ESTUARY EDUCATION OUTREACH: INSPIRING K-12 MINDS

by

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ABSTRACT

Estuary Education Outreach: Inspiring K-12 Minds

Rhema Neas-Gass

This consists of a quantitative study of elementary and middle school summer camp programs that were administered by an environmental education non-profit in Olympia, WA. This study seeks to determine if said programs had any impact on the pro-environmental behaviors of the participants. The study utilized before and after surveys to measure growth in terms of pro-environmental behaviors. The study found modest growth in relation to the pro-environmental behaviors of the youth that participated in the program.

# Table of Contents

[Table of Contents iv](#_Toc163127340)

[List of Tables v](#_Toc163127341)

[Overview 1](#_Toc163127342)

[Study Objective 2](#_Toc163127343)

[Literature Review 3](#_Toc163127344)

[Study Context 3](#_Toc163127345)

[Environmental Education in Context 3](#_Toc163127346)

[Environmental Education Models and Conservation Education 5](#_Toc163127347)

[Classroom Enrichment 6](#_Toc163127348)

[Outdoor Education 8](#_Toc163127349)

[Action-Based Outdoor Education 10](#_Toc163127350)

[Study Overview 11](#_Toc163127351)

[Methodology 11](#_Toc163127352)

[Study Design 13](#_Toc163127353)

[Survey Overview 14](#_Toc163127354)

[Study Results 16](#_Toc163127355)

[Item-Based Results 16](#_Toc163127356)

[Discussion 18](#_Toc163127357)

[Limitations 21](#_Toc163127358)

[Conclusion 23](#_Toc163127359)

[References 24](#_Toc163127360)

# List of Tables

[Table 1. Survey Results By Item 18](#_Toc163126529)

# Overview

Since the 1970s, environmental education has become more prominent within K-12 classrooms (Jensen, 1997). The environmental movement of the 1960s put these issues at the forefront of the public’s mind and this era led to some significant changes with regards to classroom pedagogical techniques and experimental education (Carelton-Hugs, 2010). Experimental pedagogical models such as outdoor education became more popular and educators became exposed to the “world as a classroom” model. Pedagogical techniques grew beyond the traditional “top-down” methods of traditional classrooms and traditional notions of power and control were challenged by these new pedagogical techniques. Educators began to question the traditional notions of power within classrooms and began to center student knowledges and experiences within classrooms. Furthermore, a greater emphasis on collaborative learning came into fruition during the 1960s and 1970s (Carelton-Hugs, 2010). This lead many instructors to implement classroom organization methods that different from rows of single desks and lead to classroom arrangements that were better suited to foster collaborative learning. This era of educational philosophy was an era of innovation and adaptation (Carelton-Hugs, 2010). Eventually, this interest expanded beyond the classroom and began to involve field trips and extracurricular activities. This lead to an interest in learning environments that differed from the traditional classroom.

# Study Objective

This study seeks to analyze the impact that environmental education programs have on the environmentally-friendly behaviors of elementary and middle school students. While they have been touted as a manner through which societal behaviors can be changed on a broad scale , there have been a limited number of studies that actually analyze the relationship between participation in an environmental education program and more eco-friendly behaviors on behalf of the participants. While they have generally been presumed to be fun, engaging ways through which educators can expose students to environmental concepts in a manner that differs from that of a traditional classroom, there have been limited numbers of studies on the long-term impacts of these programs. This study seeks to analyze whether environmental education programs have any sort of impact on the long-term eco-friendly behaviors of elementary and middle school students.

