The presence of common themes or same answers coming from multiple people interviewed will show the instrument to be reliable. Before the research study interviews were conducted, the question guide was reviewed to check for understandability and completeness of the questions.

The teachers were interviewed in their classroom so there was no artificiality in the setting. When the predetermined questions were asked, experimenter effect was controlled through not knowing what each teacher had been doing with their classes in relation to the EARTH program before the start of the research (Ary et al., 2010). The lack of previous curriculum knowledge also reduced the probability of cueing the teachers during the interviews.

Researcher background

For this study, it was beneficial to interview the teachers face-to-face because I could gain a better understanding of the teachers in their environment. The environment and

society in the Virgin Islands is much different than in the U.S. so it was useful to experience the island firsthand. I have some commonalities with the teachers at GHS, but also some differences. The biggest difference was my age and experience in education. A degree in education and background that includes horticulture is what drew me to this research study as it is a personal topic of interest. My undergraduate degree is in Agricultural Education, teacher certification, and while student teaching I gained experience in teaching horticulture-related topics to high school-aged students. Through my scholastic experiences, student teaching and work experience with youth, I went into this not only seeing it through the eyes of a teacher, but also through the lens of youth development.

Working at the 4-H Youth Development office at Iowa State University has provided me with many opportunities to work on projects relevant to this research. Compiling vegetable production information and creating youth-friendly web pages for each vegetable widened my knowledge base for typical vegetables grown in a garden. Although Midwest horticulture and vegetable production is not the same as on St. John, there are many similarities. I also worked on a curriculum development team to update existing and create new activities geared for youth between grades 4-12. This provided valuable experience developing suitable and enriching activities for different ages of youth, while complying with state education standards and working as part of a team.

I grew up on our family farm in rural Iowa that focused on corn and soybean row crop production. At the farmstead, a variety of livestock animals were kept and summer tasks included maintaining and picking produce in the garden. My childhood experiences helped to foster my interest of agriculture subject matter and many of my hobbies revolve around agriculture.

My previous education and experiences could have an impact on the research study, such as interpreting what was said in interviews to mean something different than what the interviewee meant. The differences in culture and society between the Virgin Islands and the Midwest could also make a difference. In an effort to remain open and unbiased, what was stated during the interviews was taken at face value as to not add my own thoughts or opinions. This was also true when pulling out recurring themes from the recorded interviews.

School observation.

When approaching GHS, one sees a small but great school nestled within a beautiful hilltop landscape. The first thing one notices is the Astroturf soccer field, which is often in use before school, during the lunch break, and after school. It's clear the soccer field is highly enjoyed by the students at GHS. When first looking at the metal-sided building it does not look like a "typical" school, but the education and activities that take place inside are more than one would expect. The staff and students are inviting and helpful and the view from the school is amazing.

Talented members of the St. John community share their skills with the students at GHS. One example is a great professional photographer who lives on the island and comes to the school on a regular basis to work with the students. Often, the students can be found milling around different areas of the building during the lunch break because the school does not have a lunch program and the student is responsible for bringing his/her own. A couple times I saw students or heard students being reminded to take their compostable materials left over from lunch to the compost bins outside.

Walking down the main hallway leads to the school library. Along one wall of the library is a door that opens directly to the outdoor classroom space which is very close and convenient for the middle school students involved with the EARTH program (Figure 1). The



Figure 1. The Outdoor classroom structure is at the top of the terrace gardens. It is used for EARTH classes and for events at the school.

outdoor classroom overlooks some of the Virgin Islands National Park with a breathtaking view of the forests blanketing the steep hills of the island; on a clear day, the ocean can also be seen in the distance. The outdoor classroom has pineapple, sugarcane, and other fruits planted around the periphery of the space, and passion fruit winds its way up and over the wooden shade structure. The steep hillside of the outdoor classroom has been turned into a terrace garden where peanuts, squash, peppers, and other vegetables are grown (Figure 2). Besides the challenge of planting and growing garden plants in the rocky soil, roaming pigs and chickens often uproot and damage these gardens.



Figure 2. View of terrace garden from the outdoor classroom structure.

Following the terrace garden steps down to a lower level, fruit trees are planted almost as an “edge” to keep the undergrowth from taking over (Figure 3). This area leads to the composting area, then another set of steps that lead up to the outdoor patio area (Figure

4). The large patio is home to many portable wooden tables, each equipped with irrigation tubing, where containers of soil planted with seeds will grow and produce fruits and vegetables, including tomato, eggplant, and many others. At the other end of the patio space, passion fruit vines are thick, spilling over the side, tempting those who pass on ground level with fruit just out of their reach. The door of the patio opens into the school, and the EARTH Program Coordinator's office is right inside the door and to the left. This location makes the outdoor areas easily accessible and her office window shares the same great view as seen on the patio.

The program coordinator takes care of the outdoor areas with the help of ISU interns that come to GHS each fall and spring semester. Larger projects that are not feasible for just the program director are completed with the help of the interns during their time at GHS. The interns work closely with the program director to provide fun and education experiences for the GHS students at the middle and high school as well as at the elementary school. Interns also work on an individual project during their time at GHS.



Figure 3. Steps along the side of the terrace garden to the outdoor classroom structure.



Figure 4. Vegetables are grown in pots on moveable garden tables on the patio. Fruit trees and herbs are grown in larger pots sitting around the perimeter of the patio space.

Summary

This chapter provides the methods used for this qualitative study and details on the chosen procedures. The creation of the research instrument used and data collection methods were explained. Particularly important to qualitative studies, the participants were introduced in this chapter using pseudonyms to promote anonymity. The chapter finished with background information of the researcher and some general observations of GHS.

CHAPTER 4: FINDINGS

In this chapter, the findings will be explained. First the results of the study will be presented then unintended outcomes and teacher recommendations are expressed. In qualitative research, common thoughts and ideas shared by multiple participants are referred to as themes. Common themes extracted from the interviews will be shared in the results and findings section of this chapter under each of the research study objectives. The term EARTH “time” is used in this chapter. EARTH time refers to the one class period each week in which the students work with the program coordinator in the outdoor classroom. Students take part in hands-on activities to establish and maintain the outdoor space and vegetable crops.

The objectives of the research study were to:

1. Determine to what extent teachers have integrated EARTH program topics and materials into their curriculum;
2. Identify how teachers are using the outdoor classroom; and
3. Identify possible program modifications that could help the teachers carry out their part of the program more successfully.

