IMPACTS OF OUTDOOR LESSONS TO ENHANCE STUDENT ACHIEVEMENT, MOTIVATION AND ENGAGEMENT

by

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A professional paper submitted in partial fulfillment of the requirements for the degree of

of

Masters of Science

in

Science Education

MONTANA STATE UNIVERSITY
Bozeman, Montana

July 2018
DEDICATION

This paper is dedicated to my family, especially my wife, without their support and guidance I may have never been able to complete this project. Also to my parents who have supported me through my youth and adulthood, always being there for me when I needed it. It is also dedicated to all those that love to learn outdoors and find it to be a more engaging space.
ACKNOWLEDGEMENT

This paper could not have occurred without the help of my adviser, Kate Solberg, without her help I would have been lost. Dave Willey, my science reader, was part of my inspiration for the paper. His love for educating us outside and the impact it had on me was a real driver of why I chose to study the topic. Of course, Diana Paterson, for her unwavering commitment to my graduation, even when I was apprehensive. Sherri Fairbanks, a dear friend and colleague, helped more than she knows and contributed greatly to my ability to stay focused. Finally, to all my MSSE Colleagues past, present, and future, but especially those in the completion year of 2018.
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ABSTRACT

During high school students are commonly developing and forming who they will be as adults. Often, this time in their lives takes focus while their academic careers take a back seat. Unfortunately for some, especially where my Action Research project took place, many students will not further their education. This study investigated the potential effects that learning outdoors might have on student motivation engagement, and achievement. The content I presented in the Outdoor classroom format was not different from the science content they would have learned in the classroom, rather, it represented a change of scenery (i.e., learning environment) and a more experiential classroom approach. Throughout the study, students had two labs which occurred outdoors rather than indoors, and over the course of my study the students had six days outdoors out of eighteen total class days (i.e., 33%). Results suggest that student engagement, motivation and performance did improve slightly in the outdoor classroom, yet the more significant change was observed in the students’ perception of those measured variables.
INTRODUCTION AND BACKGROUND

Background and Demographics

This study took place in an exurb in north central Massachusetts. The town is representative of many in the region, where people once thrived on an economy built on manufacturing that has since left. The town has a well-developed town center, with neighborhoods, and some business, though there are several vacant commercial buildings. This is now where many students live and have the ability to walk to school from home. This is a fairly developed area, but just outside of town there are large tracts of undeveloped, yet fragmented forests and pasture.

I came to the school in 2008 as a chemistry teacher, three years later found me teaching seventh and eighth grade science and finally three year ago I moved back to the high school to teach environmental science and biology. This tour throughout our middle and high schools gave me a unique and comprehensive view of student engagement, motivation and performance in science for the last six years in the district. The school is small and located in a forested setting with farm-fields nearby. The area around the school is perfect for engaging in outdoor investigations and encouraging students to actively experience the academic material while learning it, rather than becoming a passive observer. I find in my classroom, students often disengage at a certain point in the year, regardless of the variety of subjects and assignments; however often when I have taken a class outside, it seemed to have had a positive impact on them. Without going
outside students often seem lulled into passive learning from the day-in day-out monotony of the traditional classroom setting.

**Purpose and Implications of Study**

After teaching at the school for 10 years and noticing the trends of complacency with poor performance, non-engagement and active non-engagement, I realized that I needed to approach teaching and planning with a different focus. In discussion with colleagues, the analogy to feeling like an entertainer rather than a teacher has often been mentioned. Over the past 10 years, there have been many professional development opportunities that have been in theory good ideas and practice, but when implemented have fallen short of making noticeable impacts on student performance. Students have been consistently unimpressed with traditional lessons, and even well designed, rigorous lessons with differentiation and assessment options have failed to motivate and engage students to perform to their potential. These individual and collective observations have unearthed insight into the failed attempts to activate students to perform. It must be said that our school does have a National Honor Society Charter and in the last three years we have sent two students to Harvard, indicating that there are high achievers in the school. However, despite the success of some, the majority of students at the school do not work to their potential. It should also be said that in education today, engaging students is difficult enough with the unfiltered opportunity for instant gratification within the technology that we cannot seem to control. High student achievement often seems to be the result of a short specific list of factors; good off campus supports, an intrinsic desire for success, natural talent, and intuitive interest. These factors can work in isolation or in
tandem, but students that lack them often seem unreachable even with all the “tricks of the trade” pedagogically.

To compound the issues of a lack engagement and motivation, our students move through the building throughout the day with no chances of getting outside. The difficulties in getting outside are as follows, but not limited to; the schedule, school layout and poor past practice. Living in the snow-belt, this is not a problem in the winter, but during fall and spring, students have been observed looking out the windows frequently. All of our classrooms have a full wall of windows, so when it is nice outside, it is very obvious. The setting of the school campus is excellent for science educators, especially those of us that have an environmental/life science curriculum. The campus is surrounded by woods on one-side, and behind the woodlands are hayfields. On the school grounds and vicinity there is also a small stream and a vernal pool. The area contains a diversity of habitats that have the potential to provide excellent experiential opportunities for having students outside, learning in the environment, rather than learning about the environment.

Focus Questions

Questions to focus this study were formed around the idea that outdoor education could be an effective tool in encouraging students to find enjoyment in science while they learn the content. The first and driving question was: What is the impact of outdoor education on student engagement, motivation, and performance? My sub-question was; How do students perceive indoor lessons compared with outdoor lessons in terms of engagement, motivation and performance?
In addition, two other questions proposed by Jason George (2012) in his MSSE capstone *Science Outside the Box,* were questions that I wanted to address in my Action Research Project (AR):

- Whether or not consistent exposure to the outdoors can be incorporated into the classroom on a daily basis?
- How will this action research project affect the way I teach outdoor science in the future?

**CONCEPTUAL FRAMEWORK**

In science education, traditional methods of instruction have long been regarded as necessary, but not the most effective way for getting students engaged and motivated. Methods such as lecture, reading articles, and documentaries do have a place in the science classroom, but they are relied upon too strongly by many science educators throughout the country, including myself. It is clear that in order for an outdoor program to be successful it must be built as an extension to the classroom, not as a unique experience (Howie, 1974).