# Literature Review

## Study Context

The Puget Sound Estuarium is an environmental non-profit located in Olympia, WA. The K-12 Outreach program primarily serves K-8th grade students in Thurston and Mason counties. The Estuarium also partners with local before and after school programs and provides them with educational programming. This project seeks to be a needs analysis of the Estuarium’s elementary and middle school environmental stewardship programs. Since the Puget Sound Estuarium is the main source of supplemental STEM education for many local K-12 students, it is vital that the lessons are meaningful and engaging. For many young people, this is the only exposure that they get to STEM subjects outside of a formal classroom.For many young people, classroom-based science education is their only exposure to STEM subjects and it is not a terribly positive or meaningful one. This study will also serve as an external audit for the Puget Sound Estuarium. These external audits help the Estuarium improve its educational programming and better serve students in Thurston and Mason Counties.

## Environmental Education in Context

Outdoor education techniques were influenced by the educational philosophies of turn-of the century educators such as John Dewey (Ord, 2012). The mid-20th century changes to educational philosophy all played a key role in the development of outdoor education and especially outdoor environmental education. Outdoor education sough to provide students with a hands-on connection to real-world issues such as environmental degradation, climate change and pollution. During this same era, Rachel Carson’s “The Silent Spring” on pesticides and bird population decimation was published (Gough, 2002). This publication, along with half a dozen

others that dealt with the detrimental impacts of pollution helped spur the American environmental movement during the 1970s (Gough, 2002). The American environmental movement had an enormous impact on the development and implementation of outdoor and environmental education programs. Many of the early founders of these programs began their careers as political activists (Gough, 2002). They soon found that engaging the young in conservation efforts was a surefire way of ensuring that the next generation would remain involved in environmental activism. However, these efforts were not without pushback. Many parents initially found these programs to be controversial and too political (Gough, 2002). The K-12 controversies regarding the teaching of climate change and environmental issues continues to be an ongoing issue (Roth, 2018). It is controversial within many school districts and some states spend little to no time exploring these issues.

 This paper will begin with an overview of different environmental education models and a bit about the history behind environmental education in the United States. How did it come about? Why did it come about? What are the pros and cons of environmental education in K-12 classrooms? Are there any potentially adverse outcomes that educators should be mindful of?

This paper will analyze their pros and cons of different environmental education models and determine which ones are most appropriate for this context. Environmental education has existed in American classrooms for almost fifty years, therefore there are dozens of different models for implementing it. This paper will describe the ones that are currently in use at an environmental non-profit in Olympia, WA. Which ones were selected? How were they selected? Are they the best methods for this program? Could any improvements be made? Next, the paper will look into the research methods that are used to assess these programs and determine what could be done to make K-12 environmental education more effective in this context. These programs will be assessed by determining student knowledge via a needs assessment and making educated decisions based on the outcome of said assessment. The Puget Sound Estuarium is an interesting case study for this phenomena because it has been an active non-profit for over a decade. It has run K-12 education programs during this entire time period and has ample amounts of data to analyze.

## Environmental Education Models and Conservation Education

With regards to environmental education itself, the programs themselves can generally be divided into one of three categories: classroom enrichment (in a classroom), outdoor education and action-based. Many programs mix these elements, but in general they tend to lean more toward a certain pedagogical method. Furthermore, the pedagogical method that a program leans toward often sheds light on its learning outcomes and goals. The goal of classroom enrichment is to utilize hands-on pedagogical techniques within the classroom and promote collaborate learning. The goal of outdoor education in the most general sense is to help students gain and understanding and appreciation of outdoor environments. It seeks to build a connection between the natural environment and the students’ minds. It is theorized that if students spend time in a natural environment, they will appreciate it more and this will engender a sense of stewardship within their young minds. The academic content is also a priority, but the reason that outdoor education activities take place in natural environments is so that students will develop a connection and appreciation for the natural environment. With regards to action-based environmental education, the instructor takes the basic premise of outdoor education a step further. The goal is to not only appreciate the environment, but to actively engage in its protection and be involved in local environmental activism efforts. This pedagogical technique tends to be the most controversial one because it encourages students to take a stance on potentially controversial issues.

