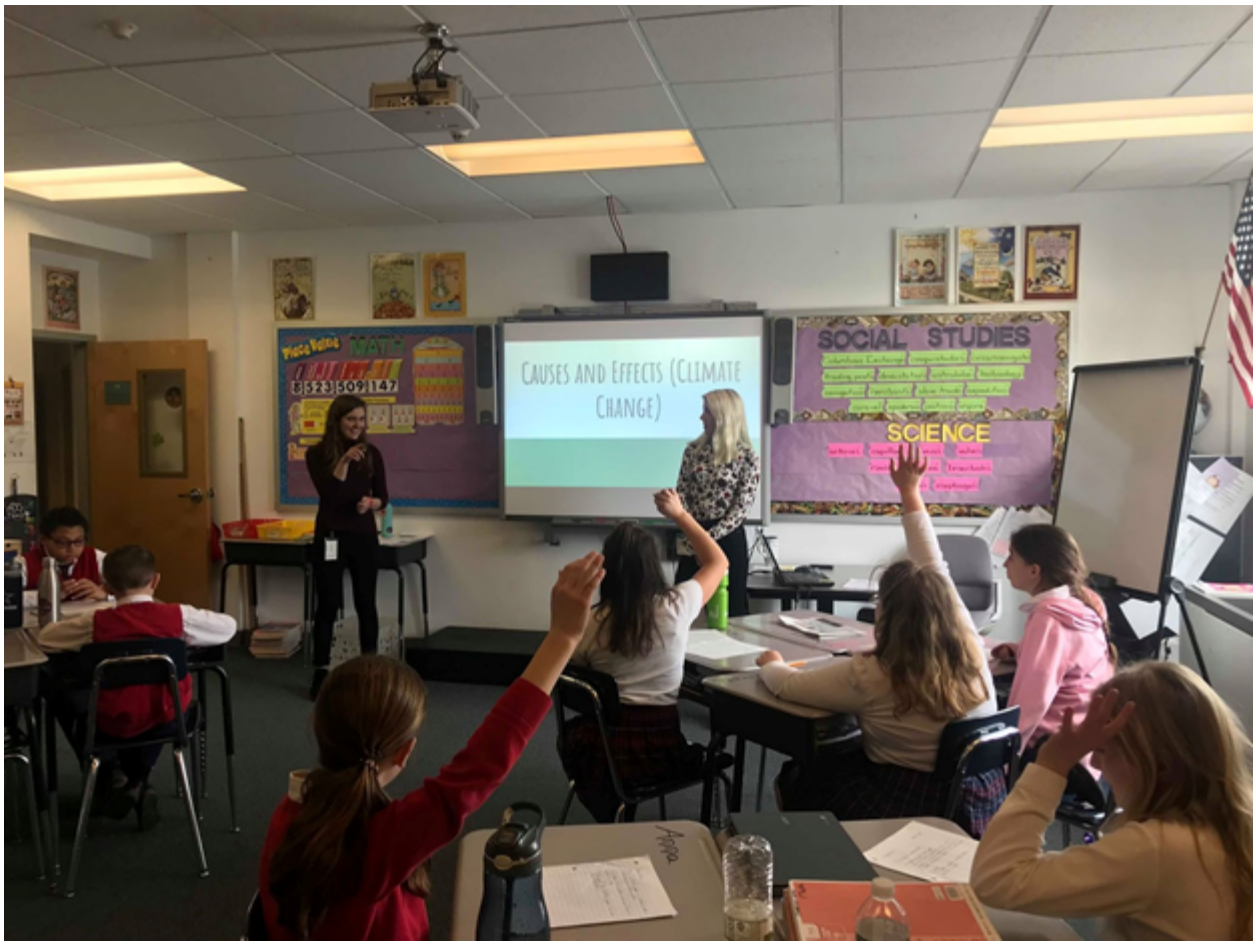
Climate Change Education with Catholic Ideals:

Measuring Knowledge, Attitudes and Behaviors



Bryn Sarner and Meaghan Long
Advisor: Dr. Andrew Schneller
Environmental Studies
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Abstract:

This research sought to bridge the gap between Catholicism and environmentalism. Three lessons were taught to a Catholic fifth grade class: environmental worldviews, the science behind climate change, and environmental empowerment and advocacy. In order to assess both environmental knowledge and attitudes, a pre and post-test were distributed to both the treatment and control groups. Through these test results, interviews, and focus groups, we found that there was a significant increase in knowledge while pro environmental attitudes only slightly improved. The qualitative findings include an increase in environmental issues awareness such as animal agriculture. During our interviews, we qualitatively assessed behavior change, which included an alteration in consumption patterns such as energy and water use, and animal product consumption. Our findings also highlighted that certain concepts were too advanced for the grade level taught. Our research is useful for better understanding environmental education incorporated with Catholic ideals.

Introduction with Literature Review:

78.2 million people or a quarter of the United States population identifies as Catholic (Georgetown University, 2017). Since about 2 million students in the U.S. attend private Catholic schools, it is imperative that educators find ways to incorporate meaningful environmental education advents into these private, religious settings (Georgetown University, 2017). Contemporary environmental education curriculum now includes efforts to address global climate change. The purpose of this research effort is to evaluate the outcomes of a 5th Grade environmental education curriculum designed to address climate change, while also incorporating Catholic messaging and morals. A secondary purpose of this research works to better understand the relationship of modern Catholicism to its role and responsibility towards addressing Climate Change…is personal pro-environmental behavior change possible using intersectional theology and environmental education? Along with efforts to curb our burgeoning global population, climate change is sometimes looked over within Catholic teaching, or seen as going directly against Catholic beliefs (Labrecque, 2015). By confronting that polarity, we hope to better understand if this dichotomy must exist. Catholic teachings and beliefs actually have proven fruitful for promoting pro-environmental values and behaviors. For instance, the teachings of Pope John Paul II that not only can environmentalism and Catholicism go hand in hand, but that they should. He is quoted reminding Catholics:

(To not) behave like dissident predators where nature is concerned, but to assume responsibility for it, taking all care so that everything stays healthy and integrated, so as to offer a welcoming and friendly environment even to those who succeed us (Pope John Paul II ,1990).

The pope made the point that:

As a friend of the poor who was loved by God's creatures, Saint Francis invited all of creation – animals, plants, natural forces, even Brother Sun and Sister Moon – to give honor and praise to

the Lord. The poor man of Assisi gives us striking witness that when we are at peace with God we are better able to devote ourselves to building up that peace with all creation which is inseparable from peace among all peoples (Pope John Paul II ,1990).

With this in mind our study works to answer the following questions:

- To what extent can Catholic teachings be incorporated into Environmental Education, resulting in increased pro-environmental behaviors?

- To what extent can environmental education with theological messages produce changes in environmental knowledge, attitudes and a greater interest in environmental issues?

- To what extent can theological environmental education surpass the *Stewardship* environmental worldview/interpretation of the Bible, and be useful in addressing action on climate change?

These questions can further be broken down into sub questions. For instance, to what extent can Catholicism lend itself to other environmental worldviews such as deep ecology or reform environmentalism. Traditionally, the culmination of environmentalism and Catholicism has been Stewardship. While Stewardship involves caring and looking out for the earth and those who inhabit it, it still heavily leans on anthropocentric ideology. Is it possible to shift from anthropocentrism to a more biocentric worldview, while still using Catholic teaching? Also, in reference to behavior change, what type of education would be most effective? Would the teachings of St. Francis be applicable to animals and the environment in terms of dietary choices changes and how this may work to mitigate climate change?

Contrary to popular belief, the Catholic Church has been actively involved in promoting environmentalism since the 1930's (Guth, et. al., 1995). As mentioned early, both environmentalism and Catholic identity within the United States have been constructed as to create an American environmental history that is free of Catholicism, and a Catholic history that is free of environmentalism (Guth, et. al., 1995). In the 1930's the Catholic church created their own "green revolution" philosophy, developed by the National Catholic Rural Life Conference.

