TEACHER PERSPECTIVES ON THE EFFECT CARING FOR CLASSROOM PLANTS HAS ON ADOLESCENTS

by
Charlotte R. Radliff

A Field Report Submitted
In Partial Fulfillment of the
Requirements For the Degree of
Master of Science in
Education Special
Education

at
The University of Wisconsin Oshkosh
Oshkosh WI 54901-8621

Summer 2020

COMMITTEE APPROVAL

Advisor
Oct. 20, 2020 Date Approved

Member
10/20/2020 Date Approved
Project Abstract

This project attempted to answer the research question: “Do teachers who have incorporated a plant care program into their classroom notice caring for classroom plants affects student behavior and mood?” Teachers in a mid-sized urban school district were invited to take a survey to gather their opinions on the effects of a plant care program on student mood and behavior. Responses were collected anonymously and information was analyzed to determine whether teachers believed there was or was not an effect on the behavior and mood of students who participate in a plant care program. Each teacher noted no change or somewhat better change in behavior or mood of students participating in a plant care program. In some areas, teachers noted a much better change in behavior or mood. This information may be used to help other teachers who may be considering having a plant care program in their classroom.
# Table of Contents

<table>
<thead>
<tr>
<th>Chapter</th>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>Introduction</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>Methods</td>
<td>6</td>
</tr>
<tr>
<td>II</td>
<td>Literature Review</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>History of School Gardens and Plants in Schools</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>Should Students be Exposed to Nature?</td>
<td>9</td>
</tr>
<tr>
<td></td>
<td>Nature and Academics</td>
<td>11</td>
</tr>
<tr>
<td></td>
<td>Ways of Exposing Students to Nature</td>
<td>12</td>
</tr>
<tr>
<td></td>
<td>Studying the Effects of a Plant Care Program in the Classroom</td>
<td>13</td>
</tr>
<tr>
<td>III</td>
<td>Methods</td>
<td>15</td>
</tr>
<tr>
<td></td>
<td>Participants and Setting</td>
<td>15</td>
</tr>
<tr>
<td></td>
<td>Procedures</td>
<td>16</td>
</tr>
<tr>
<td></td>
<td>Data Analysis</td>
<td>18</td>
</tr>
<tr>
<td>IV</td>
<td>Results</td>
<td>20</td>
</tr>
<tr>
<td>V</td>
<td>Discussion</td>
<td>34</td>
</tr>
<tr>
<td></td>
<td>References</td>
<td>39</td>
</tr>
<tr>
<td></td>
<td>Appendices</td>
<td>42</td>
</tr>
<tr>
<td>A</td>
<td>Survey</td>
<td>42</td>
</tr>
<tr>
<td>B</td>
<td>Table I: Survey Results</td>
<td>45</td>
</tr>
<tr>
<td>C</td>
<td>Survey Response Question #14</td>
<td>47</td>
</tr>
</tbody>
</table>
Chapter I

Introduction

The research question explored in this paper is whether or not teachers who have incorporated a plant care program into their classroom notice that caring for classroom plants affects student behavior and mood. A literature review was done and there was only one study found that looked specifically at classroom plants and how they affect student behavior so it is clear that there is room for more research in this area. Most research included in this paper looks more broadly at how nature affects behavior and mood—whether that be by walks, gardening, or merely being in the presence of a natural landscape. Each research article reviewed for this project showed exposure to nature in any form can be beneficial to the well-being of individuals. There were not any studies found that indicated a decline in behavior and mood after being exposed to nature.

In this study, the term “plant care program” refers to students being included in caring for plants in any way. This can be within the classroom by taking care of classroom plants or by gardening as part of their school day.

The literature review that follows this introduction includes studies focused on the benefits of plants to humans. Being around plants can be wonderful for individuals’ moods and sociability (Smidl, Mitchell, & Creighton, 2017). When there are plants in the classroom, there are fewer reports of behavior issues (Han, 2009). Students who garden have a greater sense of well-being (Van Lier et al., 2017). There is not a lot of research that specifically looks at classroom plants so the literature review looks more broadly at how plants help people mentally with a specific focus for school-aged children.
TEACHER PERSPECTIVES ON THE EFFECT CARING FOR CLASSROOM PLANTS

There is a lengthy history of having plants in schools. There have been school gardens since the late 1800s (Kohlstedt, 2008). In schools, there was an emphasis on the importance of growing your food during wartime to address issues with food scarcity due to the war. Gardens were a big part of schools during World War 1 and World War 2 (Hayden-Smith, 2007). There continue to be gardens in many schools today.

With growing concern for mental health in schools today, it is important that schools look at creative research-based methods of improving mental well-being (Diamond, 2010). Participating in education outdoors improved self-esteem, self-confidence, and overall mental well-being to a group of students in Israel (Berger, 2008). When students can play outside, in more natural landscapes, their mood is better than it would be if they were to remain inside (Berger, 2008). This is something for cities to consider when placing school buildings.

Gardening can also benefit mental health. Gardening at school can result in positive moods and reduced stress, anger, inattention, and problem behavior (Chawla, 2014).

Having plants around can be beneficial to academics. Students who have plants or natural landscapes around them, demonstrate an increase in attention span (Wells, 2000). Going for nature walks improves memory (Berman et al., 2012).