In order to effectively assess a program’s effectiveness, it is vital to analyze what it is trying to do. These different models came about due to different needs in different educational contexts. Outdoor education and action-based models came about because educators wanted to find a way to make environmental education more engaging for kinesthetic learners and more personally relevant to the lives of students. Traditional, classroom-based models have not been very engaging for middle school students. These other pedagogical methods have been created to help make environmental education more meaningful.

### Classroom Enrichment

 This model is the one that most closely mirrors the instruction that most students receive in K-12 schools. It was the first form of formal environmental education to be implemented within schools in Western Europe and the United States (Jensen, 1997; Ord, 2012). During the first incarnations of this pedagogical method, it was used to help make traditional classroom learning more engaging and connect textbook materials to real world issues. It features enrichment lessons that coincide with the standard school curriculum (Carelton-Hug, 2010). The advantage of this method is that it is relatively cheap to implement, requires little formal teacher instruction and often is not expensive to implement (Brody, 1996; Carelton-Hug, 2010). Instructor briefing for this style of instruction can often be done in a few hours and does not require extensive amounts of teacher training. This is beneficial because many school districts are underfunded and cannot afford more complex endeavors. It is a more cost-efficient way to bring potentially engaging content into classrooms in a relatively streamlined manner. The downside of this method is that it is not terribly engaging in terms of visuals or kinesthetics (Barney, 2005). This is an issue because the entire purpose of “non-traditional” pedagogical techniques is to find new ways to engage students that might not do well in traditional classrooms. A primary goal of many of these techniques is increasing student engagement in STEM classrooms. If the content is not engaging, it somewhat defeats the purpose of the entire lesson. This is especially problematic for younger learners who are often more drawn to visuals and hands-on activities (Brody, 1990; Gough, 2002; Holthius). Furthermore, it often is simply instruction that is not given with a specific take away. Students are given information about different environmental issues, but they do not necessarily know what to “do” with the information (Brody, 1990; Gough, 2002; Holthius). Furthermore, it takes place in a classroom, which detaches them from nature and can contribute to what has been theorized to be “nature deprivation syndrome” (Tomasso, 2021). This is an issue because many classrooms are unsuitable for student learning. Many students are kinesthetic learners and need hands-on environments and a “connection” to what they are learning (Tomasso, 2021). . The cramped quarters and artificial lights in traditional classrooms are insufficient for many of these students. In addition, many schools have cut or eliminated their physical education and recess programs. Therefore, these students do not get enough time outside. This could lead to what many scholars believe that nature deprivation syndrome is a serious issue for students in K-12 classrooms (Jensen, 1997; Ord, 2012). Therefore, it is crucial that K-12 teachers find a way to incorporate non-classroom learning environments into their curriculum. At the very least, instructors could try and find non-classroom environments (fields, outdoor areas) on the school property to try and add some variety and outside stimulation to their classes.

### Outdoor Education

 Outdoor education is a pedagogical method that utilizes outdoor environments as classrooms and implement hands-on activities to help teach students about local environmental issues (Carleton-Hug, 2010). Outdoor education usually takes place in an environment that is actively being studied by the class (Gough, 2002). For instance, a class might be studying wetlands or marine environments and visit a local wetland or beach in order to supplement their classroom education. Usually these visits are local, however some schools offer week-long trips to more remote destinations. If the destination is more remote, the students usually spend several weeks or an entire semester on the topic before visiting the destination (Carleton-Hug, 2010; Gough, 2002). Most outdoor education is coupled with classroom instruction before or after the educational excursion. The relationship between the pre-lessons, debriefing and the outdoor education activity itself is an important one because it is rare that an outdoor education lesson would take place in a K-12 school without some sort of pre- and post- lessons. However, there are some educational institutions known as forest schools that do offer outdoor education year-round (Brody, 1990; Gough, 2002; Holthius). However, forest schools tend to be limited in number and geared toward the early elementary school years.