This conference was developed by Edwin O'Hara (1881-1956), who was an Oregon activist and Catholic priest. O'Hara's research on American Catholicism lead him to find that American Catholics needed a rural philosophy that would bring them back to farmland and their natural landscapes (Guth, et. al., 1995). Beginning in 1991, the American Catholic bishops published "Renewing the Earth," a pastoral declaration on the environment. In 1993, the United States Catholic Conference established an official Environmental Justice Program, placing environmental issues at the forefront of Catholic's minds. The program was a product of the Department of Justice, Peace & Human Development. The program strives to educate and motivate Catholics to consider a deeper reverence for all of God's creations, including the natural world and environment (Environment/Environmental Justice Program, 2017). The Environmental Justice Program has provided over 150 small grants to environmentally friendly community organizations. The various projects have ranged from wetland restoration in coastal Louisiana, to large-scale educational retreats across country land. Although the EJP no longer funds grants, the program still strives to serve to model to communities how they can make an environmentally friends change (Guhin, 2006). Through these religious motions, Catholics were encouraged to begin to think about how their actions affected the environment and how they could integrate environmental ethics into religion (Hamlin & Mcgreevy, 2006).

However, these actions were met with discontent by many non-Catholics (Allitt, 1998). The first issue that arose was the issue of fundamental scientific disagreements pertaining to climate change, that went against what the church taught. Another issue that arose from this was the incompatibility of some of the beliefs that were embedded within environmentalism and Catholicism, such as evolution. The final challenge that arose, was the anti-anthropocentric view that environmentalism captured. Within this time-period of the early 1990's, Catholicism was

very focused on the protection of human life, while some environmentalists were arguing against the idea of a human-centric world, and promoting measures to limit human population growth (Allit, 1998).

Before the environmental progress Catholicism had made, mentioned above, the church faced great issues pertaining to the integration of the two. One of the issue that Catholicism faced while attempting to integrate environmentalism into its pedagogy, was the notion that Catholics were to be blamed for the environmental disaster that had unfolded. Many environmentalists, such as Lynn White, believed that Catholicism preached that God's message to people on earth was to subdue and have dominion over the natural world. The Catholic Church's opposition to contraceptives also sparked debate, as the population crisis unfolded and contributed to environmental degradation. Environmentalist best-seller, Paul Ehrlich, condemned Catholic disdain for contraceptives as a threat to the future of humanity, stating, "It takes a great deal of patience for a biologist familiar with the miseries of over-population to read through documents that represent the views of even 'enlightened' Catholics." Anti-Catholic rhetoric spread widely among the world, in response to the church's attempt at integration. In the 1960's in response to this backlash, Catholic's attention began to shift towards other issues including the fallout from Vatican Council II, the Civil Rights Movement, ecumenism, and the rise of Liberal Theology (Allitt, 1998).

As discussed above, Catholicism and environmentalism have been pitted against each other for decades. Within Catholicism, there is a stigma that follows it which propagates anti-environmental initiatives. Unfortunately, Roman Catholic efforts to incorporate environmentalism have been ignored, despite the progressive thinking that has occurred within

Catholicism. Catholic leaders such as Pope John Paul II and members of the U.S. National Conference of Catholic Bishops have widely been speaking out on the importance of the incorporation of Catholicism and environmentalism. The new international Catholic catechism heavily discusses environmental pollution, while Pope Francis has published an entire encyclical on the environment, Laudato Si' (Environment/Environmental Justice Program, 2017). Laudato Si' (Care for Our Common Home), is Pope Francis's outreach to "every person living on this planet" to help incorporate the Church and the world to recognize the environmental crisis we are facing (Hamlin & Mcgreevy, 2006). Within the Pope's encyclical he also specifically calls on global leaders to increase their efforts to reduce greenhouse gases. Pope Francis also states that unaddressed climate change will result in severe disruptions to both humans and ecosystems (Hope From the Pope, 2015). Finally, Pope Francis condemned eating endangered sea turtles in Mexico during Lent, proclaiming they fell under the category of meat and therefore, eating them should be evaded (Glatz, 2015). For Catholicism to successfully incorporate environmentalism into its teachings, the preconceived notion that Catholicism and environmentalism are fundamentally different, must be abolished.

Helping to end the discrepancy that is seen among Catholicism and environmentalism is the sole purpose of our study. Throughout our work, we are hoping to end the stigma that goes along with being Catholic, as well as being an environmentalist. Throughout the past several years, we have seen a drastic separation in political parties. As the right and left have both become more extreme in our country, individuals are either titled with the title of a "conservative with strong Christian values who don't believe in anthropogenic climate change" or a "liberal, atheist tree hugger". Throughout the governance of our current presidential cabinet, lines have also been blurred between church and state. We believe that the three pillars that encompass

Catholicism (stewardship/care for creation, the common good, and the poor) can also be found in the core of environmental ethics (Mizzoni, 2014). Our goal is to encourage environmental education that pairs Catholicism and biocentric ideals, in order to promote pro-environmental behaviors and attitudes towards mitigating climate change.

According to one study, when environmental awareness and responsibility are implemented into a Catholic & Environmental Curriculum, the conclusion found that only stewardship could be promoted (Ajali, Egbonyi, et.al, 2016).

Previous studies including, Carmichael, 2017, that have considered the intersectionality of Catholicism and Environmental Education have found that religious day camps and religious education programming serve as efficient avenues to implement environmental education. This study, however, was an exception to what typical Catholic education involves environmentally. Within the study it was noted that most Catholic education centers are not well equipped with environmental curriculum.

Several programs that integrate Catholic and environmental education have started in the last few years. Programs such as Camp Ondessonk which invite both Catholic and non-Catholic schools from the region to learn about the environment, show that there is a new demand for this type of education (ondessonk.com). The Pines Catholic Camp states that their program "[Their] experiential learning model is designed for upper elementary students to have hands-on activities in nature, and see God's glory in His creation" (thepines.org). Their environmental education includes principles of religion, science, math, language and history. Catholic Charities CYO Camp Environmental Education Programs offer education to 5-8th graders and fulfill next gen education standards. Campers can choose three, four and five-day experiences that "emphasize

the spiritual, social and academic development" of themselves (catholiccharitiessf.org, 2018). However, most of these programs are outdoor, camp, and environmental science based. While both our own curriculum and these other programs fulfill next generation education science standards, which seek to provide all students with an internationally benchmarked science education, there are differences. The programs mentioned previously do not focus on environmental or world view behavior change and do not take place as a part of formal curriculum in a classroom setting. Most only last for a short period of time, operating on a camp schedule and then conclude.

Furthermore, a report found on Environmental Education and Catholic Religious Education provided us with several useful findings that will be considered within our research. The report's findings are as follows:

#1 There are many more "informational resources" than educational resources considering the intersectionality of Catholicism and environmental education,

#2 Most excellent official Catholic statements on the environment have not been developed into educational curricula.

#3 Climate Change dominates the list of environmental issues addressed by curricula.

#4 Existing curricula use only a modest range of pedagogical methods.

#5 Existing curricula pay more attention to promoting individual behavior change than systemic change.

#6 Existing Catholic religious environmental education appears to focus more on the Bible, doctrine and theology, and less on liturgy, prayer and the sacraments (Greenfaith, 2012).

While designing our curriculum, these findings were considered. In Krebbs and Brew's study it was found that when science content is linked to religion it is easier to develop caring

and compassionate students (Krebbs, 2011) who abide by the principles of the Catholic faith (Brew, 2008). Similar findings were seen in *A Case Study in the Stewardship of Creation: Project-Based Learning and Catholic Social Teaching in a Climate Change Curriculum* by Peggy Riehl, Nicole Tuttle, Charlene Czerniak and Kevin Czajkowski, which looked at how they could make a school "greener" by implementing year round environmental curriculum. There curriculum focused on the seven themes (Life and Dignity of the Human Person, Call to Family, Community, and Participation, Rights and Responsibilities, Option for the Poor and Vulnerable, The Dignity of Work and the Rights of Workers, Solidarity and Care for God's Creation) of teaching about social responsibility in Catholicism and then related those themes to care and responsibility for the environment (Riehl, Tuttle, Czernick, Czajkowski, 2015).

Methods:

Population and Setting:

Treatment Group Setting:

The treatment group was comprised of students attending St.Mary's private school. St.Mary's is a small private Catholic school that has approximately 237 students from preschool to fifth grade. The school is located in the town of Ballston Spa, which has a population of about 5,459 residents. The median household income of individuals living in Ballston Spa is $37,173 and the demographic is primarily white with a small minority population (city-data.com, 2017).

Treatment Group:

The treatment group included roughly 11 students, with ages ranging from 8-10 in 5th grade. All students participating in the treatment group were students from St.Mary's School. St.Mary's charges an annual tuition of $4,800 for participating Catholics and $5,300 for nonparticipating Catholics. In terms of actual participation, four students were not allowed to participate in our study because their parents would not consent, which is 25% of the treatment group.