Objective 1: Extent of curriculum integration

The teachers at GHS were doing a variety of activities to integrate their curriculum with EARTH program materials while following the prescribed teaching standards. Some teachers included class readings that contain relevant topics and use EARTH topics to generate class quizzes. One teacher was directly coordinating classroom materials and activities to the EARTH class time for the nutrition unit.

There seemed to be a willingness among teachers involved with the program to find areas of their curriculum that correspond with the EARTH program and intertwine the two.

Depending on the teacher and subject taught, there was a wide variety of curriculum integration. Some teachers have incorporated activities on their own while others have enlisted the assistance of the program director.

The manner in which teachers integrated the EARTH program topics into their curriculum varied depending upon which subject was taught, but was occurring. Both English teachers selected readings, student assignments, and projects that included EARTH topics. As an example, Mr. Dean used the EARTH program as the key component for his curriculum. During the interview with Mr. Dean, a quiz for one of his English classes was projected onto the screen in the front of the room. A review of the quiz material revealed that the questions were based on EARTH topics. He enjoyed collaborating with the program coordinator for activities and takes information that was learned in EARTH and applied it to the student quizzes. He chose books such as *Animal*, *Vegetable*, *Miracle* and *The Good Earth* for his curriculum. Mr. Dean was very interested in collaboration and discovery and believed he has a great handle on integration of materials. Mr. Dean would work directly with the program coordinator to integrate materials. For one activity, the EARTH program coordinator brought articles related to horticulture and sustainability to his class. The students read and discussed the articles with the program coordinator and Mr. Dean.

The other English teacher, Ms. Rae, has also intentionally chosen books that complimented the EARTH program material. Her students have class projects like a manual they produced that incorporated horticulture topics. The manual was titled “How to love your garden, and your garden will love you back,” and included plant maintenance topics and recipes. The English students are participating in a Uganda primary school pen pal activity that is connected with the novel they read, *The Boy Who Harnessed the Wind*. The book has

both similarities and differences with the Uganda and GHS garden programs with which the students can connect. Both garden programs grow similar crops although the two schools are spatially far apart.

Directly connecting the health class with EARTH is new for the 2012-2013 school year. Ms. Molly has worked with the EARTH program coordinator so that the health class is coordinated with EARTH for the unit on nutrition. Once each week, the 7th grade EARTH class is held following their health class. The health teacher explained what she and the EARTH coordinator do to bring EARTH and nutrition together.

Instead of me just coming in and lecturing about nutrition and giving them facts and information about eating healthy...what we are trying to do is actual hands-on, where we take the food that's being grown in the school and making, taking that food, making nutritious snacks, and having the kids eat it so they can taste it, understand why it is good for 'em and it coordinates the two classes together. [Ms. Molly]

She continues by explaining how the health and EARTH classes work together. Ms. Molly sees the students twice a week for health with the EARTH time for 7th grade right after health class one day of the week.

One day they are in the classroom and we discuss....nutrition, vitamins, minerals, calories...and then the other day um we actually you know go and go outside and harvest and make whatever we are going to eat and we have a person coming over from UVI, the University of the Virgin Islands and she is a nutritionalist so she's going to even get more in-depth with the kids. [Ms. Molly]

In the science classes, taught by Mr. West, there is quite a bit of overlap between the EARTH topics and what he is required to cover to meet the teaching standards. The units on

soil development, soil science, and cover crops all coincide well with the topics of the EARTH program. With the overlap in what is required for his classes and EARTH, he integrated the two where he can.

Although the amount of EARTH material incorporated into the classes varies by teacher, they have all taken steps to bring EARTH into the classroom to a degree. It is clear the teachers take different approaches in how they integrate the curriculum and to include relevant materials. Some have minimal involvement and look to the program director to provide the ideas while other teachers supplement their curriculum so much of it contains EARTH materials.

Objective 2: Outdoor Classroom

The teachers do not use the outdoor classroom on a regular basis for instruction. Mr. West used the outdoor classroom and garden space as a lab experience on occasion for his science classes. The GHS teachers took ownership of their indoor classroom as their space and see the outdoor classroom as the program coordinators space. The teacher's main involvement with the outdoor classroom took place when the program coordinator had a class outside for EARTH class time with the teacher observing and assisting the program coordinator.

Several EARTH topics used in the classroom by the teachers have a direct connection to what is being done in the outdoor classroom and gardens for EARTH classes. A large part of the EARTH program is the outdoor areas that have been completed since the inception of the program. The outdoor classroom and patio is a very versatile space and is used on a regular basis for EARTH classes with the program coordinator. The teachers have access to

the outdoor classroom for their regular classes, but most opt to stay indoors and use their classroom with minimal use of the outdoor classroom.

In science class, most of the learning takes place in the classroom, but Mr. West does take the students outside for part of a lesson on occasion. Past outdoor activities for his classes have been collecting rocks and looking at plant respiration. To look at plant respiration, the class will go out and tie a plastic bag on a plant and come back the next day and check the amount of condensation in the bag. Although he teaches the majority of classes and activities in his room, he did stress the importance of students getting to be outside. Mr. West said the outdoor classroom allows students to get outside, applying the concepts learned in the classroom with hands-on activities. He also said that the students gain intrinsic reward when they see their work successfully produce something.

Getting the students out there and doing some hands on application of what they are learning in the classroom and getting them outside...getting the intrinsic reward that you get from producing and growing you know through your own efforts and seeing the ugh relationship between effort and reward. It's unfortunately all too rare in kids these days who spend too much time inside. [Mr. West]

Similarly, Ms. Molly thinks the outdoor classroom is a “great spot” and has used it a couple times for her classes but not often. When asked if she could provide a specific example of using the outdoor classroom, she responded by saying:

Umm, well last year I think I took the kids out there one time and we were doing some stretching flexibility activities umm that's about it. [Ms. Molly]

One of the outside EARTH sessions observed was with the program coordinator, Ms. Molly, and the 7th grade class. The class was split into two groups. One group filled pots

with soil, planted tomato and eggplant seeds, labeled the container with what was planted, and placed the pots on one of the planting tables. The other group created the “taster” for the class to enjoy. A taster is a simple food made with something that was grown in the school gardens. The taster for this EARTH class was baba ghanoush, an eggplant spread. The students in the taster group learned about the history of the eggplant and what baba ghanoush means. When the spread was prepared, the class washed their hands and sat in a circle. The students in the taster group shared the information they had learned with the group that had spent the class period planting seeds. The spread was served on crackers and enjoyed by the class.