Being an environmental educator, I have been outside with students many times and have noticed a particular change in my students for lessons that occur outside as compared to indoor lessons. This led me to a recurrent question that is asked in environmental education: Is an outdoor education program better than an indoor program (Lewis, 1981)? Even my own students have supported the claim, with previous students stating, “We learn better, are happier, and more engaged outside.” This is a comment I hear throughout the year and in all levels, from Advanced Placement
Environmental Science students (juniors and seniors) to College Prep Biology students (freshman).

Outdoor education is nothing new to our field and has a rich history in being a part of certain public programs. It was initially used in 1890-1911 as way for the government to begin to prepare boys for the demands of war (Georgakis, 2010). During this time, citizens were beginning to move from the country to the city and outdoor skills were beginning to see a decline. Officials were worried that future soldiers would be at a disadvantage not having had as much experience in the outdoors where they would be stationed for battle. Later, through 1939-1960, school camping was used as a tool for the National Fitness Council as a means of physical education. During this entire time there was a consistent undertone of using the school camping experience to address, “concerns of, negative impact of urbanization depriving them of connections to the countryside” (Georgakis, 2010). Due to the lack of recognition and increasing focus on performance of academic subjects the opportunity for outdoor education began to dwindle and it appears that outdoor education has disappeared from the educational landscape. Although the trend of urbanization has only seemed to increase from the 1960s to now, the amount of time spent on outdoor education has not, in fact is has decreased significantly.

In rural areas, populations have been on the decline for years as urban populations have increased, for example, in 1950, the US had 64% of the population living in cities while 36% of people lived in rural areas. In 40 years the population shifted to 75.2% urban and 24.8% rural (US Census Bureau, 1993). During this time the total US population also grew from 151,300,00 to 248,700,00 (US Census Bureau, 1993). Just
these population changes alone could force a major shift in educational services and goals. There were demographic changes experienced throughout the nation as the wealthy and poor moved as well. Outdoor education was lost to budgetary constraints and the increased workload of teachers. Although outdoor education was used historically in education the many developments this country underwent caused these programs to disappear (Georgakis, 2010).

Unfortunately, this development meant a loss of outdoor education to other subjects. It should also be noted that environmental education was relatively non-existent during these years. The rise in environmental awareness caused by the publication of several books, most notably *Silent Spring* by Rachel Carson in 1962, gave educators a new subject to teach. Environmental education entered into the education system during a time when instructional strategies were teacher centered and in an environment where teachers taught and students learned. Although this may have been effective, I suspect there were many teachable moments lost to the tradition of teaching from lecture and other teacher centered, indoor methods.

The teaching environment has come a long way since the 1960s, but I have found that there are still areas to approve upon. In current times, teachers are facing another tough challenge in education in the form of technology. Technology use has become a challenge due to the wide range of applications and the copious amounts of technology students have access to, however, I find the larger problem is student reliance on technology for instant entertainment. Students in the classroom are often not interested in what we are teaching. There is a need for teachers to make everything as intrinsically
interesting as possible (Slavin, 2003). The fact is in today’s classrooms teachers are competing for the attention of their students and competing with their friends, parents, videos, games, and social media, especially if students are not given interesting or motivating work. With the new devices available, entertainment is only a swipe away. Using this information, I took a two-pronged approach, trying to engage and increase achievement in my students, but also immerse them in outdoors so that they would not realize they were learning, even if it’s for a little while. My AR project seemed to be an extension of the past where outdoor education was seen to fulfill a range of important socio-moral learning objectives that varied over time (Georgakis, 2010).

Outdoor education is designed to get students outside doing science or learning about the natural environment around them. It is an example of experiential learning where they become doers rather than passive observers. Science content is easily extended outside and gives students the ability to become actively involved in the process. More specifically, life science topics relate so well to outdoor activities that the underutilization of the outdoors is a problem facing science education. In classrooms we often present many theoretical topics with the goal of student understanding, but students cognitively shift from understanding to memorization. An example would be the difference between understanding the difference between a hemlock and a white pine based on the location of growth, bark color and texture and leaf color, pattern and texture. In contrast within the classroom, with the presentation of the same content students are forced to memorizing leaf shape and pattern due to the inability to experience the trees. This shift has many causes, but the most apparent would be the lack of connection to the
subject and the pressure for achievement. When the outdoors is used as a venue for learning it has the potential to reignite that spark (Broda, 2002). When teachers use the outdoors to access content they give students a physical connection to the content and remove the disconnection. Delivering a lesson outside may give students access to prior knowledge and make learning closely related to a content specific situation (Resnick, 1989). The prior knowledge for many comes from being outside in a familiar setting. This is using the assumption that students do go outside sometimes outside of school. Environmental, biological, and zoological situations can be part of the scheme of a lesson, but a misconception is the outdoors cannot be used in all subject. Broda (2002), gives a great example of using outdoor learning in math to model for students what an acre looks like and making field measurements to illustrate the concept. The students can now remember the acre as an area that they have seen, much like a floor tile that is one square foot in the classroom. The difference is that showing and measuring the “acre” outside removed the disconnection to the word that has no physical meaning. With this in mind, and considering that I teach mostly life science, my goal was to try and use the outdoors as much as possible to construct a physical connection to content that is often hard to get from the classroom. Specifically, in environmental science, when I was teaching ecology, my AR study focused on the importance of being in an ecological setting rather than teaching about ecology. I wanted to decipher whether or not the same lesson would be more effective because of where I was teaching and how that affected my students’ ability to learn the content.
Knapp (1992) pointed out the genesis for outdoor education was the instructional use of natural and built laboratories beyond the school to expand and enrich learning--developed, in part, as a reaction to the traditional classroom bound teaching, in which students remain passive. Outdoor education was designed to get students more involved in the process of learning compared to what they were doing traditionally. However, Knapp (1992) suggested that outdoor learning does not always need to be student-centered. One could meet experts on the job, where the expert shares how they work, think, and use their knowledge on a daily basis. In this way, the expert is the example of the content used in the real world. The expert provides students with answers to the question “Why do I need to know this?” Outdoor education provides good opportunities for concept development because it takes place in the physical world (Knapp, 1992). As stated in the example about an acre, students can be more effectively instructed when they can see what is being taught. Atoms, for instance, will always remain an abstract concept because even when modeled, they provide little resemblance to the actual atom. When teaching, it is best to give tangible opportunities whenever possible and going outdoors opens up tremendous opportunity.