Control Group Setting:

Our treatment group was comprised of students from Saratoga Independent School (SIS). SIS campus is located in Lake Avenue along Route 29 in Saratoga Springs. The campus also includes 60 acres of wetlands along Route 29. SIS, founded in 1991, is a private elementary school for students from kindergarten to sixth grade. The annual tuition for SIS is roughly $13,400 (smsbspa.org, 2018).

Saratoga Springs, NY:

Saratoga Springs is a city located north of Albany in upstate New York. The city is 28.07 square miles with 947.3 people per square mile. The city is famous for its tourism industry, as well as its famous mineral springs, horse racetrack, and lively downtown shopping. The estimated median household income in Saratoga Springs is $67,303, with a population of 27,765. The demographics of Saratoga Springs are similar to Ballston Spa, with approximately 92.3% of the population being white, 3.2% Hispanic or Latino, 2.6% African American and 2% Asian (US Census Data, 2015).

Control Group:

The control group for our study was comprised of 20 students from Saratoga Independent School, located in Saratoga Springs, NY. The age of control students ranged from 8-10 in 5th grade.

Quantitative Data Collection and Analysis:

Our methods used purposive sampling. Throughout the study, we worked with a treatment group that consisted of Catholic students who attend St. Mary's elementary school located in Ballston Spa, New York. All of the students that are part of this research were taught an original environmental education curriculum and completed the pre/post environmental knowledge tests. Before we began our education program students completed pre-treatment knowledge tests to get a sense of the baseline knowledge of environmental education, and to determine if a statistical difference exists, at pre-program between control and treatment group knowledge and 2-MEV scores. Once we taught our curriculum to the students we then conducted post curriculum knowledge tests and post 2-MEV tests.

Bogner and Wiseman's Model of Ecological Values (2-MEV) was utilized to gauge changes in students' environmental attitudes (Bogner & Wiseman 2006). We chose to use the 2-MEV as, "the 2-MEV was specifically designed to tap the environmental values of children" (Schneller, Johnson, & Bogner, 2015, p.2). This is a validated tool used to assess students' preferences towards environmental preservation and environmental utilization. Students who show a preference towards environmental preservation have more of a biocentric perspective, "reflects conservation and protection of the environment" whereas students who lean more towards utilization have more of an anthropocentric view and, "reflect the utilization of natural resources" (Bogner & Wiseman 2006). We analyzed both MEV and pre/post knowledge tests using 1. Independent sample t-tests 2. Wilcoxon Signed rank test.

The 2-MEV was utilized by Johnson and Manoli (2008) to research environmental perception changes in a population of adolescents and found the 2-MEV to be credible and reliable (2008). The 2-MEV utilizes The Environment Questionnaire (TEQ) which consists of 16 statements graded on a Likert Scale from 1 to 5, 1 being strongly disagree and 5 being strongly 5. The 16 statements are broken down into five subcategories: intent of support, care with resources, enjoyment of nature, altering nature, and human dominance.

Qualitative Data Collection and Analysis:

One semi-structured interview was conducted with the teacher of the treatment group in April. This interview sought to get a better understanding of the environmental views and behaviors of students as well as how our lessons may have influenced the students. This interview was recorded with an iPhone followed by our transcription by hand.

Two student focus groups were conducted after the students were taught all of our lessons and completed the pre and post knowledge + 2-MEV tests. The purpose of the focus groups were to evaluate and critique the environmental education curriculum they received. During the focus group the students were asked several questions, similar to the types of interview questions the teacher was asked. This, along with photo documentation will be our form of personal trace analysis and evidence. Additionally, we conducted one parent focus group (n=2) that were also recorded using an iPhone and transcribed by hand. In order to analyze the interview data, we used coding for thematic trends, quote charts, and descriptive narratives. These interviews were recorded by a recording device followed by our transcription by hand.

In order analyze our data, we used representative quote charts, descriptive narratives, pre and post knowledge tests, the 2-MEV model, interview and focus group questions and coded transcriptions that used colors to highlight common themes and deviant cases.

Limitations:

Our research comes with limitations. In terms of our methods, there was a time restriction both when teaching and for our research as a whole. We were limited to the amount of time that St. Mary's allots for each class to be taught. For example, one class period was only 40 minutes long. We were also limited in the sense that all our data had to be collected in the span of two months. This means we were not able to document longitudinal effects of our curriculum. In terms of our research as a whole, we were limited because our research is a case study of St. Mary's elementary school and one particular class within that school. Our curriculum can only be used for other Catholic schools considering it is deeply intertwined with religious ideals which would not be allowed in a public school due to separation of church and state, and also

would not be applicable to other religious affiliated schools that were not Catholic. Although our curriculum can be applied to other Catholic schools, the results from other Catholic schools may vary considerably.

Results:

Environmental Knowledge:

Pre-Test

Upon grading our pre-tests and using an independent samples t-test on SPSS, we found that the difference between our treatment and control groups' pretests were statistically significant. Although, both groups had a low starting raw score, the treatment group was almost 50% lower than the control group on the knowledge portion of their pretests. Out of 22 possible points on the knowledge test, our treatment group received an average of 4.82 while our control group received an average of 8.1, causing the difference between our treatment and control group to be statistically significant (p value .007) (Addendum 7 for SPSS data).

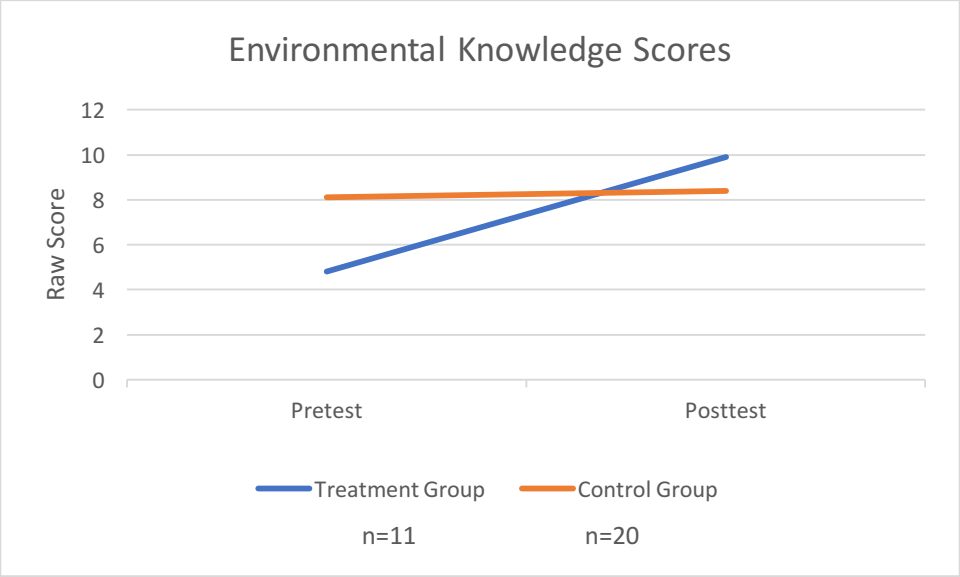
Upon further review of the questions, we found that 36% of St. Mary's students when being asked who can help fight climate change answered, "Nobody, climate change is happening naturally, and humans cannot stop it from getting worse" while 18% answered "only environmentalists". After reviewing the post test, every St. Mary student answered "everyone" to the question above, which is the correct response. When SIS students were asked how Catholicism could help fight climate change, 65% responded that they did not know and 25% answered that they did not specifically know what Catholicism was.

Post-Test

After running a Wilcoxon test on SPSS, we found that the treatment group more than doubled their environmental knowledge scores from 4.82 to 9.9 which is statistically significant

(p value .008). The control group showed no significant change in their post-tests increasing from 8.1 to 8.4 (p value .505) (See figure 1). We ran an independent samples t-test to assess the differentiation between the treatment and control group post-test and found that they were not statistically significant (p value .56). After being asked the same question of who can help fight climate change, every St. Mary student answered "everyone" to the question above, which is the correct response.

Figure 1: Post-test Environmental Knowledge Scores



2-MEV:

Pre-Test

At pre-test, both our treatment and control had a preservation average of 3.72. Our treatment group had a utilization average of 2.28, while our control had an average of 1.98. Upon running an independent samples t-test using SPSS, we found that neither the difference in preservation (p value .625) and utilization (p value .370) between the two schools were statistically significant (Addendum 7).