Usually the activities that take place in an outdoor environment are meant to teach students about a specific theme related to that environment (Brody, 1996; Gough, 2002). An example would be that students are learning about estuaries and they take a field trip to a local estuary. Classroom activities include identifying local plants and animals, testing water quality and testing water salinity. The activities are directly related to the environment and provide students with a hands-on context through which they can understand the major themes of the lesson. Another way in which outdoor education can be implemented is by exploring a similar concept in multiple locations. Students could learn about pH in a classroom and go on to test the pH of a local river, the pH of a local lake and the pH of tap water. These lessons all take place at different locations, but they are meant to connect a similar concept in multiple locations. In this instance, the connection is to the environment as a whole rather than a specific location.

 There are several downsides associated with outdoor education and all of these must be taken into consideration when planning outdoor education lessons. The main downside of outdoor education is that is logistically complicated to plan an outdoor education (Tomasso, 2021). There are multiple steps involved. There are the pre and post lessons, the permission slips, the transportation to and from the location and the debriefing after the lesson. Furthermore, the outdoor lesson might involve additional support from paraprofessionals or parent chaperones.
 It can also be expensive because it sometimes requires supplies (Ardoin. 2018). The supplies issue could be as simple as outdoor gear (boots, jackets) for students or as complicated as microscopes. Therefore, there are class issues involved better-funded school districts are able to do these types of activities more easily (Ardoin,. 2018). There are busses, permission slips and logistical plans. Furthermore, classroom management is different in outdoor environments and sometimes requires more planning due to student energy levels. Some students might thrive in a less structured environment while others might struggle to focus and remain engaged. The other downside of outdoor education is that the energy and chaos of the excursion. There also is a chance that some of the main points of the lesson might be lost and students might only remember the fact that they got to be outside. Sometimes outdoor education can feel more like a field trip that an actual lesson. This is problematic because it means that the trip itself might not fulfill its educational purpose. Therefore, it is crucial that these lessons be planned with clear learning outcomes.

### Action-Based Outdoor Education

 One way in which instructors can narrow the purpose of their lessons is by making them action-based (Ord, 2012). Action-based outdoor education is outdoor education that is done for a specific purpose (Brody, 1996). An example would be an environmental project that restores a specific environment such as a wetland or a forest. It goes beyond a trip outdoors and instead attempts to educate students on an issue and get them personally involved in their community. Action-based outdoor education is the same as traditional outdoor education, but it features more explicit learning objectives. These more explicit learning objectives allow students to feel more connected to the world around them. Furthermore, it allows them to become more involved in their local communities. This differs drastically from traditional classroom education because traditional classroom education typically does not include any sort of community involvement.

# Study Overview

This study seeks to analyze the effectiveness of an environmental education summer program in Olympia, WA. The Puget Sound Estuarium summer camp is an environmental education summer program that seeks to teach students about the mechanics of the estuary and inspire students to take action with regards to estuary preservation. If the program is effective, students will be more engaged with local environmental issues and and more likely to take action to protect the local environment. This study utilizes participants from the elementary and middle school summer programs at the Puget Sound Estuarium. Before they begin an environmental education summer program, they are given a survey that assess their knowledge of environmental issues. After that, they participate in environmental education activities at the physical aquarium facility and out in the field. This study seeks to analyze the effectiveness of those activities in relation to environmental action amongst young people.

## Methodology

This study utilizes a quantitative survey with ten items that concern the environmentally-friendly behaviors of students. The students take a survey concerning their behaviors before the program and another one after completing the environmental education program. The items included questions such as “How familiar are you with environmental issues in Washington state?” and “Are you interested in participating in any campaigns (protests, social media postings, writing letters to related to environmental issues?. Participants responded to each item with a response from “1” to “5” with “1” being the least familiar or least likely to do the action and “5” with most familiar or most likely to do the action. The items were then analyzed with a paired t-test to determine if there was any growth amongst the participants. If the numerical value of each item increased, there was “growth” and that means that the participant learned something about environmental science and was inspired to do something to help the estuary.

