

## Executive Summary

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### **Project Summary**

Programs that engage middle school students in participatory, real-world, and hands-on field-based instruction can be powerful educational experiences for students, motivating and inspiring some to appreciate and value school in deeper ways. Residential, field-based science programs have a unique opportunity to support students by creating experiences where they can participate in learning in vastly different ways from what they may engage with in the

traditional 4-walled classroom, while concurrently developing a relationship with the natural world. Decreasing education budgets and increased need to substantiate educational programs in terms of their impact on student outcomes has added pressure for residential environmental science programs to validate their impact through quantitative means. This study explores the ways that attendance at an overnight environmental education program impacted students' school attendance to better understand if and how the program addresses state and school district goals and educational policy reform targets.

## **Background**

For many environmental programs, qualitative data serves as a foundation for understanding their impact, and more recently programs are including evaluative structures to document their educational and social impacts on students. This evidence has often provided valuable feedback to the specific program; however, challenges exist to speak broadly about how environmental education programs translate to success in schools. Furthermore, much research to date has been limited to small sample sizes. Consequently, researchers in this study chose to document the impact of the Multnomah Education Service District Outdoor School program quantitatively to address this gap in environmental education research while seeking to validate the program impact through statistical means.

This research inquires: Do residential science programs have a positive impact on students' school attendance? If so, where are the largest gains? Additionally, does the impact of these programs differ depending on a student's economic, ethnic, and/or racial characteristics? If so, how? Understanding how residential science programs impact students will provide validation for the program implementation within the traditional school setting, inform school districts and other residential science programs of the benefits to student achievement and success indicators, and provide valuable data to drive program improvement.

## **Methods and Data Analysis**

Using existing secondary data gathered by school districts and the residential outdoor school program we compiled a large data set of 29,112 students from four school districts in the Portland metropolitan area who participated in the MESD Outdoor School program for various durations during the 2006-2012 school years. We utilized two different sources of secondary student data: the residential outdoor school program attendance records, and school district data. The attendance records provided by the residential outdoor school program documented school attended in sixth grade, sixth grade teacher, student name, program site attended, and dates attended. This data was coded to operationalize it for use in the SPSS statistical software. The second source of existing data were student test scores in math and science, attendance rates, incidents of referrals, suspensions, and cumulative credits earned and graduation data for the four districts within our study whose sixth grade students attended the outdoor school program. These two data sets were merged and student identifiers were stripped, ultimately resulting in 17,032 students for the analyses (see demographic breakdown in Table 1).

Table 1  
Sixth Grade Student Demographic Based on Year they Attended the Outdoor School Program

	2008-2009 (n = 4,183)		2009-2010 (n = 4,253)		2010-2011 (n = 4,276)		2011-2012 (n = 4,320)		Total (n = 17,032)	
	n	%	n	%	n	%	n	%	n	%
<b>Gender</b>										
Male	2,074	49.6	2,140	50.3	2,160	50.5	2,158	50.0	8,532	50.1
Female	2,109	50.4	2,113	49.7	2,116	49.5	2,162	50.0	8,500	49.9
<b>Ethnicity/Race</b>										
Asian	513	12.3	429	10.6	437	10.8	496	12.2	1,875	11.5
Black	538	13.0	525	12.9	522	12.9	465	11.5	2,050	12.6
Hispanic	790	19.0	497	12.2	407	10.1	432	10.7	2,126	13
Native American	85	2.0	57	1.4	55	1.4	47	1.2	244	1.5
White	2,228	53.6	2,557	62.9	2,612	64.8	2,614	64.5	10,011	61.4
Special Education	703	16.8	698	16.4	628	14.7	658	15.2	2,687	15.8
English Language Learner	627	15.0	574	13.5	486	11.4	401	9.3	2,088	12.3
<b>First Language</b>										
English	2,744	72.0	2,680	71.7	3,116	74.4	3,123	74.1	11,663	73.1
Spanish	574	15.10	577	15.4	586	14	621	14.7	2,358	14.8
Vietnamese	144	3.8	136	3.6	136	3.2	172	4.1	588	3.7
Russian	76	2.0	83	2.2	86	2.1	82	1.9	327	2.0
All other Languages	271	7.1	264	7.1	264	6.3	214	5.1	1,013	6.4
<b>School District</b>										
David Douglas	654	15.6	628	14.8	664	15.5	673	15.6	2,619	15.4
Parkrose	226	5.4	218	5.1	239	5.6	233	5.4	916	5.4
Portland Public	2,582	61.7	2,721	64	2,697	63.1	2,750	63.7	10,750	63.1
Reynolds	721	17.2	686	16.1	676	15.8	664	15.4	2,747	16.1