Post-Test

Using a Wilcoxon Signed Rank Test on SPSS, we compared the treatment group's pre-preservation score to their post-preservation score and found that there was barely a change in their score, increasing from 3.72 to 3.83 (P value .329). In terms of utilization, St Mary's also stayed about the same: 2.28 to 2.33 (P value .575). For the control group, they mostly stayed the same for both preservation and utilization, with a 3.72 to 3.92 (P value .044) statistically significant increase in preservation, and barely a change, 1.98 to 1.97 (P value .825), for utilization. Using an Independent Samples t-test, comparing the post preservation and utilization scores of the treatment vs. control group, the results were not statistically significant for preservation (p value .763), however they were statistically significant for utilization (p value .007) (Addendum 8).

Student Focus Groups:

Within the two student focus groups conducted (each comprised of 5 students), three themes became apparent: increased environmental issues awareness, altered consumption patterns, and concepts being too advanced for grade-level.

Table 1: Student Quote Chart

Increased Environmental Issues Awareness	**Changed Consumption Patterns**	**Advanced Concepts**
[It is important to] not cut down trees for roads even though we need them, because the environment is giving us oxygen	I'm going to start bringing my own bags to the grocery store and not using a lot of plastic bags	I thought the greenhouse [gases] were the least effective with me because it was sort of kind of boring
[I learned about] rising sea-levels, flooding and warmer winters	I started eating more plant-based food	Since devices give off greenhouse gasses [we should] stop using smart-boards
I would like to learn a little bit more about climate change and how that affects weather	I told my best friend not to let the water run when we're not filling up the water balloons	I didn't like the one [lesson] about worldviews, it was boring to me

Increased Environmental Issues Awareness:

A heightened environmental awareness was observed after focus groups with the students of St. Mary's School. An overall increase in care and concern for the environment's wellbeing was evident in some students within the focus groups. An example of this was seen in a student's comment, "I have been trying not to ride my bike on the grass and animals in the grass". This student expressed how after the curriculum, they recognized the intrinsic value within nature and how important it is to be aware of how human actions impact the environment. Additionally, other students mentioned how they now feel much more conscious of various environmental issues, as one student stated, "[I learned about about] rising sea-levels, flooding and warmer winters". Through another student's claim that they, "would like to learn more about climate change and how that affects weather", it is evident students were eager to learn more about climate change and the impacts of climate change on our atmosphere. Students mentioned that

although most of them had not yet taken actions to combat these environmental issues, they felt much more aware of the issues at hand. It was obvious that the environmental curriculum "planted a seed" of knowledge in these students, which provides them with the foundation to expand on their environmental knowledge.

Consumption Patterns:

In addition to increased environmental awareness, a change in student consumption patterns was also noted. While talking to the students, many mentioned small changes that they had begun to make in their consumption patterns at school and home. When asked about changes they had made, one student stated, "I told my mom that every time she eats a burger, it's like standing under the shower for two months straight,". The student discussed efforts they had made during the past several weeks to reduce their meat intake due to the negative environmental effects of meat. Several other students mentioned alternative changes in consumption patterns including taking shorter showers, turning lights off to save energy and using reusable bags. Students also discussed initiatives they took to teach their family and friends about changing their consumption patterns to embody a more environmentally friendly lifestyle. One student stated, "I told my best friend not to let the water run when we're not filling up water balloons." When asked about any changes in behavior, one student excitedly spoke up about their attempts to teach their younger siblings about the importance of turning off electronics when they are done using them. Additionally, another student discussed how they began using reusable grocery bags compared to plastic ones. All students mentioned how these behaviors were new and had resulted from what they learned through the environmental education curriculum.

Advanced Concepts:

During the focus groups conducted, many students talked about not understanding many of the concepts incorporated throughout the curriculum. Specifically, students talked about not understanding much of the terminology used within the presentations. When asked what terms were specifically hard to comprehend, one student stated, "the worldviews part was boring and hard to understand". The student mentioned not understanding many of the worldviews discussed in the first lesson, such as Anthropocentrism and Techno-Fix. Another student talked about their struggle to grasp the concept of the Greenhouse Gas Effect, stating, "it was too scientific and it talked about a lot of things I haven't learned yet". The second lesson's incorporation of the Greenhouse Gas Effect was brought up several other times during the focus groups, with many students expressing the challenges they had understanding the concept. Students also exhibited a lack of understanding of the complex relationship between their devices and greenhouse gases. For example, one student expressed that they "thought the greenhouse [gases] were the least effective with me because it was sort of kind of boring."

Finally, it was noted that students did not seem to have a strong grasp of the relationship between Catholicism and Environmentalism upon completing the curriculum. When asked about the relationship between the two, many students had nothing to say and expressed their confusion regarding the concept. The students' reluctance to discuss the relationship between the two, displayed a fundamental lack of understanding regarding the relationship between environmentalism and Catholicism.

Teacher Interview:

During the interview with Mrs.Tomita, it was concluded that the students did not fully grasp a majority of the content taught but were generally more aware of environmental issues.

When asked if students had shown any changes in pro-environmental behavior at school, Mrs.Tomita stated that, “they definitely seemed to be more aware of conserving resources, the students began reminding me to turn off the lights and the smartboard when we leave for lunch and recess,”. However, Mrs.Tomita also mentioned that students frequently expressed their confusion about many concepts discussed throughout the curriculum, resulting in their inability to fully cultivate a solid understanding of the course’s material. Mrs.Tomita specifically discussed the students’ struggles in understanding the conceptual framework behind the worldviews discussed in the first lesson. She also conveyed the students’ confusion regarding the science incorporated into the second lesson (specifically the Greenhouse Gas Effect and the difference between climate vs. weather). Mrs.Tomita expressed that she observed a heightened awareness in students, pertaining to environmental issues but did not believe they fully grasped a majority of the material presented. Mrs.Tomita suggested either teaching this curriculum to a higher grade-level (8th or 9th grade) or simplifying the material taught and presenting it in a more “kid-friendly” manner.

Parent Focus Group:

The parent interviews that were conducted yielded similar conclusions to those from the interview with Mrs. Tomita. Both parents in the parent focus groups reported having no recollection of having any discussions about the environment or climate change with their children at home. When asked if they had noticed any changes in environmental behavior in their children, one parent offered, “My child has always been very environmentally aware, but I didn’t notice any stark differences in his behavior towards the environment after completing your course”. The parent elaborated on this by stating that the student did not discuss or mention

anything about their environmental "action plans" or intentions to engage in further environmental activism.

Recommendations and Discussion:

As mentioned in our results, one major finding was a statistically significant increase in the treatment groups' knowledge scores. The students more than doubled their scores, however on average still failed the overall environmental knowledge test. This shows that they retained quite a bit of knowledge, but that the content was either too excessive or too advanced for them. Although the control group remained consistent throughout pre and post-tests, they started at a much higher raw score than the treatment group. This could be due to the level of prior environmental knowledge the two schools received. Saratoga Independent School is known for having a stronger environmental focus whereas St. Mary's School does not have any environmental courses. Therefore, our curriculum was their first academic exposure to environmental education. This could also be the reasoning behind the control group having a statistically significant increase in preservation scores and why there was a statistically significant difference in the post-test utilization scores between the treatment and control group.

As stated in our findings, if our curriculum was to be implemented again we would teach our lessons to higher grade levels, possibly 7th or 8th grade, due to the advanced concepts in our lessons. We would also increase the quantity of lessons (possibly 6 -10 lessons). If we had more time with the students and were able to spread these concepts out over more lessons, the concepts might have been easier to understand for the students.

While the infusion approach had some outcomes for doubling knowledge scores of the treatment group, students still got more than half of the questions wrong on the knowledge test. This leads us to believe the lessons could benefit from being more dynamic with more in-class

experiential components (vegetarian and vegan food tastings), utilizing hands-on devices that are solar powered (lights, chargers, toys, etc.), designing micro hydraulics in the classroom, or wind powered devices. There could have also been action components incorporated at school in an effort to share what they have learned with other classmates. This could include informational signage, environmental art/muralism, designing a compost bin, vegan food tastings for other students, working with the cafeteria to promote a meatless Monday, or any other local/sustainable food day for the cafeteria, organizing a community bike ride, doing a portable solar panel demonstration from a community member, and creating a display on campus about renewable energy or sustainable agricultural practices as just a few suggestions.