The teachers do not seem to use the outdoor classroom or gardens on a regular basis. The majority of use seems to come from the EARTH program coordinator for each EARTH class and for the elective class she teaches. The teachers take ownership in their classrooms; it is “their space” whereas the outdoor classroom is seen as the program coordinators space. The teachers all seemed comfortable in their classrooms during the interviews. When the conversation switched to their use of the outdoor classroom, the teachers would reply with the program director as the focus of their response. It was clear that area is seen as the program coordinators “space” and it is mainly used for EARTH time.

Objective 3: Success of program and possible modifications

There was great support for the EARTH program and the program director at GHS. However, there are issues that if addressed could improve the success of the program. A lack of time and staffing has contributed to reduced involvement from the teachers. The teachers provided recommendations that could improve the EARTH program. Increased community awareness and involvement was stated as possible program modifications by multiple

teachers. Positive unintended consequences are starting to emerge from the EARTH program. Students were transferring knowledge learned in EARTH and applying it to other aspects of their lives.

The EARTH program is constantly evolving and improving to provide a positive educational experience for the students. Through the interviews, a high regard for the program coordinator was apparent, but a lack of time has kept teachers from doing more with the program. Multiple teachers brought up the issue of time constraints. The issue is the lack of time to work on and speak with the other teachers and the program coordinator, as well as the lack of time to physically do more with the program. No time is set aside for collaboration between the teachers involved with the program and the coordinator. The teachers individually decide what they will include and how it is done, with the program coordinator coming to the teachers when she has an idea that might work for a class activity. The lack of time to do more physically with the program is an issue because all the teachers are not even able to be with the program director and their class during the scheduled EARTH time because they have other responsibilities.

I don't think there are any other barriers [besides time]. More time, it's you know, we run around like crazy here. There is never a free moment and, ugh, so as much as [the program coordinator] and I would like to spend time really um going step by step in terms of making sure that we are on the same page and overlapping as much as we can the time just isn't there...I also do tech support at the school...so any minute that I am not teaching or prepping for teaching I am running around you know setting up computers and solving problems. [Mr. West]

Ms. Rae, also voiced that time and scheduling are factors that inhibits teachers from being more involved with the program. She points out this is an enrollment issue. Decreased enrollment leads to a cut whereas an increase in enrollment would leave room in the budget for another staff person. Having one more staff person would make it possible to lighten the load for the other teachers so they could have more time to be involved with the EARTH program.

Scheduling...for us it is scheduling...every single staff member is stretched in so many ways that we do not have the luxury of extra periods...this year is we had to cut that team to the EARTH lab. Last year we...really made an effort to ensure that the EARTH lab had both [the program coordinator] and that the teacher she had been partnering with...was part of their teaching schedule was to be assigned to that class...this year we were not able to do that because we reduced our staffing a little bit and so everyone was full. If we found a way to get...a little more breathing room we could go back to having that kind of really nice...optimizing the success of having people having that team time to collaborate and to have shared experiences... [Ms. Rae]

She continued that she thinks the program will be okay without it, but it is not the optimum scenario. She felt that one more teacher would give everyone a little more time. As of now, there is not enough funding in the budget for another teacher, but that situation could change if the enrollment increases. Research has shown that limited time was noted as the main obstacle in a school garden based program (Graham & Zidenberg-Cherr, 2005). Through these discussions, the EARTH program feels more like an “add on” instead of a truly integrated program in the middle school curriculum.

Mr. Dean, on the other hand, commented that when he started at GHS, the EARTH program coordinator was the only one that approached him and took the time to connect with him. She immediately made the effort to tell him about the program, how he could get involved, and let him know to contact her if he had any questions. He mentioned he was never approached like that by any of the teachers at the school.

Although time is a concern to the teachers, support for the EARTH program and the program coordinator was abundant and brought up by all four participants. None of the questions asked mentioned the program coordinator, but the participants all made comments about her involvement. The teachers like the visibility and involvement of the current program coordinator. Before the start of the current program director, the program was missing a director fully focused on the EARTH program for the staff and students to go to.

I like how that [the program coordinator] is here now as the coordinator that she is actually in the school... In the beginning it wasn't like that. There were people coming and going... [The program coordinator] is the base, of being in the school everyday... It helps me as a faculty person just to know that um there is that person to go to and also I think it helps the kids because it makes it more grounded, there is stability for them. One constant face so that even though the interns are coming in and out they know there is that one person that if they have a question they can go to that one person. [Ms. Molly]

Mr. West started by saying that he was, “a huge proponent of what was going on with the EARTH program and do whatever I can to support it.” He goes on to further tell of his support of the program:

I'm super on board and very supportive of everything that [the program coordinator] is doing and, uh, her interns when they come down as well...If anyone were to ask me about my feelings with regard to the EARTH program, I'm 100% in favor and, ugh, and support it in any way I can... [The program coordinator] does a great job and I don't think anyone around here doubts that for a second. [Mr. West]

Teacher recommendations.

Specific recommendations for the EARTH program were provided by three of the teachers interviewed. Recommendations from the teachers were sought because they were the ones bringing the materials into the classroom. Each teacher provided different suggestions for program improvement ranging from community involvement to having a student teacher.

Mr. West's focus was directly with the outdoor production of crops, the consistency of production, and how consistent production would have an impact and direct benefit to the students.

More successful, fruitful, season and harvest...that's what I would love to see is just... really healthy crops...I think...that would be huge if we could be consistently providing this really impressive bounty of food, healthy, fresh you know food that these students are growing through their own efforts that's going to have more of an impact...[Mr. West]

Unrelated to that, Mr. Dean's focus was on the awareness of the program to the community. He feels as though the EARTH program is a "well kept secret" and that GHS and the EARTH program should be known interchangeably. Having articles in the local newspapers, advertising, and creating a journal or publication are three ideas to bring

attention to the EARTH program. Increasing the awareness of the EARTH program could lead to increased funding and community support.

Other suggestions made included having a student teacher and more community involvement at the school. Ms. Rae suggested having a student teacher at GHS from ISU, increasing the number of community volunteers, and possibly providing a garden class for community members. Although staffing could be an issue, a student teacher seemed to be one thing Ms. Rae would really like to see at the school when all the details are worked out and ISU and GHS are both ready.