Walks, gardens, classroom plants, and field trips are each ways students can be exposed to nature. The literature review, contained in chapter 2, discusses the various ways of exposing students to nature and some pros and cons of those exposure methods. While walks, gardens, and field trips can be useful, it may be difficult for urban schools to access nature that way. Classroom plants are something all schools can have, as long as they have windows.
Methods

To find information on teacher perspectives on classroom plants on behavior and mood, high school teachers in a medium-sized, Midwestern, urban school district who incorporated a plant care program in their classroom were asked several questions related to how students' behavior and moods were impacted by working with classroom plants. An email was sent to these teachers inviting them to take a survey with questions about their experience with classroom plants.

The survey asked teachers whether or not they have classroom plants and if so, whether they have students take part in the caring of those plants. Teachers who did have students take part in caring for classroom plants, were asked several questions regarding the perceived effects of the plants on student behavior and mood. Teachers responded with their opinions so this research does not serve as factual evidence as to whether or not plants do affect behavior. The data serves as evidence to teachers' observations and this still proves beneficial for teachers who are deciding if a plant care program would be appropriate for their classroom. The responses were collected and used to identify trends. More information regarding the participants, procedures, methods, and analysis can be found in chapter three.

Of the 270 teachers that received the email, 80 agreed to take the survey. Of those 80, 36 had plants in their classroom and of those 36, only 18 teachers had students participate in the caring of the plants. The areas looked at in the study were attendance, punctuality, ability to follow directions, willingness to interact with peers, appropriateness when interacting with peers, ability to start a task, ability to stay on task, mood in general, attitude when it comes to schoolwork and stress levels based on observation and dialogue. In all areas, teachers noted students did about the same, somewhat better, or much better. The plant program did not have a
negative effect in any area. According to survey results, having a plant care program makes the most impact on students' moods with 13/17 teachers seeing their students' mood somewhat better or much better with the program. Every teacher stated they would recommend a plant care program after trying one in their classroom. See chapter 4 for an in depth analysis of survey results.

The data collected in this study will be beneficial to teachers who are considering adding plants to their classrooms. It will also be helpful information for educators who are looking for ways they can support the mental well-being of their students. If there is a perceived benefit to having plants, it may be worth including more in the school buildings. A full discussion of the findings and their implications can be found in chapter five.
Chapter II

Literature Review

If nature can greatly reduce stress, anxiety, and depression, why not incorporate it into part of the regular school day? Studies have shown that participation in a plant care program can improve individuals' moods and sociability (Smidl, Mitchell, Creighton, 2017). Having indoor plants has shown to decrease classroom misbehavior (Han, 2009). Educators must think outside of the box to come up with ways to get students engaged in school and invested in their future. Plants are good for mental health and taking care of mental health should be a priority in schools so that there are fewer behavior issues and student minds can focus on learning. Research shows being exposed to nature in the form of gardening can have a profound effect on our mental well-being (Van Lier et al., 2017).

Many studies have examined the relationship between nature and the human brain (Stewart, 2014; Berman, Jonides & Kaplan, 2008; Capaldi, Dopko, & Zelenski, 2014). From simply thinking about nature to getting involved with nature through gardening, students have been impacted by spending time with nature. Many schools have outdoor gardens or hydroponic gardens in their classrooms (Patchen, Zhang, & Barnett, 2017).

This literature review includes elementary-aged students to young adults because the research on the effects of a garden on those within the adolescent age range is slim. The review will look at how nature affects student attention, behavior, and mood.

History of School Gardens and Plants in Schools

Gardening at school is nothing new. From the 1890s well into the twentieth century, "school gardens flourished" (Kohlstedt, 2008, pg. 60). Educator John Dewey encouraged schools to incorporate practical elements into the school day (Kohlstedt, 2008, pg. 92). Gardens were a
part of schools in both the city and the country. This continued until World War I, when gardens were once again encouraged to avoid food shortages.

Gardens have helped families survive during wartime by allowing them to grow their food (Hayden-Smith, 2007). During World War I, gardening was seen as a national priority. The United States School Garden Army (USSGA) and National War Garden Commission worked on getting citizens to grow food at home and have the youth participate by growing food at school (Hayden-Smith, 2007). The USSGA focused heavily on making the urban population producers. The program was thought to bring “country values to the city” (Hayden-Smith, 2007, p.5). The USSGA worked and several million youths enlisted by the end of the war (Hayden-Smith, 2007).

Once a food shortage was no longer a national priority, the USSGA ended. A push for school gardens came back during World War II (Hayden-Smith, 2007). The WWII Victory Garden campaign was due in part to many adults having participated in the USSGA as children during the First World War.

**Should Students be Exposed to Nature?**

It is important to determine whether caring for classroom plants is beneficial to learning before implementing it in schools. Minutes in the school day must be utilized in a manner that is conducive to maximum learning. Concern for the psychological well-being of adolescents is increasing (Diamond, 2010). If caring for plants does improve students’ mental wellbeing, it may be helpful to incorporate it into the regular school day.

Research shows attendance is important to student achievement (Lamdin, 1996). One teacher in the Bronx gets his students motivated to come to school by providing an indoor garden. Stephen Ritz has provided students with gardening experiences for years and has noticed a marked improvement in attendance. According to Ritz, “the kids really believe that they are
responsible for [the plants], and attendance has increased from 43 percent to 93 percent” (Dwyer, 2014). Having plants in the school can get students in the building and once at school, teachers will have the opportunity to get the students engaged in learning.

