

THE EFFECTS OF INTERDISCIPLINARY TEACHING ON STUDENTS IN  
OUTDOOR ACADEMY AT TAHOMA HIGH SCHOOL

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## **Abstract**

### **The Effects of Interdisciplinary Teaching on Student in Outdoor Academy at Tahoma High School**

Is interdisciplinary teaching the answer to the call for schools to improve standardized test scores? As teachers continually search for the best ways to impart knowledge and wisdom to their students in traditional classroom settings, Tahoma High School has implemented Outdoor Academy. This class integrates traditional, required 10<sup>th</sup> grade courses; English, science, and physical education, into one full day course which meets every other school day and takes biweekly field trips to attempt to provide better connection between the students and the materials learned in class. After over seven years of implementing this class, Tahoma has found that the students in Outdoor Academy continually outscore the rest of their schoolmates on standardized tests.

The continual academic success of the students in Tahoma's Outdoor Academy raises the question of; what is the experience of the students in this integrated class and how does this experience lead them to higher academic achievement? To answer this question, this research project took on a quantitative case study approach in order to allow myself to observe these students in their natural setting and also to analyze their standardized test scores, and survey them on their experience in the class. The study has shown that students felt a stronger connection to both the teachers and their peers in Outdoor Academy than they did to their other teachers and classmates, and that Outdoor Academy students scored on average 15% higher on standardized tests than did the rest of the school. Thus,

the research has shown that students retain more knowledge when they are better connected to their teachers and peers, and when lessons are made relevant to real world experiences.

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## **Introduction**

Clear skies and a mound of fly-fishing poles and tackle boxes greeted the Northface and rain-boot clad sophomores of Tahoma High School's Outdoor Academy. On a November morning so brisk that breath hangs in the morning air, these students are practicing the art of fly-fishing, while most sophomores sit at their small desks in their warm, cocoon like classrooms, as they silently read the same novel that the Outdoor Academy just completed, "A River Runs Through It," by Norman Maclean. In addition to reading the novel, Outdoor Academy students have been learning about river ecology and aquatic invertebrates, cleaning up local streams, fly-fishing, and writing about Maclean's parallels between fly-fishing and metaphysical questions. All of these experiences build upon the student's knowledge of each individual subject, and also allow students and teachers to build accountability. In addition, Outdoor Academy, which is often referred to as "a school within a school," not only builds relationships, but also teaches the importance of social responsibility and targets the long-term health and wellness of students. While the program strives, as does any school, to cement in its students information that is important for them to know in order for them to pass standardized tests, it goes a large leap farther as its driving premise is to show students *how* this information is useful, valuable and essential to the world that they live in by providing them with hands-on experiences.

In the past several decades, without most of us realizing it, lifestyle changes have occurred that have impacted students on both a physical and psychological level. While most teachers and parents, on a general level, agree upon the

importance of young children spending unstructured time exploring, and playing outdoors in order to develop and build upon their senses and inquiry skills, little attention has been paid to the importance of continuing this type of outdoor experience as it relates to students' studies throughout secondary education.

Tahoma's Outdoor Academy has taken notice of the need for secondary students to relate their studies to firsthand experiences and has answered the call. A PEI funded doctoral study done in 2007 found that "10<sup>th</sup> grade students attending Tahoma School District's, 'School Within a School,' Outdoor Academy integrating P.E., Science and Language Arts learning in the outdoors, gained in student achievement for all subject areas of standardized tests" (PacificEducationInstitute.com). The study's findings clearly demonstrate that there is a significant gain for students attending the Outdoor Academy, with absolutely no lost ground.

Outdoor Academy has consistently succeeded in raising students' standardized test scores in all subject areas, making a powerful statement about the effectiveness of integrated learning paired with hands on experiences. Due to the fact that very little research has been significantly done on this particular program, I decided to investigate the basic principals of such a project. At the secondary level, I wanted to find out; does hands-on experience with nature, in ways that parallel learning, add to the knowledge retention and deeper understanding of integrated subject areas?