For many different reasons, all of which I was in strong agreement with, the idea of having a student teacher like an AgEd person come down and do a student teaching placement here...that is something that I would still like to see explored and defined a little bit better..let's find our staff who are certified teachers, who teach in the area that um would be acceptable...and useful for an Ag Ed student and let's send them to Iowa State for some...supervisor teacher training. [Ms. Rae]

Getting the St. John community involved was also at the top of her list. Ms. Rae has been approached by people that have garden and plant-related questions. She thinks interest is there for some sort of community education class.

I think that there is a demand out there for a community gardening class...One of the things I would really like to explore...is some continuing education, adult classes, evening classes...[Ms. Rae]

In a similar manner, Ms. Rae would like to see the program take advantage of the community members that have expressed interest in volunteering their time to help the program.

I don't think we've potentially made as much use of community volunteers as we could...um...I know that there is an interest in that...at this stage the interest in that is far more weighted towards maintenance of garden space as opposed to teaching and interacting with kids in the gardening environment, um but I think if we got them in the door by doing, helping us maintain...just watering and whatever...little by little, I think that would become less scary to people who are not teachers...To have the second pair of hands um working with kids...could be a valuable experience for all involved. [Ms. Rae]

One issue with involving more community volunteers is no staff person is in place to undertake this project and oversee volunteer efforts. The program coordinator already has a full schedule and does not have the time to oversee this as well.

Through their involvement in the program, teachers are starting to see areas within the EARTH program that could be added to or fine tuned to improve the success of the program.

Unintended consequences

Throughout the interviews two unintended consequences of the EARTH program have surfaced. These unintended consequences are positive impacts the program has had on students at GHS beyond the initial scope of the program. They show continued interest in gardening outside of school and the students are transferring what they have learned to other areas. The following examples of outcomes were shared by two of the teachers involved with the program.

First, Ms. Molly's son participated in the EARTH program and his interest continued even when he advanced to high school and was no longer involved with the program at the school.

*This program has had a huge impact on my son, um, my son started with the program and he, he got all fired up about learning how to grow things and plant things and, um, at our house he planted a small garden....what's interesting is we own a restaurant in town and my husband said, you know, we order all this stuff, herbs and stuff we use in our kitchen through a company on St. Thomas and...said to my son....I will buy it from you for our restaurant.....if he can have a garden that's going to...be able to sell stuff to the restaurant it is motivational for him...what he has learned though it by hands on experience like he will be teaching me stuff that I do not know about plants you know cutting something to start a new pot at home or how to do it...
[Ms.Molly]*

Ms. Rae also had a very positive connection in one of her English classes. She talked about how she thinks that students better understand material if it is linked in as many ways as possible with other material. To accomplish this interconnectedness she chose a book that had some similarities and differences with the students and the EARTH program. The book involved a character that did a service learning project to help better his community. As part of a final project the students discussed and decided as a group on a service project that they could take ownership of and would have an impact on the community of St. John. Very early in the discussion process the students wanted to help the people of St. John with the knowledge they gained through the EARTH program.

The one [idea] that really stuck was...we grow all these seeds, we have all these seeds that we have collected that are just sitting in packets and we're recycling all of these you know yogurt containers....we could stay, do service and volunteering after school like you know....to start the seedlings and then once they have sprouted and look good we can you know have a sale...Their primary aim was that they wanted it was to feed people. Um they really perceived their gardening program as a solution to providing food to people who were hungry on St. John... [Ms. Rae]

Ms. Rae continues by sharing her thoughts and what the students believe they would be able to do with their knowledge gained from the EARTH program.

It was fascinating to me to listen to this evolution of thought where they were making the connection that there are hungry people on St. John and here we are, we know how to grow all this food so why don't we spread that, why don't we give away seedlings so that people can grow their own food and then they won't be hungry... [Ms. Rae]

She pointed out that the students thinking is a, “simplistic way to think about poverty and hunger, but underneath that is this core change in that self efficacy piece...if I were hungry, I wouldn't be hungry because I know how to grow food.” The students were also aware that they would have money involved in the project, but the amount was limited because the plants were grown through EARTH and they had harvested the seeds to be used, so there was no cost for seed. The containers were free because they are recycled yogurt containers, and the labor would be donated, leaving soil as the only item to be purchased. Ms. Rae closed by stating, “I just was really impressed at how much they had been able to

take away and transfer that and apply it to a bigger solution to a problem that they had identified.”

It was clear these two participants take great satisfaction in the EARTH program and the positive, real world impact the program has on the students outside their specified “EARTH” time. They both beamed when talking about these unintended consequences that have been observed.

My last day at GHS was also the first day of the new semester intern. It was announced the previous day that a harvest party would be taking place on the patio during the lunch period. Vegetables and fruit picked from terrace gardens on the island were spread out on a table. The students were invited to take home and make a dish to share the next day using the produce they chose. A large number of students and staff jumped at the chance to bring something to share the next day. The harvest party was a great success with many of the students and staff from the school bringing a dish of food to share, trying new types of food, and enjoying relaxed conversation.

Summary

Common views from the teachers provide a better insight to the EARTH program at GHS. Evidence reported shows the involvement and extent to which the goals of the EARTH program are being met vary widely by subject taught and the teacher. Some reduced involvement was due to lack of time while others use the EARTH program to drive their classroom learning and activities. Unforeseen benefits are also emerging as the program becomes a staple to the GHS school community. Findings are further discussed in the subsequent chapter.

Overall, the attitude towards the EARTH program was very positive, not only from those directly involved with the program but the rest of the staff, students at the school, and others outside the school. Ms. Rae has seen how the program has had an impact on all the students at the school. She says, “it’s permeated the culture of the school, so that even the kids that are not having those classes are, you know, it’s just part of that culture of the school...The kids know where they can pick a snack.”

Two teachers had two very different statements, but both are important to remember. First, from Ms. Rae is something I think many forget when dealing with a new program. Often the thought is about all that can be done, not what are the key things the program can do and do well.