Gardening provides lessons in life skills that can be extremely beneficial to students. A one-year school garden program was implemented at an elementary school in the United States. Students were divided into two groups. One group consisted of students who participated in a school garden program and the other group was simply a control group consisting of students in the same schools that did not participate in gardening. Both groups of students took a Youth Life Skills Inventory test to assess their baseline life skills. After the experimental group participated in gardening for a year, both groups were given the Youth Life Skills inventory again and the experimental group showed improvement in the areas of “working in groups” and “self-understanding” (Robinson & Zajicek, 2005).

A study was done in Israel that looked at students engaging in nature therapy. This therapy had students completing different missions outdoors each day as part of their regular education. Interviews revealed that participants found being outdoors was beneficial to self-esteem, self-confidence, and overall mental well-being (Berger, 2008). Students who have natural landscapes for play and learning show more positive moods, and reduced stress, anger, inattention, and problem behavior (Berger, 2008).

One study looked at the effect of having a vegetable garden at home had on the health and wellbeing of students (Van Lier et al., 2017). This study showed students not in poverty were more likely to have a vegetable garden. These students had better relationships and overall emotional well-being. The study may have been flawed because they were unable to account for
the fact that students who come from higher socio-economic factors have other privileges that could account for some of their positive outcomes.

Another study was done with high school students caring for plants as part of their class (Chawla, 2014). At three high school sites and one after-school program, teens engaged in gardening. Teens gardened in the following locations: private college preparatory school on a former cattle ranch in western Colorado, where students could choose gardening as their form of school service; a public high school in the same town, where they could elect to enroll in an agricultural biology class; a public alternative school in the same river valley, where horticultural science was a required class for teen mothers; and a voluntary after-school and summer gardening program to grow food for a farmer's market and homeless shelter on Colorado's Front Range. The combined sample of 52 students was composed of 31 females and 21 males. The time they spent gardening ranged from 1.5 to 10 hours per week. Results from interviews showed positive moods and reduced stress, anger, inattention, and problem behavior. Results from this study also show students with access to nature have decreased symptoms of Attention Deficit Hyperactivity Disorder (Chawla, 2014).

Nature and Academics

For most programs to get approved in a school setting, administrators and directors likely want to see that the program will benefit students academically. There is a positive correlation between more time spent in an environment that has a lot of plants in it and an increase in attention. Wells’ (2000) study used the ADDES, a nationally standardized instrument traditionally used as a measurement for Attention-Deficit/Hyperactivity Disorder. Results showed simply being surrounded by nature can lower symptoms of Attention Deficit
Hyperactivity Disorder. Children who experienced more exposure to nature, showed the greatest improvement in attention several months later.

A study done on nature walks and depression indicated that memory span increases significantly following the nature walk, as compared to the urban walk (Berman et al., 2012). Twenty participants who were diagnosed with major depressive disorder had their memory assessed before and after walks. Young adults with severe depression were asked to complete a self-report questionnaire and backward digit span task and then they were asked to take a 50-minute nature walk, followed by reassessment. The reassessment showed significant increases in memory span after the nature walk relative to the urban walk.

**Ways of Exposing Students to Nature**

Students can be exposed in many ways: walks, gardens, or field trips. Walks are a simple way to get students outdoors but gardens may expose students to nature and also inspire them to learn more about science and nutrition (Van Lier et al., 2017). To have urban students exposed to nature, technology can be used and growing techniques such as hydroponics can be used (Patchen, Zhang, & Barnett, 2017).

Getting outside and walking has proven to be beneficial. According to the Berman study (2012), individuals had an increase in memory span after a walk, however, subjects had better outcomes with a walk in a natural environment. Other methods of exposure to nature may be necessary for urban high school students since they have limited amounts of natural settings available to them.

Gardens are an excellent way for students to be exposed to nature (Van Lier, 2017; Retzlaff-Fürst, 2016; Stewart, 2014). Gardening has been extremely effective in helping high school students academically and behaviorally (Ruiz-Gallardo, Verde, & Valdes 2013). Students
can gain confidence in being a part of creating new life (Ruiz-Gallardo, Verde, & Valdes 2013). Growing their own food can motivate students to try fresh produce, which they may not have an opportunity to get often if they live in certain urban areas that may be food deserts (Cairns, 2017).

Urban schools may run into the problem of green space. One option for an urban school would be to have a hydroponic garden. In 2017, a group of educators ran an after school hydroponics program (Patchen, Zhang, & Barnett, 2017). Students grew produce on trays and in large containers with water right in the school building. Students reported a decrease in anxiety and an increase in positive self-concept from participating in the hydroponics program.

Field trips can be a wonderful way to expose students to nature and gardening, however, costs can get in the way (Michie, 1998). Field trips can be used to supplement a more consistent program so students can interact with nature on a more regular basis for maximum effectiveness (Michie, 1998).