# Study Design

This study was designed to help the Puget Sound Estuarium in Olympia, WA assess its environmental education programs and design more effective K-12 education programs. A quantitative survey was the medium of choice for this study because multiple choice questions are fairly easy to answer and can be put into a system in a fairly straightforward manner. The program participants are middle and elementary school students, therefore if the survey process is too complicated, the students are unlikely to participate in the process. Furthermore, some of the younger students might not be able to read and write very well yet. All elementary and middle school programs were given copies of the initial survey and the final one. The initial surveys were paired with the final ones and any outliers were eliminated in the process. “Outliers” consisted of surveys that were not clear to read and/or had an excessive amount of doodling on them and no clear answers to the questions that were being posed in the survey. This sort of behavior is common with younger elementary students.

In all of the summer programs, students receive their own personal clipboards and they receive both of the surveys on their clipboard. Therefore, it was able to remain anonymous while keeping the surveys together. Some of the program participants chose not to participate in the survey. There is no data with regards to who refused to participate in the survey due to the fact that the entire survey process is anonymous. However, due to the age groups that participate in these sorts of programs, this sort of behavior is fairly common.

 The data was initially recorded via the paper surveys that were given to the students. All of the legible groups of surveys were entered into an Excel spreadsheet and analyzed using statistics software. It was not double-checked or verified beyond ensuring that the data entered into the Excel sheet matched the data on the paper surveys. Since the surveys were anonymous, there is no way to verify the surveys beyond what is written on the paper. The data from these surveys was then entered into an Excel spreadsheet.

## Survey Overview

The before and after surveys that were administered are identical. The responses were itemized in the following manner 1-no idea, 2-a little familiar, 3-medium familiar 4- very familiar, 5-extremely familiar. The student participants would circle the item that most closely corresponded with their self-perception of their knowledge of the subject.

1. How familiar are you with environmental issues in Washington state?

1 2 3 4 5

No idea A little familiar Medium Familiar Very Familiar

The following questions are about things some people do. How interested are you in…

2. Picking up trash at the beach?

1 2 3 4 5

No idea A little familiar Medium Familiar Very Familiar

3. Tree planting?

1 2 3 4 5

No idea A little familiar Medium Familiar Very Familiar

4. Turning off the lights when you’re not using them?

1 2 3 4 5

No idea A little familiar Medium Familiar Very Familiar

5. Turning off the water when not using it?

1 2 3 4 5

No idea A little familiar Medium Familiar Very Familiar

6. Taking a bus, biking somewhere, or walking to a place instead of riding in a car?

1 2 3 4 5

No idea A little familiar Medium Familiar Very Familiar

7. Volunteering for events that involve conservation activities?

1 2 3 4 5

No idea A little familiar Medium Familiar Very Familiar

8. Recycling things like paper, plastic, glass and metals?

1 2 3 4 5

No idea A little familiar Medium Familiar Very Familiar

9. How interested are you in changing your lifestyle to assist in small scale environmental change?

1 2 3 4 5

No idea A little Interest Medium Interest Very Interested

10. Are you interested in participating in any campaigns (protests, social media postings, writing letters to related to environmental issues?