In attempts to engage students from passive to active participants, Knapp (1992) suggested that students be cooperatively grouped in mixed levels to improve performance. Students often have varying degrees of experience in the outdoors unrelated to their experiences in school. As noted above, assuming students all have the same experience being outside could be a mistake. Grouping students with different academic characteristics could allow them to display their strengths in an unfamiliar educational
setting. Giving students level ground from which to work may make each student more productive, in turn, making the group more productive as a whole. As a pedagogical method, it is widely agreed that cooperative learning can be very beneficial to all students, but in my experience the groups must be properly planned with specific tasks and objectives.

Outdoor learning is an incredible tool that when implemented and planned properly can maximize student engagement and productivity by making students active participants in the learning. In similar studies, students have stated that they liked being outside collecting data. They got to be involved in it, and we weren’t just sitting there. To me science is about getting your hands dirty (George, 2013). As Eleanor Duckworth once said, “Learning is messy.” This is exactly the kind of thinking I want to harness in all students. Students want to learn, they want to be involved in their learning and listening to their input validates their ideas, which can increase their willingness to engage and perform. Will all students articulate this? No, but many have a similar mindset or openness to learning in that way.

METHODOLOGY

Project Design

This AR project was completed during the spring of 2018. The project was relayed through environmental science curriculum and was implemented as it typically falls within the environmental science curriculum. The content was not moved or shifted to accommodate weather, time or this AR study. The study looked at the difference between student engagement, motivation and performance in an outdoor setting as
opposed to an indoor setting. The environmental science curriculum lends itself to being taught in multiple settings, but like many courses the day-in day-out constraints of public school scheduling often make outdoor experiences difficult and cumbersome. The content for the unit of study was water. The content involved in the water unit was not changed in order to fit the unit. Instead, I tried to fit the laboratory activities to the content of study. During this study, my class periods were 56-minutes daily and one 61-minute period, every 6 days. The challenge was having students understand what tasks needed to be completed for the day’s lab, acquire and put on any extra clothing they needed, get outside, complete the assigned task, and finally return to the classroom with enough time to get to their next class without losing time for learning. An additional challenge was to maximize the experience outdoors so that the engagement and motivation superseded the time lost during the walking from my classroom to the field site. The walk from the classroom took an average of ten minutes to go out and back. The timing of the study was not ideal because it occurred when we should have had more seasonable weather but the weather was more winter-like than spring-like. In the past students have stated that being outdoors and being uncomfortable was better than being indoors and bored. It was my intention to see if this was truly the case.

The curriculum did not vary for this study in particular and the content would have been taught at the same time, predominantly inside the classroom, but with a possible short (1 day) outdoor component. For this study, the lessons were briefed indoors and were primarily delivered outdoors.
School Demographics

Students in the district are 86.6% white, 6.0% Hispanic, 2.5% Asian, 1.6% African American and 0.2% Native American. Forty percent of our students are economically disadvantaged, 20.6% of students have disabilities and 50.6% are classified as being high needs.

Study Participation

Students that participated in the study were from two separate classes. One class contained 16 students (A period), the second class contained 21 students (B period), totaling 37 participants. The breakdown of gender is shown in Table 1. In Table 2, grade and Individual Education Program (IEP) are shown with the senior students that needed the course to graduate being indicated because this is usually a motivating factor within our student population. Students tend to be less motivated in grades 9, 10 and 11, but as seniors they realize the need to graduate and have more motivation to achieve passing grades. In order to protect the nature of the study where motivation was measured I say this as an outside force in motivation for students that may have impacted results.

Table 1

<table>
<thead>
<tr>
<th>Gender Breakdown of Students</th>
</tr>
</thead>
<tbody>
<tr>
<td>Class</td>
</tr>
<tr>
<td>-----------------</td>
</tr>
<tr>
<td>A period</td>
</tr>
<tr>
<td>B Period</td>
</tr>
<tr>
<td>Total</td>
</tr>
</tbody>
</table>

Note. (N=37).
Table 2
*Grade Level Breakdown of Participants*

<table>
<thead>
<tr>
<th>Class</th>
<th>Sophomore</th>
<th>Juniors</th>
<th>Senior</th>
<th>Seniors that need course to graduate</th>
<th>IEP</th>
</tr>
</thead>
<tbody>
<tr>
<td>A Period</td>
<td>1</td>
<td>12</td>
<td>3</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>B Period</td>
<td>0</td>
<td>8</td>
<td>13</td>
<td>11</td>
<td>8</td>
</tr>
<tr>
<td>Total</td>
<td>1</td>
<td>20</td>
<td>16</td>
<td>14</td>
<td>12</td>
</tr>
</tbody>
</table>

*Note. (N=37).*

Data Collection Methods

In order to answer the focus questions that guided this project, a number of different data sources were needed to effectively collect the data and make meaningful conclusions (Table 3). By combining data sources relevant for each specific focus question, data could be carefully analyzed and examined for meaningful patterns (Christianson, 2010).

Table 3
*Data Collection Matrix*

<table>
<thead>
<tr>
<th>Research Questions</th>
<th>1. What is the impact of education outdoors on student engagement, motivation and achievement?</th>
<th>2. How do students perceive indoor lessons compared with outdoor lessons in terms of engagement, motivation and performance?</th>
<th>3. Whether or not consistent exposure to the outdoors can be incorporated into the classroom on a daily basis?</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Pre-test / Post-test</td>
<td>Student Unit Grade</td>
<td>Student Performance Reflections</td>
</tr>
<tr>
<td>✓ ✓ ✓ ✓ ✓ ✓</td>
<td>✓ ✓ ✓ ✓ ✓ ✓</td>
<td>✓ ✓ ✓ ✓ ✓ ✓</td>
<td>✓ ✓ ✓ ✓ ✓ ✓</td>
</tr>
</tbody>
</table>
4. How will this action research project affect the way I teach outdoor science in the future?

|   | ✓ | ✓ | ✓ |

Pre-test /Post-test

I used pre- and post- test scores to evaluate students’ performance on their mastery of the content. This was conducted to show the student knowledge growth from the beginning of the unit to the end of the unit in response to the treatment. The idea of comparing to another unit of study was considered, but omitted due to a wide range of variables that would unaccounted for, and to avoid trying to compare units that were non-comparable.