**Studying the Effects of a Plant Care Program in the Classroom**

It is important to focus on the overall wellbeing of students in the classroom (Diamond, 2010). Studies show having plants in the classroom lowers stress and anxiety-allowing students to focus on learning and making it easier for them to socialize appropriately (Patchen, Zhang, & Barnett, 2017). Asking teachers their experience with students caring for plants in the classroom could help other educators decide whether trying a plant care program is a good choice for them.

Most research about student interaction with plants looks at having plants in the classroom and gardening out of the classroom. This study looked at teachers’ perspectives on the effect caring for plants has on student behavior (Han, 2009; Van Lier, 2017; Retzlaff-Fürst,
This research can be used to help educators think about options for optimizing their environment for learning.
Chapter III

Methods

The research question this paper will attempt to answer is: “Do teachers who have incorporated a plant care program into their classroom notice caring for classroom plants affects student behavior and mood?” A descriptive, quantitative research method was chosen to answer the research question because the goal was to get an overall sense of teachers’ opinions on a plant care program in the classroom. The specific areas that were looked at are as follows: attendance, punctuality, ability to follow directions, willingness to interact with peers, appropriateness when interacting with peers, ability to start a task, ability to stay on task, mood in general, attitude when it comes to schoolwork and stress levels based on observation and dialogue. Teachers were asked if they recommend a plant care program to other teachers and why or why not.

This research was conducted by using a Qualtrics survey to collect data. A survey is an adequate option to use to answer the research question because it is looking for teachers’ opinions (Leedy & Ormrod, 2016). Surveys are an excellent way to get an unbiased response from a substantial number of people (Leedy & Ormrod, 2016). Sending out a survey allowed the researcher the potential to collect up to 270 responses to gain a more generalized sense of teachers’ experiences with plant care programs. This can help other teachers decide whether to have a plant care program of their own.

Participants and Setting

The research was conducted at a Midwestern urban school district. The school district serves nearly 5,000 high school students. Approximately 15% of students have disabilities and approximately 38% of students are considered economically disadvantaged. The school district
TEACHER PERSPECTIVES ON THE EFFECT CARING FOR CLASSROOM PLANTS

serves a predominantly white population (70%), with Asian (12%), Hispanic (10%) and Black (5%) being the largest minority groups enrolled.

Three main high schools and an alternative high school were part of the study. The participants were high school teachers. Participants were selected if they were regular or special education teachers in the district. Teachers were emailed using the district staff directory and they were invited to take a survey. Two-hundred seventy teachers were invited to take the survey. When educators chose to take the survey, the first question asked them if they gave consent to take the survey and they were told all data collected was confidential. See Appendix A for a copy of the survey questions including the consent to take the survey. The survey was live for two business weeks. The first invitation was sent at the start of the two weeks and the second invite was sent at the start of the second week. The survey was closed at the end of the second week at midnight.

Procedures

This survey delivered to teachers (see Appendix A) was mainly quantitative and looked at nominal data based on a Likert scale. It began with a survey to find out which teachers in the district participated in a plant care program. Teachers were asked two dichotomous questions:

1. Do you have plants in your classroom at any time during the school year?
2. Do students participate in the care of the plants?

If teachers answered yes to both questions, they continued with a survey. The survey asked teachers' opinions and they had an opportunity to answer on a Likert rating scale with the following response options: 1-much better, 2-somewhat better, 3-about the same, 4- somewhat worse, 5-much worse. The questions asked if teachers noticed changes in behaviors and moods since beginning the plant care program. The specific areas questioned were attendance,
punctuality, ability to follow directions, willingness to interact with peers, appropriateness when interacting with peers, ability to start a task, ability to stay on task, mood in general, attitude when it comes to schoolwork, and stress levels. Teachers were then asked whether they recommend a plant care program to other teachers and why or why not.

Attendance and punctuality were included in the survey because studies have shown that having a plant care program can be a great motivator for getting to school on time and regularly (Dwyer, 2014). A school in the Bronx started an indoor gardening program and attendance increased by 50% (Dwyer, 2014). If a plant care program can get kids to school, they will get more instructional time.

The ability to follow directions is a crucial life skill and something that is required to be successful at school. According to a 2005 study done by Robinson and Zajicek, gardening can improve life skills. Since following directions is an important life skill, following directions is a category examined in the present study.

Research cited in the literature review in this paper has shown working with plants improves interpersonal skills (Patchen, Zhang, & Barnett, 2017; Smidl, Mitchell, & Creighton, 2017; Robinson & Zajicek, 2005). For this reason, teachers in the present study were asked about students' willingness and appropriateness when interacting with peers to see if classroom plants also make a difference in how students interact with each other.

Since classroom teachers often struggle with the issue of classroom management, looking at how plants can help manage behavior is important and included in the survey. Teachers were asked whether a plant care program affected students' ability to start and stay on task. If students are on-task, they are less likely to misbehave (Berger, 2008; Chawla, 2014).

Teachers were asked whether a plant care program affected their students' moods.
TEACHER PERSPECTIVES ON THE EFFECT CARING FOR CLASSROOM PLANTS

Previous studies have shown being around plants has a positive effect on students’ well-being. See page 5 of the literature review for the information on how plants affect mood. If students’ moods are affected, it is likely their attitudes toward school-work will be affected so the survey teachers received included a question about student attitudes.

Stress and anxiety have been greatly reduced in students exposed to nature and plants (Berger 2008, Chawla, 2014, and Patchen, Zhang, & Barnett, 2017). For this reason, teachers were also asked if they noticed a change in student stress levels.