You never want to stagnate, you don’t want to stop growing, on the other hand there is a place where that you reach where you are, like this is...for the staff and the budget that we have, this is pretty much the full realization of our program goals and so we just keep doing this really well.. and I think sometimes there is the pitfall of people wanting to continue to push to do more, more, more, and that’s fine if we have more, more, more, money to put into it and more, more, more staffing to put into it. Unless we think we’re going to do that, there is a place that I think we will reach umm where we should just feel really happy about how well we’re doing the job that we have...[Ms. Rae]

Second, from Mr. West, is the reminder that some of the most important facets in student learning taken away from involvement in the EARTH program are not only academic, but rather personal growth.

I think that the potential is massive and I just hope that the will continues and that we see it through because ugh I think it has incredible benefit for the students, um, you know we have been focusing here educationally but I think in terms of like holistic and personal development and growth I think that it is huge, far more important to me actually than any of the specific, um, specific kind of academic things they might pick up or even specific tips or you know agricultural approaches or anything, but just the love and the intrinsic desire to be a part of, of growing and eating healthy food. [Mr. West]

CHAPTER 5: DISCUSSION

The chapter will discuss how the data and findings contribute to the body of knowledge of school gardening programs and teacher involvement with a school garden program. The chapter will also outline why this research study was important and how the findings of the study will contribute to the EARTH program.

Discussion of Findings

Teachers at GHS integrate EARTH materials into their curriculum to varying degrees, but there is a willingness from the teachers to be involved with the program and find areas of their curriculum to integrate applicable information. The joint activities and classroom instruction help the students better understand and retain the material and concepts presented. At GHS, the EARTH program is permeating the school culture through the incorporation of horticulture-related materials in the core classes and through those involved with the program sharing experiences to their peers who are not involved. Students not directly involved with the EARTH program still have exposure to EARTH in their classes with the teachers involved and have access to the outdoor classroom and gardens.

The amount of curriculum integration varies greatly between the subject areas taught, but is occurring. Much of this variation could be due to the amount of time and effort teachers dedicate in order to bring EARTH materials into the classroom. It is clear the teachers take different approaches in how they integrate their curriculum and to what extent. Some have minimal involvement and look to the program director to provide the ideas while other teachers supplement their curriculum so much of it contains EARTH materials. The two English teachers appear to have done the most integration. The newest teacher at GHS, Mr. Dean, seems the most involved as he stated that he is using EARTH material to drive his

curriculum incorporating the topics into the class readings, quizzes, and projects. Ms. Molly on the other hand, has been at the school for years and is just starting to get involved with the program and integrate the program with her classroom instruction.

An important element of the EARTH program is the outdoor classroom. This area was formerly unsafe, containing a steep, rocky hill, but now has been turned into a great space for people to gather and learn. The main use of the space is by the program coordinator for EARTH classes and is rarely used by the other teachers. Several topics in the classroom have a direct connection to what is being done in the outdoor classroom and garden areas for EARTH classes. In addition, each teacher has easy access to the outdoor classroom, but rarely use the space except when involved with the program coordinator during the EARTH sessions. In this aspect, there seems to be hesitation towards trying a new teaching strategy.

The teachers present the feeling that their individual classrooms are “their space” and the outdoor garden areas are the coordinator’s space so opt to stay indoors for their regular classroom teaching. This could be connected to the obstacles pointed out by Graham & Zidenberg-Cherr about the lack of experience in the garden subject matter and materials connected to state standards (2005) and the call for materials and training to help guide teachers to incorporate garden related materials (Graham et al., 2005).

Teachers seem to have more and more responsibilities every year. Keeping up with the needed daily activities and teaching standards, as well as having more duties in the school, cuts into any available time. For example, Mr. West teaches and provides technical support for the school. For the 2011-2012 school year, he was active with the EARTH program by being in the outdoor classroom with the program coordinator for the students

EARTH session once a week, but this year he is not able to do that with his added responsibilities. He has to teach a class during the EARTH session and any extra time is spent preparing and repairing the computers at the school.

The amount of staffing at GHS is based on student enrollment, which has gone down from the previous year so there has been a reduction in staff, putting a strain on the rest of the teachers. This reduces the amount of time the teachers have to spend on EARTH. This issue is not unique to the EARTH program at GHS. Similarly, the lack of time was noted as the largest barrier keeping teachers from using the school garden for classroom instruction in a statewide California research study (Graham et al., 2005).

The teachers provided multiple recommendations that could possibly help the program and the teachers themselves. Although the recommendations were varied, many of them could intertwine to the program. Enlisting the community volunteers that have expressed interest with the program is one recommendation that could have immense impact for the program. This fits well with another recommendation that the gardens need to consistently produce a healthy crop of fruits and vegetables to have a larger impact on students. Volunteers taking part in the outdoor maintenance of the gardens may possibly fill this need. The plants will receive more care, garden-related issues could be dealt with more rapidly, and an educational experience for the community volunteers could be provided. A lead person to communicate and schedule volunteers is needed in order to provide a successful volunteer base. As previously mentioned, the teachers and program director do not have time to add this to their list of duties so more discussion needs to be given to this project before its initiation.

I visited St. John twice, about 3.5 months apart, to complete this research. During both visits, I was asked multiple times by people who lived or worked on St. John what brought me to the island. Nearly all of them knew of the school, but almost no one knew of the EARTH program. This supports the notion there needs to be an increase in the amount of publicity related to the EARTH program. To increase the awareness of the EARTH program and possibly draw in community volunteers and support, program promotion would be beneficial to help build the brand of the EARTH program at GHS. The recommendations of writing to local newspapers and increasing the advertising are opportunities that could be carried out with student and class projects.

The association between Iowa State University and Giffit Hill School has provided beneficial opportunities for both parties. Each semester, ISU interns have the opportunity to spend a semester at GHS working directly with the EARTH program. This provides a rich and educational experience for the college student interns, and in return, the EARTH program has extra knowledge base to assist in the completion of projects at both the middle and high school building and at the elementary school. Another way to provide an educational experience would be to have an ISU student teacher at GHS for a portion of their semester-long teaching experience. There is an interest from both parties to see this happen, but there are some areas of concern. Training and experience of the supervising teacher(s) is one matter. It was suggested that possible supervising teachers could attend some sort of instruction at ISU. I see this as a less feasible option compared to having someone from ISU travel to GHS in order to provide some guidance to assure having a student teacher is a positive experience for everyone involved.