We also could have had students design their pro-environmental action plans at school and then again as homework with their parents, so as to undertake behaviors that everyone in their family knows what they are trying to accomplish. Another suggestion would be to have students sign a climate action plan pledge so that they formally commit to undertaking these new pro-environmental behaviors, possibly with a weekly checklist that they can "check off" to record and see how many times they undertook those behaviors and then report back to the class on their progress. This could be designed by the teacher or taken from one of the many preformatted pledges available online. Pledges like these, https://tinyurl.com/Environmental-Pledge , can be altered or redesigned to meet the needs/specifics of your lesson.

According to our secondary research found in our literature review, most Catholic, environmental education curricula has previously mostly taught in a religious day camp or religious education program setting (Carmichael, 2017). The curriculum also tended to focus more on individual behavior change than systematic change and only used a modest range of pedagogical methods (Greenfaith, 2012). Another study found that when environmental

awareness and responsibility were implemented into Catholic and environmental curriculum, they found that only stewardship could be promoted (Ajali, Egbonyi, et. al, 2016).

Our curriculum took Catholic, environmental integrative education out of a religious day camp or religious education program setting and brought it into a traditional classroom setting. Much like previous studies, we also mostly focused on individual behavior change, but did touch upon systematic change. We also only used a modest range of pedagogical methods. However, we were able to promote more than just the stewardship worldview; incorporating techno fix, anthropocentrism, and deep ecology.

Conclusion:

Through implementing and designing three environmental lesson plans with Catholic ideals, we were able to significantly increase the students' knowledge on the subject matter. These results were seen through the more than doubling of the students' post-test environmental knowledge scores and student focus groups. Although students more than doubled their knowledge scores they still failed the environmental knowledge test. Our results also showed no statistical significant change in the student's MEV scores. These test results support our finding that the concepts discussed in our lesson plans were above grade-level for the students taught. However, student focus groups revealed two main qualitative findings: increased environmental awareness and altered consumption patterns (ie. pro-environmental behaviors). Some limitations that we faced in our research included limited time in both the classroom and the duration of our research period. Additionally, the student's lack of prior environmental knowledge served as a significant obstacle within our research. Although it was feasible to integrate Catholic ideals into environmental education, we do not believe the inclusion of Catholicism in our teachings was the impetus of the students' behavioral changes. Due to time constraints, we have no way of

measuring a significant change in the students' worldviews, therefore it is difficult to assess if students' worldviews have shifted. Overall, there is much improvement needed for this curriculum to have a more profound effect on student environmental attitudes, behavior, and knowledge using Catholic ideals.

Addendum 1

Informed consent

SKIDMORE COLLEGE
INFORMED CONSENT FORM

Environmental Education Research
Parent Consent Form (Treatment Group)

1. **INTRODUCTION**

You and your child are invited to participate in a research study evaluating the impact of an environmental education program designed to educate students about the Hudson River ecosystems, pollution, endangered species, and history, and environmental behaviors. Your child was selected as a possible participant because he/she is a part of Laurie Tomita's classroom at St.Mary's School. We ask that you read this document and ask any questions you may have before agreeing to allow your child to participate. The study is being conducted by Dr. Andrew J. Schneller and students, Bryn Sarner and Meaghan Long, in the Skidmore College Environmental Studies and Sciences Program.

2. **BACKGROUND**

The purpose of this study is to examine how Catholicism and environmentalism can go hand in hand and affect student environmental knowledge and attitudes. During the lesson, students will learn about climate change and causes, as well as various environmental worldviews.

3. **DURATION**

Participation for your child in this study is expected to include three classes at St.Mary's, from January through March/April of 2018. This will include 2 written assessments (each lasting

approximately 30 minutes). The first assessment (pre-test) will be conducted in the beginning of January. One more assessment (post-test) and either one brief semi-structured interview or a focus group style interview will be completed following this curriculum in March/April of 2018.. The time participants will commit to completing assessments/interviews and participating in the program will total 4 hours.

Your participation in this study as a parent includes participation in a 15-minute semi-structured interview, if you so choose.

4. PROCEDURES

If you agree to allow your child to be in this study, we will ask them to do the following things: fill out 2 questionnaires about their environmental knowledge and attitudes (one in January 2018 and one in March/April 2018), and participate in a brief focus group style interview in March/April of 2018. Your student will participate in a Catholic environmental education curriculum that will focus on a variety of aspects related to climate change. If consent is not granted for the study, your student will still have the opportunity to participate in the curriculum, but will not participate in the pre or post-tests or focus groups. This course will be offered three times in Laurie Tomita's classroom, on the school grounds of St.Mary's.

If you agree to be part of the interview we will ask you questions about your student's involvement in the curriculum, and their interest in environmental education, environmental initiatives, and any other outcomes that you may have noticed as a result of their participation in the semester-long integrative Catholic environmental education curriculum.

5. RISKS/BENEFITS

This study has no perceived risks.

The benefits of participation are: environmental education, with Catholic components and potential increase in student environmental knowledge and attitudes. Increased knowledge about the causes of climate change and various environmental worldviews will be gained.

6. CONFIDENTIALITY

The records of this study will be kept private. You and your child's name will not be stored on any forms or digital files that are kept with data collected for this study. Student paper questionnaires (pre and post-tests) will only be identified by ID numbers. All digital interviews and focus group recordings will be stored on a secured server. All digital recordings will be transcribed onto a Word document, also stored on a secured server. Any paper surveys from minors will be identified by keeping a key of ID#s during data collection that will be stored in a locked cabinet and kept separate from all other study data. This key is only used during data collection to insure that all assessment instruments are accurately coded. All copies of the key, both paper and electronic will be destroyed or deleted from all sources at the conclusion of data collection and after data analysis. Participant's names (for minors) will not be attached to any responses; pseudonyms will be assigned for all publication purposes. All digital recordings and

transcriptions will be destroyed after a manuscript has been accepted for publication in a peer reviewed academic journal. The only individuals who have access to these data files are Professor Schneller and his students, Bryn Sarner and Meaghan Long. In any publication or presentation, we will not include any information that will make it possible to identify you or your child.

7. VOLUNTARY NATURE OF THE STUDY

Your decision whether or not to participate, or to allow your child to participate will not affect your current or future relations with Skidmore College, St.Mary's, or any of their representatives. If you and your child decide to participate in this study, both of you are free to withdraw from the study at any time without affecting those relationships.

8. CONTACTS AND QUESTIONS

The researcher(s) conducting this study are Andrew Schneller, Meaghan Long and Bryn Sarner. You may ask any questions you have right now. If you have questions later, you may contact the researchers at aschnell@skidmore.edu or 518.580.8192 (office) or 619.333.9087 (cell).

If you have questions or concerns regarding this study and would like to speak with someone other than the researcher(s), you may contact Mary Hoehn, Institutional Review Board Chair, Skidmore College, 815 N. Broadway, Saratoga Springs, NY 12866, phone 518-580-8052, e-mail mhoehn@skidmore.edu or Dr. Robert Turner, Environmental Studies Program Director, Skidmore College, 815 N. Broadway, Saratoga Springs, NY 12866, phone, 518-580-5251, email bturner@skidmore.edu. Or email Laurie Tomita, your child's teacher at St.Mary's, at ltomita@smsbspa.org.

9. STATEMENT OF CONSENT

You will be given a copy of this form to keep for your records.

The procedures of this study have been explained to me and my questions have been addressed. The information that I provide is confidential and will be used for research purposes only. I understand that my participation is voluntary and that I may withdraw anytime without penalty. If I have any concerns about my experience in this study (e.g., that I was treated unfairly or felt threatened), I may contact the Chair of the Institutional Review Board or the Chair of the sponsoring department of this research regarding my concerns.

As parent or legal guardian, I authorize _____ (child's name) to become a participant in the research study described in this form.
As parent or legal guardian, I authorize _____ (child's name) to be audiotaped during either the semi-structured interview or focus group.
Parent/Guardian Signature
_____ Date_____
==========

As a Parent participant, I consent to be interviewed and have provided my phone number or email:

Signature_____Date_____

Phone number or email_____

As a Parent participant, I consenting to be audiotaped during the semi-structured interview.

Signature_____Date_____

==========

Signature of Person Obtaining Consent

Signature_____Date_____

SKIDMORE COLLEGE
CHILD ASSENT FORM (Treatment Group)

Environmental Education Research

We are doing a study to evaluate environmental education that you will be completing as part of Ms.Tomita's classroom. We are asking you to participate to help us learn more about environmental education. Your classmates have also been invited to participate in this study.