**Data Analysis**

Answers to the first two questions in the survey were collected and put into percentages to see what percent of teachers had plants in their classrooms and of those that did, how many had students that participated in the caring of those plants. That information was also put into pie graphs for a visual representation of the data. A pie chart was used because according to the 2018 CDC Evaluation Brief, it is “quickly understandable, graphically appealing and it compares parts of a whole” (p. 1). We are looking at how many teachers out of all the teachers have plants and how many of those teachers have a plant care program. Responses to the survey questions were organized by looking at each question and organizing the responses into percentages. Those percentages for each question were displayed on a 100% divergent stacked bar chart. Divergent stacked bar charts are frequently recommended for Likert scale surveys (Heiberger & Robbins, 2014).

The final question in the survey asked teachers if they would recommend a plant care program and why or why not. Teachers wrote out their responses after answering “yes” or “no.” All teachers chose “yes” but only 6 teachers responded to the “why or why not” question. Of those six responses, all teachers had positive things to say about the plant care program.
Since there were only six responses to the question of why or why not teachers would recommend a plant care program, coding and developing themes was fairly simple. The first step to analyze the responses was reading over them to get familiar with what were teachers’ overall experiences with a plant care program. The initial takeaway was teachers were happy with the results a plant care program had in their classroom. Next, responses were reviewed and main ideas of sentences were highlighted and then coded by meaning. Everything that seemed relevant or interesting was coded. Finally, themes were developed from the codes that were created. Teachers used the words “purpose” and “responsibility” more than once and they also said other things related to the ideas of “purpose” and “responsibility” so those are the main themes that were taken from the responses. Two other themes that were developed from reading the responses were “positive for environment” and “student/teacher connection”. These themes were only seen once or twice in the responses so are not the biggest themes to come from the results.
Chapter IV

Results

A survey was sent to 270 educators. Out of 270 educators, 82 responded initially to the survey but only 80 consented to continue taking it after the initial consent to take survey question. This survey had a 30% response rate. Survey participants were kept anonymous. Thirty-six of the 80 participants have plants in their classroom and 18 of those 36 have students take part in caring for the plants. A few participants stopped completing the questions mid-survey, so the total participants changed slightly. The survey had teachers able to answer on a Likert rating scale with the following response options: 1-much better, 2-somewhat better, 3-about the same, 4-somewhat worse, 5-much worse. Beginning on page 22, figures 3-12 only include 1-3 because no teachers responded 4 or 5 on the survey.

The figures in this chapter show the data visually. To view the full data set, which lists each survey question and the corresponding responses both in percentages and by choice count, see Appendix C. The first two questions are displayed as pie charts to compare yes and no answers easily and the rest are displayed as divergent bar charts to easily compare responses.

Do you have plants in your classroom at any time during the school year?

a. 36 said yes, 44 said no

Forty-five percent of survey respondents have plants in their classroom. Slightly more survey respondents stated they did not have plants in their classroom. The 55% of survey respondents who did not have plants in their classrooms completed the survey with this question (see figure 1).
Figure 1

Do students participate in the caring of the plants?

a. 18 said yes, 18 said no

Exactly half of survey respondents claimed they had students participate in the caring of the plants. This could include: watering, checking on the health, feeding, or moving the plants toward sunlight. The other half of survey respondents did not have their students participate in the caring of the plants and they were done completing the survey. The sample size of the following research is 18, which is a small sample size and is a limitation of this study (see figure 2).
TEACHER PERSPECTIVES ON THE EFFECT CARING FOR CLASSROOM PLANTS

Figure 2

What was the effect of the plant care program on student attendance?

Three out of 18 teachers stated the plant care program made student attendance "somewhat better." The other 15 teachers stated attendance was "about the same" as without having plants (see figure 3).
Figure 3

*What was the effect of the plant care program on student punctuality?*

Four out of 18 teachers stated the plant care program made student punctuality "somewhat better." The other 14 teachers stated attendance was "about the same" as without having plants. This is similar to the results on the effect on attendance (see figure 4).
What was the effect of the plant care program on student ability to follow directions?

Seven out of 17 teachers saw students ability to follow directions was “somewhat better” after incorporating a plant care program. This question had one less survey respondent than previous questions (see figure 5).
Six out of 17 teachers noticed a “somewhat better” effect in their students’ willingness to interact with peers and two out of 27 noticed a “much better” effect on their students’ willingness to interact with peers. This might have a lot to do with how the teachers set up their plant care programs and whether they design them as a group/peer activity or not (see figure 6).
Figure 6

*What was the effect of the plant care program on student appropriateness when interacting with peers?*

Seven out of 17 teachers noticed a “somewhat better” effect on student appropriateness when interacting with peers. The rest claimed they saw no difference. This may vary from classroom to classroom because some classes may not have behavior problems (see figure 7).
Figure 7

What was the effect of the plant care program on student ability to start a task?

Six out of 17 teachers noticed an improvement in student ability to start a task. Three out of 17 noticed a "somewhat better" ability to start a task and three out of 17 noticed a "much better" ability to start a task. This could depend on whether or not the teachers made the caring for the plants an initial task expected of students. If students did not have a task to do at the beginning of class prior to the plant care, it would make sense that incorporating the plant care program would make a difference (see figure 8).
Figure 8

What was the effect of the plant care program on student ability to stay on task?