Through my time with the teachers, a couple unintended consequences were also shared about the positive impact the EARTH program has had on students at GHS. These inadvertent outcomes provide examples of how the program is having a lasting positive impact on students and is carrying over to other aspects of their life and learning. These consequences should be considered successes of the program and hopefully, as the program continues, more experiences like these will come to light.

Contributions to body of literature

The information supplied by the teachers at GHS involved with the EARTH program provided insight to the EARTH program and how the teachers are meeting the goals of the program. The findings will contribute to the growing body of knowledge centered on school gardens. A review of the literature identified that research focusing on the teachers involved with school garden program and classroom integration was lacking. The vast majority of research is student focused. This research study provides more information on that portion of school garden research related to teacher involvement. More specifically, this research study will provide insight and aid schools considering the introduction of a garden program. Possible roadblocks and concerns related to curriculum integration and an outdoor classroom space may be diverted by considering the information provided through this research. Teachers may provide abundant support for a school garden program, but that does not translate to the amount of involvement they will supply.

This research study builds on the work of another researcher and contributes to the EARTH program and GHS school community. Elizabeth Childs (2012) completed a quantitative research study involving the students at Giff Hill School, focusing on the positive change in student attitudes and beliefs after their involvement in the EARTH

program. At the completion of her research, looking at faculty involvement with the program and curriculum changes that have taken place, in relation to the EARTH program, was a recommended (Childs, 2012). Continued review of the EARTH program from different aspects provides insight to the workings and integration of the school garden program. A more complete research base and understanding of school garden programs is beneficial to the success of the EARTH program and other school garden programs.

Research has shown that first and fourth grade students involved with a garden program were more willing to try different types of vegetables (Morris, Neustadter, & Zidenberg-Cherr, 2001, Morris & Zidenberg-Cherr, 2002). My observations and participation in an EARTH lab session corroborated this. Many of the seventh grade students in the lab could identify an eggplant, but had not tried it before. When invited to try the eggplant “taster” baba ghanoush, the students didn’t hesitate.

Dirks & Orvis (2005) promote the use of supporting texts to create student work and assessments as a way to incorporate garden topics into the classroom. This option was used by the English teachers at GHS. They have sought out literature and other resources to use in their classes to simultaneously reach the objectives of their teaching and incorporate EARTH. Some texts used in the science class incorporate EARTH topics by default as many topics already overlap. This supports the notion previously explored that science seems to have the greatest connection (Graham et al., 2005).

Significance

Findings presented from the completion of this study will help the EARTH program in multiple ways by providing an insight to how the program is being incorporated into classroom learning and the use of the outdoor classroom. This research study grants a better

understanding of the current status of the EARTH program and offers possible direction for future actions to the EARTH program committee. The findings and recommendations will provide guidance to the EARTH program and can be found in the next chapter.

Summary

The results and findings of the research study were discussed. The amount of curricular change to incorporate EARTH materials into the classroom varied based on the teacher. The teachers are not particularly utilizing the outdoor classroom for instruction unless participating with the EARTH program coordinator. The teacher recommendations were further discussed and are possible program modifications. Contributions were presented on how this research contributes to the body of knowledge on school gardens.

CHAPTER 6: SUMMARY, CONCLUSION, & RECOMMENDATION

This chapter will provide a summary and conclusion of the research study conducted. Recommendations for action as well as recommendations for further research will be expressed. The chapter will conclude with the implications and significance this study provides to Agricultural Education.

Summary of the Study

This research project assessed the two EARTH program goals associated with classroom teaching to the extent they are met from the perspective of the teachers involved with the program. The first objective of the study was to determine the extent to which the school curriculum has been integrated to include horticulture and place-based environmental science. The teachers have all integrated their curriculum to included EARTH program materials. The teachers were willing to find areas of their curriculum to integrate materials that correspond with the EARTH program, but the extent of the integration varied by teacher and the subject taught.

The second objective was to identify how the outdoor classroom and garden space has been utilized by the teachers and students. The teachers are not using the outdoor classroom on a regular basis. The majority of use comes from the EARTH program director for each EARTH class although several topics covered in the classroom have a direct connection to what is being done in the outdoor classroom. The teachers take ownership of their classroom space opting to use their classroom with minimal use of the outdoor classroom. The outdoor classroom may be used informally by the GHS students before and after school and for student clubs. However, this is not being driven by academic purpose or the teachers.

The third objective was to identify possible program modifications that could help the teachers carry out their part of the EARTH program more successfully. The EARTH program has been constantly evolving and improving to provide a positive education experience for the students at GHS. The lack of time and scheduling difficulties inhibit some of the teachers from becoming more involved with the program, but all teachers support the EARTH program and program coordinator. Consistency of production, increased program awareness, and added community involvement were all provided by the teachers as ways the program could improve to be more effective.

The purpose of the research study was to obtain the teachers views on topics pertaining to the program goals set in place at the inception of the EARTH program plus their perceptions of the program. The mission of the EARTH program is to “integrate gardening education into the Giff Hill Middle School’s curriculum and eventual lunch program” (GHS, 2012). The EARTH program is a joint venture between Iowa State University (ISU) and GHS. ISU students have the opportunity to intern at GHS for a semester. The interns help the program coordinator with projects at the school and with student activities during the EARTH classes.

To carry out the purpose of the study, interviews were conducted with the teachers involved in the EARTH program over a two day period and took place in each teacher’s primary classroom. Interviews were used to allow for explanation and the ability to encourage more detailed answers if not provided at first. Face-to-face interviews also allowed the interviewer to gain a greater understanding of the EARTH program by means of seeing the facilities available and how they are used.

Thoughts contributed by the teachers provide a better insight to the EARTH program at GHS, and the overall attitudes towards the EARTH program are very positive. The quantity of program materials used widely depending on the individual teacher and subject taught. Some reduced involvement was due to lack of time while others use the EARTH program to drive their classroom learning and activities. Unforeseen benefits of EARTH program are also emerging as the program becomes a staple to the GHS school community.

Based on the results of this research, future considerations for the EARTH program will be expressed to the EARTH program committee. Increasing program awareness throughout St. John and increasing community involvement with the EARTH program are two matters that could increase funding and support to the program. Specific to the middle school teachers, a time set aside for group collaboration between the teachers and the EARTH program coordinator should be implemented to increase the consistency of the program throughout the middle school. These considerations revolving around the EARTH program will be for the benefit of the school, teachers, students, and community. This research will provide a beneficial contribution not only to the EARTH program, but also to the pool of school garden research and knowledge previously established.