Your parent has agreed for you to be in this study. If you agree to be in our study, we are going to ask you to complete 2 brief questionnaires at 2 different time-points during class, in January and March/April. These questionnaires will take 30 minutes to complete. You will also participate in a short focus group in March/April that will take about 20 minutes.

You can ask questions about the study at any time. If you decide at any time not to finish, you can stop.

The questions we will ask are only about climate change, Catholicism and the environment - you will not receive a grade on this assignment. Your name will not be attached to your questionnaires. This means that your information will be kept private.

If you sign this paper it means that you have read this and you want to be part of our study and learn about climate change, Catholicism and the environment. If you don't want to be in the study, don't sign this paper. Being in the study is up to you and nobody will be upset if you don't sign this paper or if you change your mind later. What you decide won't make any difference to your grades in school.

Participant signature

_____ **Date**_____

Signature of Person Obtaining Assent

_____ Date_____

Name of Child: _____ Parental Permission on File: ¨ Yes ¨ No

(If "No," do not proceed with assent or research procedures.)

SKIDMORE COLLEGE
INFORMED CONSENT FORM FOR PARENTS

Environmental Education Research
Parent Consent Form (Control Group)

1. INTRODUCTION

Your child is invited to participate in a control group for a research study evaluating the impact of an environmental education program at St.Mary's school, designed to educate students about climate change and environmentalism. Your child was selected as a possible control group participant because they are a part of Jeny Randall's classroom at SIS, but is NOT a part of this specific environmental education project. We ask that you read this document and ask any questions you may have before agreeing to allow your child to participate. The study is being conducted by Dr. Andrew J. Schneller and students, Bryn Sarner and Meaghan Long, in the Skidmore College Environmental Studies and Sciences Program.

2. BACKGROUND

The purpose of this study is to examine how Catholicism and environmentalism can go hand in hand and affect student environmental knowledge and attitudes. During the lesson, students will learn about climate change and causes, as well as various environmental worldviews. Your child and their classmates will serve as the control group for the study, as they will not be participating in this curriculum. The control group simply provides us with comparison data, and will enable us to determine how our environmental education lessons impact student environmental knowledge and attitudes.

3. DURATION

Your child will complete 2 written assessments (each lasting approximately 30 minutes). These written assessments measure student environmental knowledge and attitudes. Assessments will take place in-class, in January and March/April 2018.

4. PROCEDURES

If you agree to allow your child to be in this study, we will ask them to do the following things: fill out questionnaires about their environmental knowledge and attitudes, on two occasions (January 2018 & March/April 2018).

5. RISKS/BENEFITS

This study has no perceived risks. In order to show our gratitude, students in this control group will receive a pizza party at school for their voluntary participation in our research project.

6. CONFIDENTIALITY

The records of this study will be kept private. Your child's name and the name of the school will not be stored on any forms that are kept with data collected for this study. All electronic files will be saved with an ID number (and not your child's name) and stored on a secure server. The only individuals who have access to these data files are Professor Schneller and his students, Bryn Sarner and Meaghan Long. In any publication or presentation, we will not include any information that will make it possible to identify your child. Questionnaires will only be identified by ID numbers. We will keep a key of names and ID#s during data collection that will be stored in a locked cabinet and kept separate from all other study data. This key is only used during data collection to insure that all assessment instruments are accurately coded. All copies of the key, both paper and electronic, will be destroyed or deleted from all sources at the conclusion of data collection and before data analysis.

7. VOLUNTARY NATURE OF THE STUDY

Your decision whether or not to allow your child to participate will not affect your current or future relations with Skidmore College, SIS, or any of their representatives. If you decide to allow your child to participate in this study, they are free to withdraw from the study at any time without affecting those relationships. If your child will not be participating in this study they can still enjoy the pizza party.

8. CONTACTS AND QUESTIONS

The researcher(s) conducting this study are Andrew Schneller, Meaghan Long and Bryn Sarner. You may ask any questions you have right now. If you have questions later, you may contact the researchers at aschnell@skidmore.edu or 518.580.8192 (office) or 619.333.9087 (cell).

If you have questions or concerns regarding this study and would like to speak with someone other than the researcher(s), you may contact Mary Hoehn, Institutional Review Board Chair, Skidmore College, 815 N. Broadway, Saratoga Springs, NY 12866, phone 518-580-8052, e-mail mhoehn@skidmore.edu or Dr. Robert Turner, Environmental Studies Program Director, Skidmore College, 815 N. Broadway, Saratoga Springs, NY 12866, phone, 518-580-5251, email bturner@skidmore.edu, or email Jeny Randall at jrandall@siskids.org.

9. STATEMENT OF CONSENT

You will be given a copy of this form to keep for your records.

The procedures of this study have been explained to me and my questions have been addressed. The information that I provide is confidential and will be used for research purposes only. I understand that participation is voluntary and that I may withdraw my student at any time without penalty. If I have any concerns about my experience in this study (e.g., that anyone was treated unfairly or felt threatened), I may contact the Chair of the Institutional Review Board or the Chair of the sponsoring department of this research regarding my concerns.

As parent or legal guardian, I authorize _____ (child's name) to become a participant in the research study described in this form.

Parent/Guardian Signature

_____ Date_____

Signature of Person Obtaining Consent

_____Date_____

SKIDMORE COLLEGE
CHILD ASSENT FORM (Control Group)

Environmental Education Research

We are doing a study to evaluate environmental education. We are asking you to participate to help us learn more about environmental education. Your classmates have also been invited to participate in this study.

Your parent has agreed for you to be in this study. If you agree to be in our study, we are going to ask you to complete some brief questionnaires at 2 different time-points during class, in January and March/April. These questionnaires will take 30 minutes to complete.

You can ask questions about the study at any time. If you decide at any time not to finish, you can stop.

The questions we will ask are about climate change - you will not receive a grade on this assignment. Your name will not be attached to your questionnaires. This means that your information will be kept private.

If you sign this paper it means that you have read this and you want to be part of our study. If you don't want to be in the study, don't sign this paper. Being in the study is up to you and nobody will be upset if you don't sign this paper or if you change your mind later. What you decide won't make any difference to your grades in school. Skidmore College students will be throwing your class a pizza party for your voluntary participation. All students in your class will be invited to the pizza party, even if they decide not to participate in our study.

Participant signature

_____ **Date**_____

Signature of Person Obtaining Assent

_____ **__Date**_____

Name of Child: _____ Parental Permission on File: ¨ Yes ¨ No
If "No," do not proceed with assent or research procedures.)

SKIDMORE COLLEGE
INFORMED CONSENT FORM

Environmental Education Research
Teacher Consent Form

1. INTRODUCTION

You are invited to participate in a research study evaluating the community and student impact of an integrative Catholic environmental education program designed to educate 5th Grade students about climate change and various environmental worldviews. You were selected as a possible participant because of your connection to St.Mary's School being taught in Laurie Tomita's classroom at Saratoga Independent School. We ask that you read this document and ask any questions you may have before agreeing to participate. The study is being conducted by Dr. Andrew J. Schneller and students Bryn Sarner and Meaghan Long in the Skidmore College Environmental Studies and Sciences Program.

2. BACKGROUND

The purpose of this study is to examine how Catholicism and environmentalism can go hand in hand and affect student environmental knowledge and attitudes. During the lesson, students will learn about climate change and causes, as well as various environmental worldviews. The purpose of this research is to contribute to the sparse body of peer reviewed educational research that works to better understand the multiplicity of outcomes of theology-based environmental education.

3. DURATION

Your participation in this study is expected to include one semi-structured interview in March/April of 2018. This 15-minute semi-structured interview will include questions about student behavior changes pertaining to our curriculum, as well as any previously incorporated environmental content in your teaching.

4. PROCEDURES

If you agree to be in this study, we will ask you to do the following things: Meet with us at St.Mary's, or local library, park, or café, where we will discuss the curriculum. We will use a digital voice recorder to record this semi-structured interview. The course in question will be offered through the months of January-March/April in Laurie Tomita's classroom, on the school grounds of St.Marys. We will ask you questions about your involvement in the curriculum and any outcomes you may have noticed of participation, for you personally or for your students.

5. RISKS/BENEFITS

This study has no perceived risks.

The benefits of participation are: you will be helping to document outcomes of theology-based environmental education in Ballston Spa.