![Bar Chart]

Five out of 16 teachers saw a "somewhat better" effect in students' ability to stay on task. This is one less than the teachers that saw an improvement in starting a task. The plant care program likely does not take a long time on most school days so this could account for it not making a huge difference in keeping students on task. A participant must have skipped this question because the total number of responses is one less than the rest of the responses (see figure 9).
Figure 9

What was the effect of the plant care program on student mood in general?

13 out of 17 teachers claimed a plant care program gave their students a better mood.

Mood was claimed to be improved more than any other area. Three out of 17 teachers stated mood was “much better” after a plant care program and 10 out of 17 claimed mood was “somewhat better.” It can be concluded that most teachers see a positive change in their students’ moods when they care for plants in their classroom (see figure 10).
One teacher saw a “much better” improvement in their students’ attitude when it comes to schoolwork because of their plant care program and five teachers saw a “somewhat better” improvement. This could vary a lot based on whether the plant care is part of the schoolwork mentioned. Students could enjoy doing schoolwork more if it has to do what the plants they are growing or they could like it more based on being in a better mood because of the plants in their environment (see figure 11).
Figure 11

What was the effect of the plant care program on student stress levels?

Nine out of 17 teachers say their students’ stress levels as “somewhat better” with a plant care program. This is relevant because stress may have an impact on mood. If plants can help with stress levels, mood may also be improved (see figure 12).
The final questions asked “Do you recommend a plant care program to other teachers? Why or why not?” All teachers answered that they would recommend a plant care program. See Appendix D for each response as to why in its entirety.

Only six of the original 18 participants responded to the question asking why they would recommend a plant care program. The themes that emerged from these responses were responsibility and purpose. The first respondent said “I found the students that took care of my plants felt they had a purpose and enjoyed the responsibility.” The second interviewee claimed the plant care program “gave students a responsibility to carry out and brought students to the room on a more regular basis.” The third respondent stated specifically that the plants “give
TEACHER PERSPECTIVES ON THE EFFECT CARING FOR CLASSROOM PLANTS

extra purpose to students who might need a little extra TLC.

Teachers gave a few other reasons for recommending a plant care program. One teacher uses plants in their lab and stated students “already have an interest in plants.” These are students that take Biology by choice. One teacher said that giving the students non-virtual contact with living things “has never been more important.” Two teachers mentioned the environment. One stated “plants add to the classroom atmosphere” and another wrote “only one person can water the plant, but everyone can take a moment to tidy their area. Doesn't it feel good to make your space clutter free and beautiful?” All respondents had positive things to say about the plant care program.
Chapter 5

Discussion

The question the survey attempted to answer was “Do teachers who have incorporated a plant care program into their classroom notice caring for classroom plants affects student behavior and mood?” Results indicate that in many areas, teachers do see a change in behavior and mood.

Survey research involved a pool of 270 high school teachers in a Midwestern school district. Out of 80 respondents who took the survey, 36 have classroom plants. Eighteen of the 36 teachers that have classroom plants have students participate in the caring of those plants.

For most of the questions, teachers responded the plant care program had “about the same” or a “somewhat better” effect on their students. There are a few categories teachers noticed their students do “much better” in because of the plants. No teachers saw “somewhat worse” or “much worse” effects due to their plant care program.

When it comes to student attendance and punctuality, results indicate that having a plant care program had little impact on attendance (14 stated “about the same”, three stated “slightly better”) and similar impact on punctuality (13 stated “about the same”, four stated “slightly better”). One teacher stated the plants “brought students to the room on a more regular basis.” The Bronx indoor gardening program, mentioned in the literature review, stated attendance increased by 50% with a plant program (Dwyer, 2014). Teachers did not appear to notice such drastic improvements in this study but in some classrooms, improvements were observed.

Teachers saw more of an effect in terms of students following directions with a plant care program. This may have been in part because students had to follow directions to care for the plants. Seven teachers stated students were “somewhat better” about following directions with a
Plant care programs are a way for students to interact with their peers when working together caring for plants. Teachers noticed more improvement in this area than in previously mentioned areas. Two teachers noticed having a plant care program made peer interaction “much better” in their classroom. Another six teachers noticed peer interaction was “somewhat better” with a plant care program. The other nine teachers did not notice a difference. Many studies previously cited in this paper state caring for plants improves interpersonal skills (Patchen, Zhang, & Barnett, 2017; Smidl, Mitchell, & Creighton, 2017; Robinson & Zajicek, 2005), so it is not surprising more teachers noticed an improvement in this area. Seven out of 17 teachers noticed there was an improvement in student appropriateness when interacting with peers.

In some classrooms, having a plant care program gave students a task to start immediately upon entry. Three teachers stated students were “much better” at starting tasks with a plant care program and three teachers noticed students were “somewhat better.” The other 10 teachers noticed no change. A couple of teachers stated the plant care program gave their students “purpose” and this might be a reason why some noticed an improvement in the area of starting a task.