Appendix A

Student Unit Grades

Each student’s unit grade was examined for an increase in assessment performance as well as frequency of assignments completed, and grades were calculated on a normal average for the units as opposed to a weighted average. This was to ensure that the numbers were comparable for my research, however students grades were reported to the school as a weighted average. One of the biggest issues my students face is the irregularity with which they complete and turn in assignments. This metric was used to see if the study had an impact on the student’s motivation to complete work.

Group Student Interviews

Student interviews took place after treatment. Students were questioned on their level of engagement, motivation, and performance. The interviews were conducted to attain first person accounts of treatment effects and opinions of students on learning and motivation and engagement.
Student Performance Reflections

Student performance reflections were used for their data collection, but also used to provide students with opportunities to reflect on how they perceived the unit and its effect on their motivation, engagement and performance (Appendix B).

Student Engagement and Motivation Surveys/Questionnaires

Student engagement and motivation surveys were used to allow students to self-assess their level of engagement and motivation before and after the treatment. Surveys aimed to get students to think about their engagement and motivation as it related to science class in general the content and their success (Appendices C and D).

Daily Teacher Journal

The daily teacher journal was kept to have immediate and consistent reflection on the state of the research. This log was kept mostly for the ability to have firsthand reflection on the way the unit was progressing. I recorded the weather conditions for the day, the task each group was assigned, whether or not they completed the task, a record of observed student engagement, and the number of students that were absent in the group. The record of student engagement was determined on how I felt the group was working based on on-task behavior and conversation, questions they asked each other and myself, and the general behavior and body language during the outdoor activity.

DATA AND ANALYSIS

During the study, the data collected included both qualitative and quantitative data. The data was analyzed to determine whether or not outdoor education could enhance student motivation, engagement and performance in science. The study used
various instruments to collect data, the first of which were two surveys on student motivation and engagement (Appendices C and D). The surveys were administered prior to the study treatment to get baseline data on student engagement and motivation. The surveys showed interesting data in students’ perception of their overall engagement and motivation. Students were administered both surveys through Google Classroom and Google Forms on a voluntary basis. The motivation survey included $N=24$ students and the engagement survey was $N=25$.

In Figure 1, students were asked whether or not they wanted to be successful in science class 75% strongly agreed, 21% agreed and 4% were neutral.

![Figure 1. Item #1 from student motivation survey (Appendix C).](image)

This was to be expected, but those results also set the stage for the rest of the survey (Fig. 1). This question was asked to give context to many of the remaining questions in the survey. The next item on the survey was “I complete my homework in science class.”
Students from my study were overwhelmingly neutral about doing homework (Fig. 2) yet all wanted to be successful in class. This could be a reflection of school wide policy that states a student cannot be assessed more than 10% of their total grade for performance on homework. Students understand that homework has little effect on their grade as a stand-alone category. Students feel similarly about checking their work as they do about homework (Fig. 3).
Figure 3. Item #4 from student motivation survey. (Appendix C).

Students again were overwhelmingly neutral in their diligence of checking their work for mistakes. This is of interest because it provided insight into how they reviewed their tests and labs, which made up 35% of their total grade, additionally quizzes and activities are 30% of their total grade. Contrary to my initial thought, students appeared to be less concerned with short-term results, but very concerned about long term success. As inconsequential as this may sound, students will often ask nearly immediately after assessments whether or not they passed and/or performed well, yet this survey showed that they were less affected by the outcome than they appeared.

The other items from the survey that are not represented by graphs had data that was inconclusive or not as meaningful to understanding student motivation in science. Item #9 *I want to go to college for a science degree*, was understandably 50% for strongly disagree which was concurrent with item #7 *I want to go to college*, where 25% of students strongly disagreed. In the school and town where I teach, my results supported the existing view that students had a low desire to go to college. There may
also be a desire to avoid serious financial struggles that would not permit them to attend college. In addition, although the data are not available, the percentage of parents who attended college is also lower in this town.

I think this survey showed that students are less motivated about science, but are interested in doing well in science, probably because they wanted to do well in general. However, I think they also lacked the skills or knowledge on how to achieve success in the science classroom.

The Student Engagement Survey (Appendix B) generated data that was concurrent with the motivation survey. One of the most telling questions about engagement was whether or not students enjoyed learning about science in general (Figure 4).

![Bar chart](image)

**Figure 4.** Item #1 student engagement survey (Appendix D).

I was not surprised to see that 13 students reported enjoying learning about science, and that some reported they did not enjoy it. Item #2 provided reassurance that this data was legitimate by indicating how many students were paying attention during
science class. The data is nearly identical with students showing 37% feeling neutral for both enjoyment and attention and 33% strongly agreeing with both measurements. This made sense as students that enjoyed science were going to be more able and conscious of paying attention during class than those that did not enjoy science. In Figure 5, students reported that they at least were engaged in science class the majority of the time.

![Bar chart](image)

*Figure 5: Item #2 student engagement survey (Appendix D).*

An interesting point in the survey data was student’s feelings on their effort level on science assignments. In Figure 6, 53% of students (14 students) reported that they try their best on assignments in science. With only 48% of students reporting agreement on enjoying science it was encouraging to see that more than half the students were putting their best effort into work even when 40% were neutral on trying their best on science assignments.
The data given by the two surveys indicated that the majority of students reported being engaged in science at least marginally, and that they were more motivated by doing well in science than they are motivated by the content and a general interest in the subject. During and prior to the survey, the students had been exposed to the outdoor classroom very little in the class they were currently taking. This was done intentionally to collect baseline data prior to the start of the treatment.

The results of the pre- and post-test data (Figure 7), which showed a marked increase from pre- to post-test. The average gain across both classes was a 16% increase in performance. Class A’s score increased 12% while Class B’s score increased by 21%.
This apparent growth could be attributed to several factors that included both indoor and outdoor activities. The scores also reflected the typical growth that is seen throughout any unit and though the pre and post test scores were not compared to a control unit’s pre- and post- test scores, I intended to compare them to a control unit score. There is some question on whether or not the growth in performance can be attributed to lessons being experientially centered and outdoors. Often times, completion in work can be an issue within classes that I have taught. In Figures 8 and 9, both unit scores have been graphed versus missed assignments. In both cases students may have not handed in assignments for two reasons; they were absent and did not make up the work or they failed to pass in the assignment.
Figure 8. Soil unit final percentage vs. missing assignments. This was an indoor lab unit.