6. CONFIDENTIALITY

The records of this study will be kept private. If you consent, we will assign you a participant ID number. If you also consent to your name and affiliation being used for publication purposes, your name will also be stored on forms that are kept with data collected for this study. All electronic files will be saved with your ID number and/or name, and stored on a secure server. The only individuals who have access to these data files are Professor Schneller and his students, Bryn Sarner and Meaghan Long. In any publication or presentation, we will not include information that will make it possible to identify you unless you have provided your consent at the end of this document. We will keep data in a locked cabinet. All paper transcriptions and electronic recordings will be destroyed or deleted from all sources at the conclusion of data collection, after analysis.

7. VOLUNTARY NATURE OF THE STUDY

Your decision whether or not to participate, will not affect your current or future relations with Skidmore College, St.Mary's School, or any of their representatives. If you decide to participate in this study, you are free to withdraw from the study at any time without affecting those relationships.

8. CONTACTS AND QUESTIONS

The researcher(s) conducting this study are Andrew Schneller, Bryn Sarner and Meaghan Long. You may ask any questions you have right now. If you have questions later, you may

contact the researchers at aschnell@skidmore.edu or 518.580.8192 (work) or 619.333.9087 (cell)

If you have questions or concerns regarding this study and would like to speak with someone other than the researcher(s), you may contact Mary Hoehn, Institutional Review Board Chair, Skidmore College, 815 N. Broadway, Saratoga Springs, NY 12866, phone 518-580-8052, e-mail mhoehn@skidmore.edu or Dr. Robert Turner, Environmental Studies Program Director, Skidmore College, 815 N. Broadway, Saratoga Springs, NY 12866, phone, 518-580-5251, email bturner@skidmore.edu.

9. STATEMENT OF CONSENT

You will be given a copy of this form to keep for your records.

The procedures of this study have been explained to me and my questions have been addressed. The information that I provide is confidential and will be used for research purposes only. I understand that my participation is voluntary and that I may withdraw anytime without penalty. If I have any concerns about my experience in this study (e.g., that I was treated unfairly or felt threatened), I may contact the Chair of the Institutional Review Board or the Chair of the sponsoring department of this research regarding my concerns.

I consent to be interviewed:

Participant Signature_____Date_____

I consent to be audiotaped during the interview:

Participant Signature_____Date_____

I consent to have my name and affiliation used in a future publication or presentations:

Participant Signature_____Date_____

Signature of Person Obtaining Consent

_____Date _____

Addendum 2
Environmental knowledge questionnaire

Part I: Circle the best answer to the following questions

1. Deep Ecology is defined as...
a. The study of trees and plants
b. An environmental philosophy that regards human life as just one of many equal components of an ecosystem.
c. A philosophy that regards humans as more important than any other form of life in an ecosystem
d. A philosophy that suggests technology will be able to solve climate change

2. You can recycle everything except...
a. Plastic
b. Food scraps
c. Paper
d. Glass

3. What are the three most common Greenhouse Gases?
a. Carbon Dioxide, Methane and Oxygen
b. Hydrogen, Carbon Dioxide and Oxygen
c. Methane, Carbon Dioxide and Nitrous Oxide
d. Oxygen, Methane and Barium

4. The leading cause of climate change is…
a. Littering

b. Transportation
c. Animal Agriculture
d. Landfills

5. Pope Francis wrote a book about climate change called...
a. God's Green Earth
b. St. Francis and environmentalism
c. How to Stop Climate Change
d. On Care for our Common Home

6. What is the name of the lifestyle choice that excludes all animal products (eating meat, dairy, eggs and honey)
a. Vegan
b. Vegetarianism
c. Paleo
d. Gluten-free

7. Who can help fight climate change?
a. Only adults
b. Only environmentalists
c. Only students
d. Everyone

8. Why is environmental activism important for everyone to be apart of?
a. Effects of climate change will impact all forms of life
b. Humans do not own the environment
c. Not everyone has been taught about climate change, although all should understand it and know what to do to fight climate change
d. All of the above.

9. One pound of beef requires the same amount of water to produce as it would take to run the shower for how long?
a. 2 months
b. 3 weeks
c. 1 year
d. 2 days

10. In what ways are we experiencing effects of climate change today?
a. Flooding
b. Irregular weather (Warmer winters/ Colder Summers)
c. Natural Disasters
d. All of the above

11. Out of these four options, which one is the most effective in fighting climate change?
1. Recycling
2. Composting

3. **Reducing meat and dairy consumption**
4. **Using public transportation**

Part II: Short Answer:

12. Your parent asks you to come to the grocery store with them. During this shopping trip, what are three things you can do to help fight climate change?

13. Name different ways in which climate change affects A. Humans B. Animals and C. Non-living organisms.

14. Name five different actions that you can take today to effectively combat climate change.

15. Name one way in which you can raise awareness about climate change in your community, at school and at home.

16. What are the three R's of sustainable waste management? What is the most important "R" of the three?

17. How can Catholicism be related to environmental advocacy?

18. Read and interpret the following Bible verse…
Look at the birds of the air: they neither sow nor reap nor gather into barns, and yet your heavenly Father feeds them. Are you not of more value than they?

How can this Bible verse be related to environmentalism or any topics we have discussed in class?

19. Out of all of the environmental worldviews discussed in class, which one (ones) do you identify with strongest and why? (Deep Ecology, Stewardship, Reform Environmentalism, Ecofeminism, Techno-fix)

20. If you were stuck in an elevator with someone and only had 30 seconds to convince them to do something good for the environment, what would you tell them? Why?

Addendum 3

The Model of Ecological Values - Environment Questionnaire – arranged by Model of Ecological Values factors, each item will have a likert scale attached (1-5)

"I Very much agree" "I agree" "I'm not sure" "I disagree" "I totally disagree"

Preservation

Intent of support

If I ever have extra money, I will give some to help protect nature.
I would help raise money to protect nature.
I try to tell others that nature is important.

Care with resources

To save energy in the winter, I make sure the heat in my room is not on too high.
I always turn off the light when I do not need it anymore.
I try to save water by taking shorter showers or by turning off the water when I brush my teeth.

Enjoyment of nature

I would really enjoy sitting at the edge of a pond watching dragonflies in flight.
I really like to be able to go on trips into the countryside – for example to forests or fields.
I feel good in the silence of nature.

Utilization

Altering nature

People have the right to change the environment (nature).
I like a grass lawn more than a place where flowers grow on their own.
To feed people, nature must be cleared to grow food.
Weeds should be killed because they take up space from plants we need.

Human dominance

Building new roads is so important that trees should be cut down.

Because mosquitoes live in marshes and swamps, it would be better to drain these and use them for farming.
People are supposed to rule over the rest of nature.

Addendum 4
Student Focus Group Questions

1. Can you explain to me which classroom lesson or experience you thought was the most meaningful for you? (specific lesson, activity, discussion of an issue).

2. To what extent to you feel you have a better understanding of the link between Catholicism and Climate Change?

3. Do you have plans to implement your environmental action plans?

4. Do you think you'd like to participate in more environmental activities in the future? Or maybe you're not interested in doing more…

5. Have you taught any of your friends or family members anything about environmental issues and ways to fix them?

6. Can you explain to me which classroom lesson or experience you thought was the least meaningful for you? (specific lesson, discussion, activity).

7. Are there any environmental issues that you really care about as a result of taking the class us?

8. Have you tried to tell any of your friends or family members about these environmental issues?

9. Have you changed any of your environmental behaviors since taking the class with us?...maybe things you do differently at home or at school?

10. Have you tried to get your friends of family members to change any of their environmental behaviors?

Addendum 5

Parent Focus Group Questions

1. Has your child expressed any increased interest in relation to the environment/nature?

2. Has your child taught you or any family members or friends anything about
a. Climate change?

2. Has your child shown any increased interest or understanding of
a. environmental issues?

3. Has your child taught you or any family members or friends anything about
a. environmental issues/climate change?

4. In relation to the environmental action component of the class...to what extent did their
5. formed action plans instigate any conversation related to combating climate change.

6. Do you feel your child will remain interested in environmental
a. issues?

7. Have you noticed any behavior changes in your child regarding their relationship with nature?

Addendum 6
Teacher Interview Questions

1. Does your school have any required environmental education in any of the classes offered?
a. If so, what types of lessons are taught?

2. To what extent do you think that your students understand how to apply environmental issues to their own community, as a result of our lessons or environmental action plan? For instance, how have they demonstrated it or changed their behaviors?

3. Have any of your students shown an increased interest in combating climate change as a result of taking our class?

4. To what extent do you think that students realized the link between climate change and Catholicism? If yes, what was the conversation about, or how did they demonstrate this understanding?