Teachers did not notice as much of an improvement when looking at the area of staying on task. Five teachers stated the plant program made the ability for students to stay on task “somewhat better” and the other 11 teachers claimed students were on task “about the same” as before. Previous studies claimed having a plant care program reduced misbehavior (Berger, 2008
& Chawla, 2014). Some classrooms, such as Biology, spend a lot of their class time working with the plants so the plants play a central role and are the reason for students remaining on task. In many other classrooms, teachers have plants more for aesthetic purposes and students only interact during a couple of minutes when they are checking on and caring for the plant.

The majority of survey participants noticed an improvement in student mood due to the plant care program. Only four participants said the mood in the room was “about the same.” Ten participants noted students’ moods were “somewhat better” and three participants said moods were “much better”. This aligns with the Chawla (2014) and Berger (2008) studies that found students have a more positive mood when working with and being around plants.

When it comes to schoolwork, five of 17 participants noticed “somewhat better” effort from their students and one teacher noticed a “much better” effort. The improvement some teachers noticed in schoolwork could be due to an increase in attention span (Wells, 2000).

More than half (9/17) of the participants noticed somewhat of an improvement in their students’ stress levels. Studies show having plants in the classroom lowers stress and anxiety (Patchen, Zhang, & Barnett, 2017). Since many teachers had plants in their classrooms from the start of the year, it may not have been easy to tell a difference in stress levels because many teachers might not see students in classrooms that do not have plants. A survey asking students how they feel in their classroom with plants and/or when engaging in a plant care program could be beneficial.

After the survey questions, the teachers were asked if they would recommend a plant care program. Despite the costs and effort it takes to maintain a plant care program, every teacher surveyed said they would recommend a plant care program. The main themes that emerged from teachers’ answers were purpose and responsibility. Teachers also noted a plant care program
brought students to the room on a more regular basis and gave them an opportunity to connect to the students in a new way.

**Strengths and Limitations**

A limitation of this study is the low return rate. While 80 teachers responded initially to the survey, not many actually provided a plant care program. An even smaller number of teachers qualified to answer most of the questions. Only 18 teachers participated in the complete survey. Another limitation of this study was sample profile. The teachers surveyed were all teachers of a medium sized urban Midwest school district so results are only a reflection of how plant programs affect students in those specific environments.

A strength of the study was the reliability of teachers' responses due to the survey being anonymous. Teachers had nothing to gain from answering in a particular way so they could be honest about their perceptions of a plant care program.

**Implications for Research**

Future research should focus on the benefits of plants to students’ moods. Plants could be particularly beneficial to at-risk students and those with emotional-behavioral disorders. Future research should include experimental studies within the classroom (particularly in those classrooms with at-risk and emotional-behaviorally challenged students) to get data on students’ moods following a plant care program. Studies can also include how simply having plants in the classroom can affect students’ moods because even though common knowledge suggests plants are useful for uplifting one’s mood, there is not a lot of data to confirm this is the case in the classroom. Schools are focused on having research-based classrooms and having more research that strongly supports having plants could help students feel calmer and happier which will allow learning to come more easily.
Given the many positive experiences teachers have with a plant care program, schools should strongly consider adding plants to classrooms that don’t already have them. This research demonstrates something as simple as a houseplant in a classroom can affect students positively in a variety of ways. Simply putting plants in a classroom has a noticeably positive effect on students’ moods, and what teacher doesn’t want their students to feel happy and comfortable while learning? Schools should strongly consider the environment in which learning takes place and how they can improve it with plants.
References


TEACHER PERSPECTIVES ON THE EFFECT CARING FOR CLASSROOM PLANTS


Appendix A

Survey (approved by IRB via Qualtrix)

1. By clicking yes below, you agree to participate in the survey. The purpose of this research is to assess the effects plants have on students in the school setting. The survey should take approximately 1-10 minutes to complete. Your personal information will not be collected.

   a. yes, I agree to participate in the survey
b. no, I do not agree to participate in the survey

2. Do you have plants in your classroom at any time during the school year?
   a. yes
   b. no

3. Do students participate in the caring of the plants?
   a. yes
   b. no

4. What was the effect of the plant care program on student attendance?
   a. Much better
   b. Somewhat better
   c. About the same
   d. Somewhat worse
   e. Much worse

5. What was the effect of the plant care program on student punctuality?
   a. Much better
   b. Somewhat better
   c. About the same
   d. Somewhat worse
   e. Much worse

6. What was the effect of the plant care program on student ability to follow directions?
   a. Much better
   b. Somewhat better
   c. About the same
   d. Somewhat worse
   e. Much worse

7. What was the effect of the plant care program on student willingness to interact with peers?
   a. Much better
   b. Somewhat better
   c. About the same
   d. Somewhat worse
   e. Much worse
8. What was the effect of the plant care program on student appropriateness when interacting with peers?
   a. Much better
   b. Somewhat better
   c. About the same
   d. Somewhat worse
   e. Much worse

9. What was the effect of the plant care program on student ability to start a task?
   a. Much better
   b. Somewhat better
   c. About the same
   d. Somewhat worse
   e. Much worse

10. What was the effect of the plant care program on student ability to stay on task?
    a. Much better
    b. Somewhat better
    c. About the same
    d. Somewhat worse
    e. Much worse

11. What was the effect of the plant care program on student mood in general?
    a. Much better
    b. Somewhat better
    c. About the same
    d. Somewhat worse
    e. Much worse