We utilized multiple regression statistical tests to illustrate relationships between the independent and dependent variables across multiple years (2008-2012). For our first set of analyses completed at this time, the dependent variable was change in attendance rate between 5<sup>th</sup> and 7<sup>th</sup> grades. Changes in attendance between 5<sup>th</sup> and 7<sup>th</sup> grade was chosen to investigate anecdotal evidence from participating teachers that attending Outdoor School in the fall builds classroom community, leading to stronger connections between students and school, which in turn promotes positive behaviors such as increased school attendance. The specific research question was to investigate whether the attendance rate of students in 5<sup>th</sup> grade varied significantly from their 7<sup>th</sup> grade attendance rates, and whether there were any differences based on other demographic factors. Our independent variables were whether students attended in the fall or the spring, gender, ethnicity/race, special education, English language learner, student's first language, and their RIT score on the Oaks Math test. Each of the variables were delineated in conjunction with students' attendance rate change from 5<sup>th</sup> to 7<sup>th</sup> grade. By citing different projections of attendance, we could make inferences as to the impact of student's 6<sup>th</sup> grade year as a factor influencing attendance.

## Findings and Discussion

Our initial inquiry into the impact of the MESD Outdoor School program on student's attendance appears to support the assumption and anecdotal reports from teachers that the Outdoor School program supports positive changes in attendance. Although causality between participating in a residential outdoor educational program and changes in a student's attendance rate cannot be claimed, we did find patterns of statistically significant results for certain variables across the years of study. Furthermore, other statistically different findings were related to decreased program duration during certain years.

Overall, we found positive, statistically significant changes in attendance rates between 5<sup>th</sup> and 7<sup>th</sup> grades for all students included in the study, from 2008-2012. Specifically, some findings of note include:

- Students who attended Outdoor School in the fall had a statistically significant increase in attendance rates between 5<sup>th</sup> and 7<sup>th</sup> grades when compared with students who attended in the spring.
- Male students had a statistically significant increase in attendance rates between 5<sup>th</sup> and 7<sup>th</sup> grades when compared with female students.
- Students whose first language was Spanish had a statistically significant increase in attendance rates between 5<sup>th</sup> and 7<sup>th</sup> grades when compared with students whose first language is English.
- Asian students had a statistically significant increase in attendance rates between 5<sup>th</sup> and 7<sup>th</sup> grades when compared with White students.

As we differentiate the students by year, which makes the program duration variable relevant, we notice some interesting trends in the statistically significant results. In 2008-2009, all of the students in all four districts attended the MESD Outdoor School program for the 5-night program. In 2009-2010, districts began making cuts, resulting in 21% of the students attending a 2-night program and the remaining 79% of students still participating in the 5-day program. During the 2010-2011 school year, students in our study participated in either a 5-night program (79%) or a 3-night program (21%). During the 2011-2012 school year, all of the students in our study attended for either a 3-night (95%) or 4-night (5%) program.

We have included some of the key findings from this set of analyses below with discussion about the potential significance for policy and practice, as well as identifying new questions these findings have raised.

#### *Fall vs. Spring Attendance*

- In 2008-2009, when all students attended a 5-day program, we found a positive and statistically significant difference in attendance rates between students who attended in the Fall vs. the Spring session.
- This finding did not bear out in 2009-2010 when 21% of students participated in a 2-day program; however,
- There was a statistically significant difference in 2010-2011 when the shortest duration was 3 days and the majority of students attended the full 5 days (79%).
- In 2011-2012 when nearly all students attended three days, no statistically significant differences were found.

These findings support our hypothesis and years of qualitative data and anecdotal evidence that the duration of the program matters. Numerous teachers and Outdoor School Educators have witnessed and described a process where many students, particularly inner city kids who may be unfamiliar and even resistant to being outdoors have a transformational experience around the 3<sup>rd</sup> or 4<sup>th</sup> day.