Conclusions

Although an overwhelmingly positive response and outlook for the future of the program from the teachers directly involved with EARTH was evident, the program seems disjointed. The individual teachers had a good partnership with the program coordinator, but not as an EARTH program team. As a group of teachers, joint collaboration is not apparent. A segment of the EARTH program mission is to integrate garden education into the

curriculum. The envisioned extent of this integration should be expressed to the teachers to gain consistency.

The outdoor classroom space is considered a great space, but is underutilized by the teachers at GHS. For the most part, teachers do not use the outdoor classroom or garden areas unless with the program coordinator for the weekly EARTH class. Barriers linked to curriculum integration are evident. Some of these are not readily changeable and will take time. Suggestions provided by the teachers have merit and should be considered.

Recommendations for Action

In order to create an interconnected program throughout the middle school, the development of a curriculum specific to the EARTH program would be useful. All middle school teachers should be urged to incorporate garden education materials into their curriculum to make it a consistent focus throughout the middle school. The school focus would be more congruent if all middle school teachers incorporated gardening education into their curriculum instead of just a portion of the teachers.

The inclusion of a middle school garden based curriculum would make the EARTH program cohesive throughout the middle school instead of fragmented with only partial involvement by the middle school teachers. The curriculum would delineate the focus and goals of the program and how it would be incorporated in the GHS classes. Guides have been developed for all grade levels with many conforming to state and federal standards to help teachers integrate garden based topics into their classroom (Boden, 2009). This would provide guidance on how to effectively integrate garden related activities into all middle school classrooms. With the high turnover rate of teachers, the inclusion of a curriculum

guide would help new teachers get involved with the EARTH program right away when they start at GHS.

The teachers involved with the EARTH program ought to work as a “team.” A theme-based teaching approach would focus on the EARTH program with the curriculum framework organized around the program topics and would span the middle school curriculum (Lonning, DeFranco, & Weinland, 1998). Group collaboration between the program coordinator and the teachers would improve the consistency of what students are learning in the classroom and during their EARTH class time. To help foster this movement, inservice meetings should be held on a regular basis to keep the group unified.

Recruitment of community volunteers as suggested by one of the teachers is also urged. Funding is not in the budget for another staff person, so making use of volunteers could be very beneficial to the program. If the program coordinator does not have to spend as much time with direct care and maintenance of the plants and garden areas it would open more time to work with teachers on curriculum integration.

The EARTH program is in its third year of operation, with funding in place for the first five years. The creation of a communication plan with the elementary school, high school, and community would help keep the program on track to reach the goals set in place. This program is still in the early stages of development and needs more attention and direction to reach its full potential.

Further Research

As a result of this research study, other areas within the EARTH program have been identified for future research. Using a blend of both qualitative and quantitative research approaches should be considered for future research. An in-depth program evaluation with

the EARTH program coordinator and school administration is recommended. As the program is in its third year of operation, the EARTH program could benefit from an evaluation of what has been completed, what aspects still need attention, and the future goals of the program.

A longitudinal study focused on the Iowa State University EARTH program interns is another facet of the program to be researched. The interns spend a considerable amount of time at GHS. I suggest documentation of their experiences with the EARTH program and any effects interning has had on them and their future plans. The ISU student interns provide a model for the students at GHS. GHS students have to opportunity to learn what college entails and the opportunities college can provide to students. Similarly, more research should be focused on the students to build on the previous research of Childs (2005). A follow up research piece that allows for more open responses from the students would provide beneficial information about the impact the EARTH program has on the students attending GHS.

Further research should also be completed with the people who have a direct impact on the program, but are not located at the school. This could include the St. John community and the EARTH program committee. The community of St. John is a possible volunteer and funding source to the program. Research done in connection to their knowledge of the EARTH program and involvement with the program would be beneficial. The EARTH program committee plays a major role in the implementation and continuation of the program. Stakeholders connected to the EARTH program need to be identified. The continuation of the EARTH program could be in question and may cease to continue without the support of the program stakeholders.

Summary

The EARTH program is in its third year at GHS and is having many positive impacts at the school to both those who are and are not directly involved with the program. The teachers involved with the program have integrated EARTH materials into their curriculum to an extent, although there are many ways further integration could be accomplished. There is room for improvement to use the outdoor classroom by the teachers outside of the scheduled EARTH classes. Beyond that time, it is used minimally by the teachers. The teachers provided recommendations that could improve their involvement with the program as well as other general recommendations for the program. Recommendations for action and future research topics were provided.

APPENDIX A. IRB APPROVAL

IOWA STATE UNIVERSITY
OF SCIENCE AND TECHNOLOGY

Institutional Review Board
Office for Responsible Research
Vice President for Research
1138 Pearson Hall
Ames, Iowa 50011-2207
515 294-4566
FAX 515 294-4267

Date: 8/24/2012

To: Sara Goemaat
206 Curtiss Hall

CC: Dr. Michael Retallick
206 Curtiss Hall

From: Office for Responsible Research

Title: Teacher Perceptions of the Educational Goals of the Education and Resiliency Through Horticulture Program at Giff Hill School, USVI

IRB ID: 12-376

Study Review Date: 8/24/2012

The project referenced above has been declared exempt from the requirements of the human subject protections regulations as described in 45 CFR 46.101(b) because it meets the following federal requirements for exemption:

- (2) Research involving the use of educational tests (cognitive, diagnostic, aptitude, achievement), survey or interview procedures with adults or observation of public behavior where
 - Information obtained is recorded in such a manner that human subjects cannot be identified directly or through identifiers linked to the subjects; or
 - Any disclosure of the human subjects' responses outside the research could not reasonably place the subject at risk of criminal or civil liability or be damaging to their financial standing, employability, or reputation.

The determination of exemption means that:

- **You do not need to submit an application for annual continuing review.**
- **You must carry out the research as described in the IRB application.** Review by IRB staff is required prior to implementing modifications that may change the exempt status of the research. In general, review is required for any modifications to the research procedures (e.g., method of data collection, nature or scope of information to be collected, changes in confidentiality measures, etc.), modifications that result in the inclusion of participants from vulnerable populations, and/or any change that may increase the risk or discomfort to participants. Changes to key personnel must also be approved. The purpose of review is to determine if the project still meets the federal criteria for exemption.