12. What was the effect of the plant care program on student attitude when it comes to schoolwork?
    a. Much better
    b. Somewhat better
    c. About the same
    d. Somewhat worse
    e. Much worse

1. What was the effect of the plant care program on student stress levels?
   a. Much better
   b. Somewhat better
   c. About the same
d. Somewhat worse
e. Much worse

2. Do you recommend a plant care program to other teachers? Why or why not?
   a. yes
   b. no
   c. 

Appendix B

Table 1

Teacher Perspectives on the Effects of Classroom Plants Survey Results

<table>
<thead>
<tr>
<th>Question</th>
<th>Response</th>
<th>Percentage</th>
<th>Choice Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q1 - By clicking yes below, you agree to participate in the survey. The purpose of this research is to assess the effects</td>
<td>Yes</td>
<td>97.56%</td>
<td>80</td>
</tr>
</tbody>
</table>
plants have on students in the school setting. The survey should take approximately 1-10 minutes to complete. Your personal information will not be collected.

<table>
<thead>
<tr>
<th>Question</th>
<th>Response</th>
<th>Percentage</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q2 - Do you have plants in your classroom at any time during the school year?</td>
<td>Yes</td>
<td>45.00%</td>
<td>36</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>55.00%</td>
<td>44</td>
</tr>
<tr>
<td>Q3 - Do students participate in the caring of the plants?</td>
<td>Yes</td>
<td>50.00%</td>
<td>18</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>50.00%</td>
<td>18</td>
</tr>
<tr>
<td>Q4 - What was the effect of the plant program on student attendance?</td>
<td>Much better</td>
<td>0.00%</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Somewhat better</td>
<td>17.65%</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>About the same</td>
<td>82.35%</td>
<td>14</td>
</tr>
<tr>
<td>Q5 - What was the effect of the plant care program on student punctuality?</td>
<td>Much better</td>
<td>0.00%</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Somewhat better</td>
<td>23.53%</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>About the same</td>
<td>76.47%</td>
<td>13</td>
</tr>
<tr>
<td>Q6 - What was the effect of the plant care program on student ability to follow directions?</td>
<td>Much better</td>
<td>0.00%</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Somewhat better</td>
<td>41.18%</td>
<td>7</td>
</tr>
<tr>
<td></td>
<td>About the same</td>
<td>58.82%</td>
<td>10</td>
</tr>
<tr>
<td>Q7 - What was the effect of the plant care program on student willingness to interact with peers?</td>
<td>Much better</td>
<td>11.76%</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Somewhat better</td>
<td>35.29%</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>About the same</td>
<td>52.94%</td>
<td>9</td>
</tr>
<tr>
<td>Q8 - What was the effect of the plant care program on student appropriateness when interacting with peers?</td>
<td>Much better</td>
<td>0.00%</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Somewhat better</td>
<td>41.18%</td>
<td>7</td>
</tr>
<tr>
<td></td>
<td>About the same</td>
<td>58.82%</td>
<td>10</td>
</tr>
<tr>
<td>Q9 - What was the effect of the plant care program on student ability to start a task?</td>
<td>Much better</td>
<td>18.75%</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Somewhat better</td>
<td>18.75%</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>About the same</td>
<td>62.50%</td>
<td>10</td>
</tr>
<tr>
<td>Q10 - What was the effect of the plant care program on student ability to stay on task?</td>
<td>Much better</td>
<td>0.00%</td>
<td>0</td>
</tr>
</tbody>
</table>
### TEACHER PERSPECTIVES ON THE EFFECT CARING FOR CLASSROOM PLANTS

<table>
<thead>
<tr>
<th>Question</th>
<th>Much better</th>
<th>Somewhat better</th>
<th>About the same</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q11 - What was the effect of the plant care program on student mood?</td>
<td>17.65%</td>
<td>58.82%</td>
<td>23.53%</td>
</tr>
<tr>
<td>Q12 - What was the effect of the plant care program on student attitude</td>
<td>5.88%</td>
<td>29.41%</td>
<td>64.71%</td>
</tr>
<tr>
<td>Q13 - What was the effect of the plant care program on student stress</td>
<td>0.00%</td>
<td>52.94%</td>
<td>47.06%</td>
</tr>
<tr>
<td>Q14 - Do you recommend a plant care program to other teachers? Yes?</td>
<td>100.00%</td>
<td>0.00%</td>
<td></td>
</tr>
</tbody>
</table>

**Appendix C**

Survey Response Question #14

*Do you recommend a plant care program to other teachers? Why or why not?*
1. I found the students that took care of my plants felt they had a purpose and enjoyed the responsibility.
2. Gave students a responsibility to carry out and brought students to the room on a more regular basis.
3. I only have a few plants, but when asked, students take great care to water and care for the plants. It helps me build rapport with students and is a way for me to connect with and give extra purpose to students who might need a little extra TLC. It also helps students care for their space/class environment. Only one person can water the plant, but everyone can take a moment to tidy their area. Doesn't it feel good to make your space clutter free and beautiful?
4. Our use is lab based, so students grade hinges on the experiment they design with their plants, and also club based as they already have an interest in plants. Bio uses plants all of the time!
5. Non virtual contact with living things has never been more important. I use hydroponics and aquaponics in classes.
6. Plants add to the classroom atmosphere!