1 2 3 4 5

No idea A little Interest Medium Interest Very Interested

# Study Results

Fifty-one students participated in the survey. With regards to participation by group, the grade level with the most participation was the TOGETHER! 3rd to 5th grade level with sixteen participants. The group with the least number of participants was the 6th-8th grade fee-based group, which had nine participants. The average number of participants per group was twelve. The numerical survey results were analyzed using a pairwise t-test. The t-test was utilized to analyze all results from the before and after sections of the survey to see if there was any numerical growth in relation to the environmental education items that were put before them. A one-tail test was used to see if there was or was not a significant increase in student responses after the educational program. Analysis was conducted using R software and a Bonferroni correction was applied to account for the number of questions asked. A positive t-test result (upward numerical growth), defined as p < 0.05, indicated that the student learned something about environmental science and feels more committed to protecting the environment. A lack of correlation (not statistically significant result) indicates that there has been no growth in relation to the student’s knowledge of environmental science. A negative number indicates that the student is less confident with regards to his knowledge of environmental science. Growth between the two data sets is significant because it demonstrates that students and learning from these environmental education programs and they are worth the financial investment that is being put into them. Furthermore, it indicates that these programs should be expanded because they are contributing to the environmental education of young people in the community.

## Item-Based Results

With regards to item #1 (see Appendix A), t the results for all participants for item #1 are not quite statistically significant due to the p value being only 0.0920. For item #2,The two-tailed p-value is 0.0088 and this difference is considered to be very statistically significant. For item #3, the two-tailed p value equals 0.0054. This difference is considered to be statistically significant. For item #4, the two-tailed p value equals 0.0267. This value is considered to be statistically significant. For item #5, the two-tailed p value equals, 0.0345. This value is considered to be statistically significant. For item #6, the two-tailed p-value is 0.03667. This value is considered to be statistically significant. For item #7, the two-tailed p value is 0.02, which is not considered to be statistically significant. For item #8, the two-tailed p value is 0.01, which is generally not considered to be statistically significant. For item #9, the two-tailed p-value is 0.0051, which is generally considered to be statistically significant.

# Discussion

 According to Student’s t-test, the majority of the items were considered to be statistically significant.. This indicates that the program has most likely had at least some impact on the environmental consciousness of the young people that participated in the program. Items number 2, 3,4,5,6 and 9 all showed statistically significant change from the first survey to the second. Items number 1, 2, 7 and 8 did not show statistically significant change from the first to the second survey.

Table 1. Survey Results By Item

Survey Results By Item

|  |  |  |
| --- | --- | --- |
| **Item Prompt** | **p-value** | **Statistically Significant?** |
| 1. How familiar are you with environmental issues in Washington state? | 0.0920 | No  |
| 2. Picking up trash at the beach?  | 0.0088 | Yes |
| 3. Tree planting?  | 0.0054 | Yes |
| 4. Turning off the lights when you’re not using them?  | 0.0267 | Yes  |
| 5. Turning off the water when not using it?  | 0.0345 | Yes  |
| 6. Taking a bus, biking somewhere, or walking to a place instead of riding in a car?  | 0.03667 | Yes |
| 7. Volunteering for events that involve conservation activities?  | 0.02 | No |
| 8. Recycling things like paper, plastic, glass and metals?  | 0.01 | No |
| 9. Are you interested in participating in any campaigns (protests, social media postings, writing letters to related to environmental issues?  | 0.0051 | Yes |
| All Fee-Based Participants vs all TOGETHER! students  | 0.0038 | Yes |

*Note*. Table representing survey results by question. P-values are represented in the center column and statistical significance of responses is represented in the left column.

 The items that did not show any statistical change from the first to the second survey were the prompts “How familiar are you with environmental issues in Washington state?”, “Are you interested in volunteering for events that involve conservation?” and “Are you interested in recycling things like paper, plastic, glass and metals?”. The first one is predictable, because “environmental issues in Washington state” is a broad, abstract category that young students might feel intimidated by. They might have some knowledge of local environmental issues, but they might feel as though their knowledge is not broad or substantial enough. This survey demonstrates that if you ask children more specific questions (ones related to particular environmental issues) rather than broad ones, you are more likely to get accurate answers. Furthermore, it appears as though this concept also applies to engagement. Students are more likely to be engaged with issues that relate to specific items (items 2,3,4,5,6) rather than the broader environment as a whole (items 1 and 7). This is an important piece of data because it can be used to inform the creation of effective environmental education programs for young people. The one item that does not follow this pattern is the one that pertains to recycling, “Are you interested in recycling things like paper, plastic, glass and metals?” This one could be due to laziness or lack of access. As children, student participants do not have much control over whether or not the adults in their life choose to recycle. Their parents might not recycle, therefore they might copy the behavioral patterns of the adults in their lives. They might live in an apartment complex that does not have recycling and/or does not have a recycling bin near the unit that they live in. They also might feel intimidated by the process due to the fact that they might not know where to put the paper, plastic and glass in each bin if where they live has them separated.