Figure 9. Water unit final percentage vs. missing assignments. This was an outdoor lab unit.

In the Soil unit students missed on average 2.0 assignments/student across seven graded assignments while in the Water unit students missed an average of 2.1 assignment/student over the eight graded assignments for the unit. Both units spanned a
total time of 18 school days during the months of March and April. In looking at these figures, students completed a higher percentage of assigned work in the Water unit than in the Soil unit, yet the average number of missed assignments was higher during the water unit. Students grades were also slightly better, confirming a slight improvement in performance during the Water unit.

Engagement and motivation were primarily measured using the student responses during the interview that were conducted. The two primary focus questions during the interview were:

1. How do you feel this activity differed from what we typically do in other units we have done in the past?

2. Does hands on mean minds off? Does the interaction with the content help you learn it better?

Groups were questioned together with whom they worked with to determine engagement and motivation as it related to the work in groups. Throughout the interview, other questions were asked, but these were the driving questions. The first question elicited 37/37 (100%) responses where students could articulate how this unit was different from what we typically do. One student quite frankly put, “We got to go outside for once.” While this student was overly critical, the meaning was understood. We went outside more for this unit than any other before it. Another student commented, “This one was more hands on, more us and less you, student centered. I like it better to a certain extent. We need the guidance, but not hand holding.” Yet another, “It was more hands on, physical activity. I’d rather be doing that outside, than notes inside.” Students verbalized
this usually in conjunction with positive remarks on their response to the second question. The responses to the second question were 32/37 (86%) confirming their feeling of impact of their engagement and motivation during the unit. Students remarked that their ability to focus was increased and enhanced by the lab being outside. Students commented on motivation and engagement increases usually under one theme, “I think it being hands on motivated me because I was part of the activity, actually using our hands to get data.” Additionally, students were more motivated by the fact that, “it was more fun, so yes to all [engagement and motivation] of them, the more enjoyable the content the more likely you are to get it done.”

Despite the praise of the outdoor unit, there were five individuals that did not find the unit more engaging and motivating. One student was particularly adamant that she likes to take notes and while outside found it to be more distracting being outside and she found herself daydreaming often. Another student, a senior, stated his increased motivation and engagement during this unit stemmed from his desire to graduate in June, not the environment we were learning in. Two other students found out together that they wished we had more practice in the classroom on the learning of the sampling techniques used on the stream, which they said would have greatly increased their engagement in the content, because they felt underprepared and overwhelmed going outside with the sampling kits. Some other students commented on motivation being tested by the weather we encountered (1°C water and snow). If this unit had occurred in more comfortable weather they may have had a little more motivation and engagement, “rather than focusing on their lack of comfort.”
After the treatment of outdoor learning, students completed one Student Performance Journal in Appendix D. This journal was developed as a self-reflection instrument to allow students to gauge what they did during the unit and how they thought they performed. Students were very honest with their accomplishments and the results are contained in Tables 4 and 5.

Table 4
Common Student Response on Student Performance Journals

<table>
<thead>
<tr>
<th>Student Response Trends</th>
<th>Too large of group</th>
<th>I didn’t hand in the assignment</th>
<th>Need to come to school more</th>
<th>More participation needed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Responses</td>
<td>2</td>
<td>7</td>
<td>4</td>
<td>2</td>
</tr>
</tbody>
</table>

*Note. N= 33*

During interviews 10/37 students said their group sizes were too large yet only 2 responded that this impacted their performance academically.

Table 5
Trends in Overall Student Confidence on Performance

<table>
<thead>
<tr>
<th>Confident and Positive about performance</th>
<th>Not Confident and identified improvements needed</th>
</tr>
</thead>
<tbody>
<tr>
<td>8</td>
<td>16</td>
</tr>
</tbody>
</table>

*Note. N= 33*

Though not all students completed the performance journals due to absence, the trend was 2:1 for students with a negative feeling on their performance despite the unit’s increased impact on engagement and motivation.

Within the post treatment surveys, students showed trends when the data was combined. The post treatment survey’s (Appendix E) performance data is contained in
Table 6. This table indicated that students were not very aware of what the stream tests were measuring in the lab.

Table 6

**Student Correct Response Percentage to Content Questions**

<table>
<thead>
<tr>
<th>Survey Question on Content</th>
<th>What was the purpose of the physical assessment of the stream lab?</th>
<th>What was the purpose of the chemical assessment of the stream lab?</th>
<th>What was the purpose of the biological assessment of the stream lab?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Percent of students with correct response</td>
<td>21%</td>
<td>55%</td>
<td>0%</td>
</tr>
</tbody>
</table>

*Note. N= 33*

The surveys questions regarding impact of the treatments on engagement and motivation were as follows. Figure 10 shows that 70% of students felt more engaged during the treatment. This figure corroborates the findings from the student interviews. Additionally, Figure 11 supports the interview findings, where 76% of students agreed or strongly agreed that they were more motivated by the treatment of the class being outside.
Figure 10. Survey responses measuring student opinions on engagement, N=33.

Figure 11. Survey responses measuring student opinions on motivation, N=33.

In Figure 12, the majority of students agreed or strongly agreed that the treatment made the completion of tasks easier than without the treatment. It should be stated that the students may have been referring to the actual lab tasks and/or the unit assessment. This did not change the number of strongly disagree students for the three figures presented.
In spite of these student opinions, the students’ attendance data was an unexpected finding that had significant implications to the study. This was calculated by multiplying the number of students, N=37, by the number of days each unit contained, 18 days. In the two study time-frames, both contained a weeklong vacation while the soil unit had two snow days and the water unit had one, all of which were not included in the 18 unit days. While this may seem irrelevant, the attendances in each class were not good to begin with, both classes coming in well under 90%.
In Class A, the attendance dropped from 85% to 81%, while in Class B the attendance was consistent at approximately 85%. This data supports the results shown Figures 8 and 9 where students’ grades were closely linked to their ability to complete assignments and turn them in.

**INTERPRETATION AND CONCLUSION**

This study exemplifies the potential effectiveness of action research and the truth that there is more to learn from an unsupported hypothesis than a supported idea. This research truly taught me more than I expected and I learned more about the unforeseen than what I thought I would.