5. Have your students shown an increased interest or understanding about environmental issues, broadly, as a result of our lessons?

6. Have our lessons started any conversations related to Catholicism and climate change?

Addendum 7
Independent and paired sample t tests:
Student Preservation Pre-Test:

T-Test

[DataSet1]

Group Statistics

	VAR00002	N	Mean	Std. Deviation	Std. Error Mean
VAR00001	St. Marys	11	3.7164	.56303	.16976
	SIS	20	3.7195	.71479	.15983

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
VAR00001	Equal variances assumed	.244	.625	-.013	29	.990	-.00314	.25014	-.51474	.50847
	Equal variances not assumed			-.013	25.175	.989	-.00314	.23316	-.48318	.47690

Student Utilization Pre-Test:

➔ **T-Test**

Group Statistics

	VAR00002	N	Mean	Std. Deviation	Std. Error Mean
VAR00001	St. Marys	11	2.2755	.49579	.14949
	SIS	20	1.9775	.60663	.13565

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
VAR00001	Equal variances assumed	.830	.370	1.390	29	.175	.29795	.21428	-.14030	.73621
	Equal variances not assumed			1.476	24.504	.153	.29795	.20186	-.11820	.71411

Student Knowledge Pre-Test:

➔ **T-Test**

Group Statistics

	VAR00002	N	Mean	Std. Deviation	Std. Error Mean
VAR00001	St. Marys	11	4.8182	2.35874	.71119
	SIS	20	8.1000	3.98880	.89192

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
VAR00001	Equal variances assumed	2.304	.140	-2.489	29	.019	-3.28182	1.31878	-5.97903	-.58460
	Equal variances not assumed			-2.877	28.755	.007	-3.28182	1.14075	-5.61578	-.94786

Addendum 8:

Wilcoxon Signed Rank Test

(St. Mary's- Treatment Group):

NPar Tests

[DataSet1]

Descriptive Statistics

	N	Mean	Std. Deviation	Minimum	Maximum
Pre	11	4.818	2.3587	2.0	9.0
Post	10	9.900	3.2128	4.0	15.0

Wilcoxon Signed Ranks Test

Ranks

		N	Mean Rank	Sum of Ranks
Post - Pre	Negative Ranks	1[a]	1.50	1.50
	Positive Ranks	9[b]	5.94	53.50
	Ties	0[c]		
	Total	10		

a. Post < Pre

b. Post > Pre

c. Post = Pre

Test Statistics[a]

	Post - Pre
Z	-2.655[b]
Asymp. Sig. (2-tailed)	.008

a. Wilcoxon Signed Ranks Test

b. Based on negative ranks.

Wilcoxon Signed Rank Test (Saratoga Independent School- Control Group):

NPar Tests

Descriptive Statistics

	N	Mean	Std. Deviation	Minimum	Maximum
Pre	20	8.100	3.9888	1.0	15.0
Post	20	8.400	3.8852	.0	16.0

Wilcoxon Signed Ranks Test

Ranks

		N	Mean Rank	Sum of Ranks
Post - Pre	Negative Ranks	7[a]	8.93	62.50
	Positive Ranks	10[b]	9.05	90.50
	Ties	3[c]		
	Total	20		

a. Post < Pre

b. Post > Pre

c. Post = Pre

Test Statistics[a]

	Post - Pre
Z	-.667[b]
Asymp. Sig. (2-tailed)	.505

a. Wilcoxon Signed Ranks Test

b. Based on negative ranks.

Wilcoxon Signed Rank Test for MEV Preservation Scores (St. Mary's- Treatment Group):

NPar Tests

Descriptive Statistics

	N	Mean	Std. Deviation	Minimum	Maximum
PrePres	11	3.7164	.56303	2.80	4.60
PostPres	10	3.8260	.63818	3.10	4.90

Wilcoxon Signed Ranks Test

Ranks

		N	Mean Rank	Sum of Ranks
PostPres - PrePres	Negative Ranks	4[a]	4.50	18.00
	Positive Ranks	6[b]	6.17	37.00
	Ties	0[c]		
	Total	10		

a. PostPres < PrePres

b. PostPres > PrePres

c. PostPres = PrePres

Test Statistics[a]

	PostPres - PrePres
Z	-.975[b]
Asymp. Sig. (2-tailed)	.329

a. Wilcoxon Signed Ranks Test

b. Based on negative ranks.

Wilcoxon Signed Rank Test for MEV for Utilization Scores (St. Mary's- Treatment Group):

NPar Tests

Descriptive Statistics

	N	Mean	Std. Deviation	Minimum	Maximum
PreUti	11	2.2755	.49579	1.57	3.29
PostUti	10	2.3320	.35367	1.57	2.71

Wilcoxon Signed Ranks Test

Ranks

		N	Mean Rank	Sum of Ranks
PostUti - PreUti	Negative Ranks	3[a]	7.33	22.00
	Positive Ranks	7[b]	4.71	33.00
	Ties	0[c]		
	Total	10		

a. PostUti < PreUti

b. PostUti > PreUti

c. PostUti = PreUti

Test Statistics[a]

	PostUti - PreUti
Z	-.561[b]
Asymp. Sig. (2-tailed)	.575

a. Wilcoxon Signed Ranks Test

b. Based on negative ranks.

Wilcoxon Signed Ranks Test for MEV for Preservation (Saratoga Independent School- Control Group):

NPar Tests

Descriptive Statistics

	N	Mean	Std. Deviation	Minimum	Maximum
PrePres	20	3.7195	.71479	2.22	5.00
PostPres	20	3.9195	.67585	2.67	5.00

Wilcoxon Signed Ranks Test

Ranks

		N	Mean Rank	Sum of Ranks
PostPres - PrePres	Negative Ranks	5[a]	4.90	24.50
	Positive Ranks	10[b]	9.55	95.50
	Ties	5[c]		
	Total	20		

a. PostPres < PrePres

b. PostPres > PrePres

c. PostPres = PrePres

Test Statistics[a]

	PostPres - PrePres
Z	-2.018[b]
Asymp. Sig. (2-tailed)	.044

a. Wilcoxon Signed Ranks Test

b. Based on negative ranks.

Wilcoxon Signed Ranks Test for MEV for Utilization Scores (Saratoga Independent School-Control group):

NPar Tests

Descriptive Statistics

	N	Mean	Std. Deviation	Minimum	Maximum
PreUti	20	1.9775	.60663	1.10	3.14
PostUti	20	1.9710	.68059	1.00	3.14

Wilcoxon Signed Ranks Test

Ranks

		N	Mean Rank	Sum of Ranks
PostUti - PreUti	Negative Ranks	10[a]	10.05	100.50
	Positive Ranks	9[b]	9.94	89.50
	Ties	1[c]		
	Total	20		

a. PostUti < PreUti

b. PostUti > PreUti

c. PostUti = PreUti

Test Statistics[a]

	PostUti - PreUti
Z	-.221[b]
Asymp. Sig. (2-tailed)	.825

a. Wilcoxon Signed Ranks Test

b. Based on positive ranks.

Addendum 9

Paired Sample T-tests (Post Tests)

Knowledge:

T-Test

Group Statistics

	SIS	N	Mean	Std. Deviation	Std. Error Mean
StMarys	StMarys	10	9.9000	3.21282	1.01598
	SIS	20	8.4000	3.88519	.86876

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
StMarys	Equal variances assumed	.349	.560	1.052	28	.302	1.50000	1.42622	-1.42148	4.42148
	Equal variances not assumed			1.122	21.522	.274	1.50000	1.33677	-1.27587	4.27587

Preservation:

T-Test

Group Statistics

	group	N	Mean	Std. Deviation	Std. Error Mean
StMarys	StMarys	10	3.8260	.63818	.20181
	SIS	20	3.9195	.67585	.15112

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
StMarys	Equal variances assumed	.093	.763	-.364	28	.719	-.09350	.25716	-.62026	.43326
	Equal variances not assumed			-.371	19.082	.715	-.09350	.25212	-.62105	.43405

Utilization:

T-Test

Group Statistics

	group	N	Mean	Std. Deviation	Std. Error Mean
StMarys	StMarys	10	2.3320	.35367	.11184
	SIS	20	1.9710	.68059	.15218

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
StMarys	Equal variances assumed	8.596	.007	1.565	28	.129	.36100	.23060	-.11137	.83337
	Equal variances not assumed			1.911	27.891	.066	.36100	.18886	-.02593	.74793

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