Non-exempt research is subject to many regulatory requirements that must be addressed prior to implementation of the study. Conducting non-exempt research without IRB review and approval may constitute non-compliance with federal regulations and/or academic misconduct according to ISU policy.

Detailed information about requirements for submission of modifications can be found on the Exempt Study Modification Form. A Personnel Change Form may be submitted when the only modification involves changes in study staff. If it is determined that exemption is no longer warranted, then an Application for Approval of Research Involving Humans Form will need to be submitted and approved before proceeding with data collection.

Please note that you must submit all research involving human participants for review. **Only the IRB or designees may make the determination of exemption**, even if you conduct a study in the future that is exactly like this study.

Please be aware that **approval from other entities may also be needed.** For example, access to data from private records (e.g. student, medical, or employment records, etc.) that are protected by FERPA, HIPAA, or other confidentiality policies requires permission from the holders of those records. Similarly, for research conducted in institutions other than ISU (e.g., schools, other colleges or universities, medical facilities, companies, etc.), investigators must obtain permission from the institution(s) as required by their policies. **An IRB determination of exemption in no way implies or guarantees that**

APPENDIX B. INFORMED CONSENT

Title of Study: Teacher perceptions of the educational goals of the Education and Resiliency Through Horticulture program at Giffit Hill School, USVI.

Investigators: Michael S. Retallick, Ph.D.

Sara J. Goemaat

This is a research study. Please take your time in deciding if you would like to participate. Please feel free to ask questions at any time.

INTRODUCTION

The purpose of this study is to see to what extent selected EARTH program goals are being met from the perspective of the teachers directly involved with the program. You are being invited to participate in this study because of your role in the EARTH program.

DESCRIPTION OF PROCEDURES

If you agree to participate, you will be asked to respond to questions regarding the EARTH program. You will be asked to describe your experiences related to the program. The interview will take place individually. Your participation will last for no more than one hour and the process will be facilitated by the researchers.

The data for this project will be collected using the responses to the interview questions. The interviews will be audio taped and field notes taken. You may skip any question that you do not wish to answer or that makes you feel uncomfortable. The audio recording will be transcribed and used to analyze the data. You may be asked to review the transcripts to ensure that your comments were accurately transcribed and reflect what you intended to say.

RISKS

There are no foreseeable risks at this time from participating in this study.

BENEFITS

If you decide to participate in this study there will be no direct benefit to you. It is hoped that the information gained in this study will benefit the project through programmatic improvements.

COSTS AND COMPENSATION

You will not have any costs from participating in this study. You will not be compensated for participating in this study.

PARTICIPANT RIGHTS

Your participation in this study is completely voluntary and you may refuse to participate or leave the study at any time. If you decide to not participate in the study or leave the study early, it will not result in any penalty or loss of benefits to which you are otherwise entitled. You can skip any questions that you do not wish to answer.

CONFIDENTIALITY

Records identifying participants will be kept confidential to the extent permitted by applicable laws and regulations and will not be made publicly available. However, federal government regulatory agencies, auditing departments of Iowa State University, and the Institutional Review Board (a committee that reviews and approves human subject research studies) may inspect and/or copy your records for quality assurance and data analysis. These records may contain private information.

In order to maintain confidentiality to the extent permitted by law, the following measures will be taken. Your name will not be attached to any of the transcripts or data from the questionnaire. A unique code will be used so you cannot be associated with your responses. However, because of the size of the school, we cannot guarantee anonymity because those with knowledge of the program may be able to identify those involved.

The hard-copy data, including audio tapes and transcripts, will be stored in a locked office and electronic data will be stored within a file on a password protected, secure campus network. Only the researchers associated with the project will have access to the data and transcripts. The audio tapes will be destroyed once the research project has been completed and no later than one year after the interviews are completed. If the results are published, your identity will remain confidential.

QUESTIONS OR PROBLEMS

You are encouraged to ask questions at any time during this study.

- For further information about the study contact Dr. Michael S. Retallick by phone (515-294-4801) or email (msr@iastate.edu).
- If you have any questions about the rights of research subjects or research-related injury, please contact the IRB Administrator, (515) 294-4566, IRB@iastate.edu, or Director, (515) 294-3115, Office for Responsible Research, Iowa State University, Ames, Iowa 50011.

PARTICIPANT SIGNATURE

Your signature indicates that you voluntarily agree to participate in this study, that the study has been explained to you, that you have been given the time to read the document, and that your questions have been satisfactorily answered. You will receive a copy of the written informed consent prior to your participation in the study.

Participant's Name (printed) _____

(Participant's Signature)

(Date)

APPENDIX C. INTERVIEW GUIDE

Title of Study: Teacher perceptions of the educational goals of the Education and Resiliency Through Horticulture Program at Giffit Hill School, USVI.

Investigators: Sara Goemaat, Michael S. Retallick, Ph.D.

Purpose of the Study:

The purpose of this research is to determine to what extent the EARTH program goals have been met through the perceptions of the teachers involved with the program. Barriers and needs of the program according to the teachers will be investigated.

Objectives of the Study:

The objectives are to:

4. Determine to what extent teachers have integrated EARTH program topics and materials into their curriculum.
5. Identify how teachers are using the outdoor classroom.
6. Identify possible program modifications that could help the teachers carry out their part of the program more successfully.

Background

1. How long have you lived/taught on the island?
2. Previous teaching experience.
3. Explain your role and regular involvement in the EARTH program.

Objective 1: Curriculum integration

1. How have you integrated your curriculum to include EARTH program topics such as horticulture and healthy foods?
2. How comfortable are you incorporating the EARTH curriculum into your classroom? Please explain your answer.
3. What would help you to further incorporate the program into your classroom learning?

Objective 2: Outdoor classroom

1. How often (each week) are you using the outdoor classroom?
2. How do you use the outdoor classroom space? Please share a couple specific examples of class activities.

3. Explain how what you are teaching in the outdoor classroom helps connect the students to the natural world.
4. Describe the typical outdoor classroom experience for your class/students. What communication occurs prior to the experience? When and with whom? What do you do? What do others do? Who develops the lessons/activities? Who teaches the lesson/conducts the activities?

Objective 3: Success of program

1. What barriers keep you from getting more involved with the EARTH program? What could help you incorporate and carry out EARTH program content more effectively?
2. What suggestions do you have that can make the program more effective for the students? For the community?

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