In response to my focus main focus question; What is the impact of outdoor education on student engagement, motivation and performance? The data suggested strongly that student engagement and motivation increased. Students supported this hypothesis with a resounding, “we learn better outdoors” and though the performance
data did not support that, it was supported by their interview and post treatment survey results. Students’ comments were also supported by my own observations during the unit, as the majority of the students appeared to really be engaged and be motivated by the treatment. There was less off task behavior, there was academic discourse, students appeared to be lost in the content and truly enjoy the activity of learning and discovery. The data for this reinforced my belief that students need to get outdoors to learn and engage with the content they are learning when and where it fits into the curriculum. Though the performance data did not suggest a high rate of growth, student perception can increase academic confidence which then translates to academic performance in other ways. Though it was not observed in this study, it is worth investigating further in the future.

How do students perceive indoor lessons compared with outdoor lessons in terms of engagement, motivation and performance? The answer to this question was clear in the post treatment survey results, students like going outside to learn. It was not unanimous, but it was the large majority of students. Though not included in the data, there was a survey question where students indicated that weather had little impact on motivation or engagement, warm weather is clearly preferred to the weather of early April. Some other perceptions were that students liked the freedom of being turned “loose” in the outdoor classroom, but did want a little more practice with some procedures before going outside. They confirmed Howie’s writings, “It is clear that in order for an outdoor program to be successful it must be built as an extension to the classroom, not as unique experience” (Howie, 1974, p.35). The students had the ability to articulate this by suggesting less direction than a typical lab, but more than the treatment provided.
A question proposed by Jason George in 2012 *Science Outside the Box*, was

- Whether or not consistent exposure to the outdoors can be incorporated into the classroom on a daily basis?

Though the treatment unit had only two outdoor lessons that totaled 6 of 18 days or 33% of the unit, I do believe outdoor lessons could be regularly incorporated into the science classroom. Things learned from the treatment in regards to making regular outings more practical is to have students meet in the lobby of the school rather than the classroom. If materials are needed, one person from the various groups could be selected to get materials rather than have the whole class go. Multiple times students forgot materials in the classroom due to distraction. I also believe this would enhance the authenticity of the task and would give students more responsibility for their learning. Outdoor activities as a daily outing may eventually lose their appeal like many school activities and to go out every day is impractical, yet weekly and monthly outdoor activities would only enhance curriculum.

I think the major finding of this research is not about whether or not outdoor education is a viable instructional method in the science curriculum. The conclusions come from the attendance data and the amount of completed work in the unit. Regardless of outdoor lessons, these two components in the academic lives of students is having the largest impact on their engagement, motivation and performance. Students that miss school or class seldom make up the work that they missed and if that occurs the work is of lower quality. This was most evident in the student performance journals, where many students were quite candid in their assessment of their work and attendance. It is my hope
that the regular use of outdoor education in the science classroom may help students with these larger issues. If my science classes can become a place where students want to be then maybe the performance will follow. Regardless of the instructional setting or lesson structure, students can not benefit when they do not work or are not present.

VALUE

This experience has been grueling and enlightening on many levels. Action research is a practice that I plan to use for the rest of my career. I do not think it will be completed on this same level, but the process of studying my classroom has been so beneficial to my teaching. I had hoped for more concrete results in terms of my students’ performance, but what this project did show me will improve that into the future. The value for this investigation came from an unexpected place. While I was anticipating the value being in the outdoor learning experience the real value came from the reflection of the students.

In the data collection methods, I may have found the most value. While the quantitative data I collected was not as supportive of increasing student performance as I hoped, the qualitative data made up for that deficit. I found student questionnaires to be very helpful in determining trends in student thinking and opinion. The honesty they have in a survey or questionnaire is much greater than that in an interview. Students provided a great deal of insight into their responses that informed me of their interpretation of how I was delivering the unit which will help me in the future. The best example of this was response to the time of day playing a role in their ability to be motivated and engaged. Of course, high school students are tougher to motivate in the morning, but the support for
this in the questionnaire was surprising because it was more influential than their effect from the weather.

I have often looked at pre-tests as a way for a teacher to show sure-fire growth, the test is taught to, and the students succeed by improving over the course of the unit. I did not take this approach and tested the students, then taught the unit and gave the post test. I did not teach to the test and the students improved by 16%. Though this growth was moderate, the value of the practice showed me that in teaching the principles within the unit, the students can still improve on content as a whole.

Outdoor learning can be completed in the winter and students will get uncomfortable perhaps, but otherwise enjoy themselves. In my research of literature, it was clear that comfort was an important concept to be aware of in outdoor education. Frequently, studies referenced the comfort of students playing an important role in their ability to learn and remain engaged, but while my data suggested similar views, the significance of comfort was secondary to the experience of not being in the classroom. This highlighted the importance of getting classes outside and the value that the students place on being outdoors learning in the environment, rather than learning about it from the classroom.

Another item from the study that stood out was the student performance journals. While this data collection instrument was utilized only one time, it was again, remarkable the honesty the students had in this format. Their ability to articulate their point and the relationship to their performance was powerful. In almost all cases, students predicted their performance perfectly and could identify the strength or weakness that was
responsible for the performance. It is my hope that I can eventually connect the two for the students and get them to perform at their highest potential.

In terms of outdoor education, the most valuable thing I learned is the importance of structure while outdoors. The days we went outside, students had tasks to complete and a limited time to do it. When students were not busy they quickly became distracted and off task behaviors soon followed.

Another large factor of outdoor education is group size. For the focal point of this investigation students were in one of three groups and group sizes ranged from 4-7. In the groups that had the most students, there were the most off task behaviors observed. Many students indicated that the group sizes were too large and they felt marginalized, due to the tasks being completed by other group members leaving them with the job of observing the task get completed. Group sizes were an important factor that were poorly managed in this investigation and likely had an impact of the performance of some students. Students that remained engaged and motivated were those that were working and had a task to finish.

The final question was how will this action research project affect the way I teach outdoor science in the future? The way I will teach outdoor science in the future has already taken effect. Though the results were not as impactful as I had hoped, the desire to see the performance increase has encouraged me to make changes. In outdoor lessons in the future the group sizes will be limited to 4 students, students will be assigned roles, students will be given an appropriate amount of time, the weather will be more strongly considered and there will be more in-class preparation completed. These improvements
will all be made with the idea of getting students to perform better on the assignments and assessments with the units with an outdoor component.