 Furthermore, many Washington state K-8th grade schools do not have recycling bins in the classroom. This is especially true at many elementary schools in the lower grades. Therefore, they might not be interested in recycling due to the fact that the option is not a realistic one for them. With regards to recycling education, it should be a conjoined effort between environmental education programs, local schools, local apartments and local HOAs. Students cannot solve this issue by themselves and if more recycling options were readily available to them, they might be more likely to participate in the process. Schools and community organizations can also supplement these learning objectives by having lessons on recycling at the school if they do not already.

 Another item that did not receive any statistically significant positive growth on the student’s t-test was item number 7 “ Are you interested in volunteering for events that involve conservation activities?”. This question also pertains to access. As young children, these students are not able to drive or safely take the bus by themselves. Therefore, if their parents are not involved in environmental activism, they are unlikely to get involved on their own. This response might be more related to access than genuine desire due to the fact that students might not foresee a realistic way to attend such events.

## Limitations

 The primary limitation of this study is that it only measures a students’ desire to perform a certain action rather than the rate at which they actually perform them. It is possible that many students might participate in a program, leave feeling extremely inspired and never actually act on the feeling. In an ideal situation, there would be a third survey that measures student action in relation to the desire to perform the items in the first two surveys. This is an issue because environmental education programs tend to be extremely expensive to put on and most of the non-profit and governmental organizations that fund them want to see results from their investment. However, it is extremely difficult to track down former program participants and find out if they engaged in any long-term environmentally-friendly behaviors. Therefore, the only thing that program administrators can actually measure is desire and hope that desire is someday turned into action.

 Another item that would be useful to measure is the long-term prevalence of environmentally-friendly behaviors. Do students participate in a program, act in an environmentally-friendly manner for a period of time and slowly return to their old ways? Does program participation engender a lifelong commitment to environmentally-friendly behaviors that is carried out in action? Having more follow-up surveys that are given to participants over a period of five or ten years would be incredibly helpful for programs that fund and implement environmental education programs for young people. Many of these organizations focus on young people with the hope that an early environmental education will impact their behavior in the future. However, there is a dearth of data to actually support this assumption. More research needs to be conducted in relation to early exposure to environmental education programs and an individual’s environmentally-friendly behaviors in their late teens or early 20s.

# Conclusion

This study demonstrates that environmental education programs have an impact on elementary and middle school students’ perceptions of environmental issues and the role that they can play in the world around them. Education and inspiration are the first steps toward action, therefore it can be determined that these programs have at least somewhat of an impact on the environmental perceptions of middle and high school students. Therefore, they should be continued and expanded upon in K-8th grade learning environments. Based on the items presented in this survey, environmental education programs also appear to help students contextualize the broader concept of “environmental issues” within the realm of specific problems that they are more readily aware of. More research needs to be done in relation to the age at which individuals are first introduced to these concepts and their environmentally-friendly (or unfriendly) behaviors as adults. More research could also be done in relation to different environmental education programs and student learning styles. Perhaps the introduction of certain topics works best at certain ages (in terms of student retention). It is also possible that these programs would benefit from a curriculum analysis that looks into the different pedagogical methods that are employed and how they do or do not incorporate different learning styles. Regardless of all of these considerations, this study proves that environmental education programs do impact students with regards to making them think more critically about environmental issues and feel inspired to engage in environmentally-friendly actions.

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