#### *Racial Differences and Achievement Gap Implications*

Although more analyses are still in progress, several key findings point to differences in Outdoor School experiences between different racial and ethnic groups. Some of the most significant results include:

- In 2008-2009 (5-day duration), changes in attendance rates for African American students were positive and statistically significant when compared to White students. This difference was not found to be statistically significant in any other year.
- Asian students showed a statistically significant, positive increase in attendance for the overall study (2008-2012), and in the 2008-2009 school year when compared with White students.
- In 2009-2010, students whose first language is Spanish showed a statistically significant, positive change in attendance rates, as they did in the overall data (2008-2012). This difference was not statistically significant any other year.
- In 2011-2012, there were no statistically significant changes in attendance rates.

Although these findings raise additional questions (such as comparing 2009-2010 attendance rates among students whose first language is Spanish based on whether they attended a 2-day or 5-day program), they are quite important in regards to equity in education. Students from the non-dominant culture have been historically underserved in schools, facing opportunity gaps that lead to disparities in academic success. Furthermore, these same students have been greatly underrepresented in Science, Technology, Engineering, and Math (STEM) fields, fields that desperately need a more diverse pool of innovators and problem solvers.

## **Conclusions**

Overall, our research supports the assumption that students who attend the Outdoor School program have a positive increase in attendance, particularly for certain groups of students. This research also documents a unique phenomenon where students who attended the residential outdoor science program in the fall had a more positive impact on their attendance rates than those students who attended in the spring. We believe this is in part because the teachers can solidify their classroom community and build relationships with their students while at Outdoor School and they are able to draw from the learning experience throughout the year. Additionally, this research draws attention to the variations in significant results based on program duration. Taken together, the overall findings and gradually decreasing occurrence of statistically significant results as more schools attended for shorter durations supports the claim that Outdoor School promotes increases in school attendance rates.

Although further investigation over time will provide a richer story, we feel the findings to date need to be shared and are quite significant for educational policy and funding decisions. School attendance has been identified by the state and local districts as a key indicator of academic success; therefore, programs that are shown to increase attendance rates, particularly at this critical period of adolescent development, should be fully supported, expanded in reach, and continually evaluated and improved.

## *Lessons Learned*

During the research project a few key learning opportunities arose for our team to navigate and should be considered for future research endeavors.

- Time commitment: Our biggest learning occurred when managing the data and working with districts to utilize their resources for data compiling. It took 16 months from our initial contact with school district for approval of the research to receive the data so we could begin data analysis, and at that point, it took significant time to further code and process the data so it was useable in SPSS.
- Raising more questions: As with any good research project, more questions have emerged than answers. However, related to our first lesson, conducting longitudinal research of this depth and breadth takes a considerable amount of time and expertise. We hope to find ways to analyze the data to its fullest potential, but our current resources have expired.
- Inconsistencies within the data: Only after receiving the data from the schools were we alerted to the inconsistencies among the years of data available and variations in district data reporting practices. Although we cannot change this reality for the years of study, it does point to the need for clear data collection and reporting protocols across the state if similar large-scale, long-term research projects are planned.

#### *Recommendations for next steps*

While this research illuminates some interesting phenomenon regarding the change in attendance and behavior for students who have attended the Outdoor School program, the research has generated many more questions that we seek to investigate further. Time and coordination with larger efforts across the state, would garner a more thorough understanding of how the Outdoor School program impacts students.

If additional research support becomes available, possible suggestions for further research include:

- Examining how attendance in Outdoor School impacts incidences of student disciplinary actions (behavior) and student achievement scores, and how these vary among groups and with different durations of the program. These analyses could be continued with the existing data set.
- Investigating the impacts on graduation and achievement among high school student leaders; and
- Comparing groups of students across the state to investigate potential differences in student outcomes between students that have attended an Outdoor School program compared with those who have not.

This initial research has only begun to scratch the surface of the demonstrated impacts of the Outdoor School program, the possibilities for further research have enormous potential. Additionally, it speaks to the need for research, practice, and assessment to be embedded within the Outdoor School program to establish a consistent procedure for gathering and assessing data to communicate program goals.