George, J.A. (2013) Science Outside the Box, Montana State University.


APPENDICES
APPENDIX A

WATER PRE AND POST TEST
Water Pre-Test

Environmental Science

1. Which of these classifications of water would apply to aquifers such as the Ogallala Aquifer located in the U.S. Great Plains?
   a. Fresh water
   b. Salt water
   c. Groundwater
   d. Surface water
   e. Ice Cap

2. A wetland near you only contains standing water during the spring months, and dries out during summer. What type of wetland is it?
   a. Marsh
   b. Swamp
   c. Bog
   d. Vernal pool
   e. River

3. Which part of a pond would be located at its bottom and would have food webs based on decomposition instead of photosynthesis?
   a. Littoral
   b. Limnetic
   c. Benthic
   d. Profundal
   e. Horizon

4. Water mining occurs when
   a. water is withdrawn from an aquifer at the same rate that it replenishes.
   b. water is withdrawn from an aquifer at a lower rate than it replenishes.
   c. water is withdrawn from an aquifer at a faster rate than it replenishes.
   d. water is withdrawn from an aquifer by means of digging
   e. None of the above

5. Which of these would be negatively affected by the construction of a dam?
   a. Drinking water availability
   b. Irrigation capacity
   c. Electricity generation
   d. Downstream wetland habitats
   e. Boating and recreation

6. Which of these is not a water conservation strategy, but a way to increase water availability?
   a. Desalination
   b. Xeriscaping
   c. Drip irrigation
   d. Usage of gray water
   e. Pivot
7. What form of human-generated pollution causes eutrophication of surface waters?
   a. Nutrient pollution
   b. Thermal pollution
   c. Sediment pollution
   d. Biological pollution
   e. None of the above

8. Humans use more fresh water for ________ than for any other purpose.
   a. drinking and cooking
   b. washing and home use
   c. agricultural irrigation
   d. electrical production
   e. mining and industrial processes

9. Which of the following best describes a floodplain?
   a. a region of land that is periodically flooded when a river overflows
   b. an area that is periodically flooded because humans have altered the landscape
   c. an area that is incidentally flooded when farming or mining operations change the course of rivers
   d. an area where flood irrigation of crops is used, such as a rice paddy
   e. a region of land that has been deliberately, permanently flooded due to human disturbance, such as in dam building

10. Dam removal in the U.S. ________.
    a. is controversial because dams provide such good habitats for native species
    b. will probably continue because the environmental impacts of dams are reviewed periodically
    c. will assist with our transition to more natural forms of renewable energy
    d. provides many new jobs and opportunities and so is economically beneficial
    e. will probably increase rapidly as we move to a more fossil-fuel-dependent society

11. Sinkholes can result from ________.
    a. overconsumption of water from aquifers
    b. building on floodplains
    c. flood damage and chemical erosion
    d. poorly drilled wells in soft soils
    e. substrates that become weak following rain

12. A watershed is ________.
    a. the area of land that drains into a river or lake
    b. an inland basin that connects to another inland basin
    c. a river that drains into the sea
d. a term used to describe water stored underground
e. the water held in the atmosphere prior to returning to Earth in the form of rainfall

13. What form of wastewater treatment will use aeration and bacteria to remove most of the organic material before chlorine or UV light disinfects it?
   a. Primary treatment
   b. Secondary treatment
c. Wetland treatment
d. Tertiary Treatment
e. Reactionary Treatment

14. The resource allocation of the Colorado River's water is being complicated by ________.
   a. the rapid growth of Las Vegas
   b. large numbers of people moving out of Nevada
c. sinkhole collapses in Arizona and southern California
d. rapid growth of vegetable farms in southern Arizona
e. saltwater intrusion into the Colorado estuary near San Diego

15. Over pumping groundwater in coastal areas can cause ________ to move into aquifers, making the water undrinkable.
   a. VOCs
   b. suspended solids
c. hard water ions
d. untreated sewage
e. Saltwater

16. Xeriscaping can save water by ________.
   a. replacing landscaping plants with rocks, sand, and sculpture
   b. creating wetlands instead of landscaping
c. planting native or drought-resistant landscaping plants
d. replacing lawns with artificial turf and gravel parking areas
e. collecting rain water and storing it in cisterns or tanks

17. Emergent vegetation such as cattails and reeds grow in the ________ zone of a lake.
   a. Aphotic
   b. Limnetic
c. Benthic
d. Littoral
e. Profundal

18. Artificial wetlands ________.
   a. are the major program for replacing lost natural wetlands
   b. purify water for use as bottled drinking water
c. are a source of arsenic contamination in Bangladesh
d. are created using xeriscaping methods
e. can help purify water and also provide wildlife habitat

19. Methods for desalinating sea water to produce fresh fresh water include ________.
a. treating with activated charcoal and clay
b. making sea water acid to transform salts to solids
c. reverse osmosis and distillation
d. filtration and sedimentation
e. treating sea water with salt-consuming marine bacteria

20. Why is grain production in the Great Plains considered largely unsustainable?
a. The Ogallala aquifer is being depleted for irrigation water.
b. Competition with cattle ranching is resulting in a decline in crop production.
c. More and more people are becoming gluten intolerant, so there will be less and less demand for wheat, barley, and rye.
d. So many pesticides are needed for grain production that streams in the Great Plains are becoming dead zones.
e. The energetics of crop production in the Great Plains are such that more energy is needed to grow the crops than can be gotten from the crops.
APPENDIX B

STUDENT PERFORMANCE JOURNAL
### Table 3. Performance Journal Entry (Variation of a Student Observation Journal)

Performance Journal Entry

**Directions:** Please complete a journal response using the following sentence starters. Please complete all the starters and giving a *brief explanation* on the reason(s) you feel that way.

<table>
<thead>
<tr>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Circle the meaning you are using.</td>
</tr>
<tr>
<td>1. I feel (un)prepared because... you should either circle unprepared or prepared and then write a clarifying statement.</td>
</tr>
<tr>
<td><em>I feel (un)prepared because I did not participate fully in the activities that we completed.</em></td>
</tr>
</tbody>
</table>

Circle the meaning you are using. These questions refer to your *Streamside Questions*.

| 1. I feel (un)prepared because... |
| 2. I feel like I did(n’t) do well because... |
| 3. I may be (un)happy with my grade because... |
| 4. What could(n’t) I have done to get more/ less out of the unit for water? (*This includes the Stream Lab and the Snow Lab).* |
APPENDIX C

STUDENT MOTIVATION SURVEY
Student Motivation Survey

This survey is designed to gauge student motivation.

* Required

1. I want to be successful in science class.
   Mark only one oval.

   1 2 3 4 5

   Strongly Disagree Strongly Agree

2. I complete my homework in science class.
   Mark only one oval.

   1 2 3 4 5

   Strongly Disagree Strongly Agree

3. I study class material so I can earn the best grade I can. *
   Mark only one oval.

   1 2 3 4 5

   Strongly Disagree Strongly Agree

4. I check my work for mistakes so that I can earn the best grade I can. *
   Mark only one oval.

   1 2 3 4 5

   Strongly Disagree Strongly Agree

5. I frequently ask questions to improve my understanding when I am unsure of a topic or process. *
   Mark only one oval.

   1 2 3 4 5

   Strongly Disagree Strongly Agree

https://docs.google.com/forms/d/1NCBkxznV_m-gG3rvy29yibBJTIA2mHdjPLXxmxUjaw6vgy/edit
6. My choices, in school, are always focused on my future and being successful. *
   *Mark only one oval.

   |   |   |   |   |   |
   | 1 | 2 | 3 | 4 | 5 |

   Strongly Disagree |   |   |   |   | Strongly Agree

7. I want to go to college. *
   *Mark only one oval.

   |   |   |   |   |   |
   | 1 | 2 | 3 | 4 | 5 |

   Strongly Disagree |   |   |   |   | Strongly Agree

8. I want to complete some post-high school education and maybe complete an associates or other degree (non-bachelors). *
   *Mark only one oval.

   |   |   |   |   |   |
   | 1 | 2 | 3 | 4 | 5 |

   Strongly Disagree |   |   |   |   | Strongly Agree

9. I want to go to college for a science degree. *
   *Mark only one oval.

   |   |   |   |   |   |
   | 1 | 2 | 3 | 4 | 5 |

   Strongly Disagree |   |   |   |   | Strongly Agree

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APPENDIX D

STUDENT ENGAGEMENT SURVEY
Science Engagement Survey

Form is designed to assess student engagement in science class.

Your email address (diarson@winchendonk12.org) will be recorded when you submit this form. Not diarson? Sign out.
* Required

1. I enjoy learning about science.*
   Mark only one oval.

   1  2  3  4  5
   Strongly Disagree  ○  ○  ○  ○  ○  Strongly Agree

2. I am engaged in science class 70% of the time.*
   Mark only one oval.

   1  2  3  4  5
   Strongly Disagree  ○  ○  ○  ○  ○  Strongly Agree

3. I frequently participate in class.*
   Mark only one oval.

   1  2  3  4  5
   Strongly Disagree  ○  ○  ○  ○  ○  Strongly Agree

4. I often find myself thinking about topics from science class outside of the class period.*
   Mark only one oval.

   1  2  3  4  5
   Strongly Disagree  ○  ○  ○  ○  ○  Strongly Agree

5. When completing science assignments I find myself trying my best to complete quality work.*
   Mark only one oval.

   1  2  3  4  5
   Strongly Disagree  ○  ○  ○  ○  ○  Strongly Agree

https://docs.google.com/forms/d/1UWjgPBzMLUfU9sakxjHphDiweoB0m12x25kOi5VuiW/edit 1/2
Science Engagement Survey

6. I feel as though I am learning a lot about the world around me in science class.*
Mark only one oval.

1  2  3  4  5

Strongly Disagree  □  □  □  □  □  Strongly Agree

☐ Send me a copy of my responses.

Powered by

Google Forms

https://docs.google.com/forms/d/1WgoP87zM/8Gilssak_L-pHt6Da-Bd5N13k25hOSnuul/edit

2/2
APPENDIX E

OUTDOOR TREATMENT SURVEY
Stream-side Week Survey 1A

Please fill out the following survey based off of your experience in the field conducting our stream survey. Answer the questions with the most accurate response you can.

* Required

Grade Level *

- 12th Grade
- 11th Grade
- 10th Grade
- 9th Grade

Gender

- Male
- Female
- Prefer not to say

During the week of the stream-side lab, I felt I was more engaged in what we were doing as a class. *

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strongly Disagree</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Strongly Agree</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

During the week of the stream-side lab, I felt I was more motivated to learn about the stream and what makes it healthy. *

https://docs.google.com/forms/d/e/1FAIpQLSocE2T7by9PP39z-3hY0QAjJeNrlF9yT9dCdPnu9jbGQxJDk0GDw/viewform
During the week of the stream-side lab, I felt it was easier to finish tasks because they allowed me to do science, rather than only learn about the science.

What was the purpose of the physical assessment of the stream lab?

What was the purpose of the chemical assessment of the stream lab?

What was the purpose of the biological assessment of the stream lab?

The weather varied greatly throughout the stream lab, we had warm sunny and really cold and snowy. The weather impacted my ability
Sunny and reasonably cold and sunny. The weather impacted my ability to focus on the tasks at hand.*

1 2 3 4 5
Strongly Disagree  ○ ○ ○ ○ ○ Strongly Agree

The weather impacted my motivation for completing the tasks.*

1 2 3 4 5
Strongly Disagree  ○ ○ ○ ○ ○ Strongly Agree

The cold weather affected my experience.*

1 2 3 4 5
Negative  ○ ○ ○ ○ ○ Positive

The warmer weather affected by experience.*

1 2 3 4 5
Negatively  ○ ○ ○ ○ ○ Positively

We also got to go outside during different parts of the day. Doing the lab in the morning affected my experience.*

1 2 3 4 5
Strongly Disagree  ○ ○ ○ ○ ○ Strongly Agree

Doing the lab outside in the afternoon affected my experience.*
<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td><strong>Strongly Disagree</strong></td>
</tr>
</tbody>
</table>

**The time of day had little to do with my experience.** *(*)

- [ ] Yes
- [ ] No

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Google Forms

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