## **Literature Review**

Though there have been many studies conducted on outdoor integration programs for primary aged children, there has been considerably less research published on the importance of interdisciplinary teaching in terms of secondary students. Thus, this research project will attempt to strengthen the fundamental building blocks of what is currently known about how effective interdisciplinary teaching is when utilized at the secondary level, namely 10<sup>th</sup> graders enrolled in Tahoma High School's Outdoor Academy.

In beginning to construct my own research project on interdisciplinary learning, it is important that we first look at the evidence that already lies before us to determine where to start. I will break the findings of my research into three primary categories of interest for the purposes of this study. First, we will see just how scholars have defined the term "interdisciplinary learning." I would like to know if this term is a universal one or rather an ambiguous term that can mean any number of integrations has taken place in the classroom. This will lead us into the next area of interest, which will focus on what is being taught currently in outdoor integration programs. It will take a brief look at how teachers are weaving experience in nature into their curriculums across the board. Finally, I will provide an overview of some of the documented outcomes of such interdisciplinary programs. The three of these research areas will form the pillars of my project and will provide a base of knowledge that my own research can support and build upon.

### *Defining Interdisciplinary Learning*

Interdisciplinary learning is one of many ways to learn over the course of a curriculum. When educators consider their curricular objectives and students' needs, they may choose interdisciplinary learning to deliver part or all of the content that they will present. This method can help bring students to a new awareness of the meaningful connections that exist among the disciplines (Jacobs, 2001). Dr. Heidi Jacobs, an interdisciplinary learning expert whom has written several books on the subject states that, "interdisciplinary is a knowledge view and curriculum approach that consciously applies methodology and language from more than one discipline to examine a central theme, topic, issue, problem, or work" (1989, p. 4-5). From her perspective, for an interdisciplinary unit to be effective, it must be designed properly. "A curriculum begins as a preformatted package of required elements and recommendations for learning for a specific grade level, semester, or year. A good curriculum expands on this guide, becoming a blueprint for learning that an educator designs and plans in real time with the needs of the real-world students in mind" (1989, p.8).

It seems to be agreed upon by all educators that most curricula are firmly rooted in the discipline fields and have a three-part structure, consisting in equal measures. According to the "Concept to Classroom" teacher's workshop these three parts are "content, skills and thinking process and assessments," (2004, p. 5). A curriculum that is interdisciplinary presents these three elements through exploring connections among the disciplines in order to gain a deeper understanding.

*Teaching Content in Interdisciplinary Classrooms*



When interdisciplinary teaching was still facing backlash in the 1980's the National Association of Secondary Principals' (NASSP) did a great deal to help the new curricula enter into the mainstream. The NASSP argued at the time that, "the currently dominant subject-oriented approach to the curriculum leads to... students skimming across the surface of a vast curriculum, leaving insufficient time to gain deep, significant understandings" (1996). Educators gradually came to accept the fact that interdisciplinary learning could augment, instead of threaten, traditional teaching styles (Jacobs, 1989). These advocates for interdisciplinary teaching made it a possibility for educators to interject real world experience into the classroom, and also made it possible to intertwine discipline-centered curricula so that it supports, rather than detracts from one another. Their efforts can be seen in many classrooms today as teachers find new and innovative ways to bring material to life.

Jennifer Ward provides his readers with fifty-two ideas to help children connect with the outdoors and explanations for parents on how these activities inspire growth. She states the results from several past studies that have all found that the amount of time a child spends in nature exploring and playing directly effects the rate at which the child develops through the beginning stages of learning (2008, p.xvii).

It has been argued by researchers that taking a fieldtrip is as easy as stepping out of the classroom door (Broda, 2007, p. 1-6). Herbert Broda's research and guide to learning outdoors provides educators with ideas about how to turn any schoolyard or outdoor area into an extension of the classroom. It points out that while school districts may be cutting budgets and eliminating field trips, any piece of

nature can provide a classroom with hands-on opportunities that not only enhance learning, but also add depth to any subject area as nature builds upon knowledge in an interdisciplinary fashion.

Joseph Cornell also gives readers an insight to the advantages of teaching children through experiences in nature. His book provides games and experiments for teachers or parents to conduct outdoors with their children and students. This source presents the argument that intertwining outdoor experience with formal classroom learning not only caters to visual and hands-on learners, but also deepens students' understanding of class materials and begins to build an appreciation for nature among children (1998).

In Nature's Playground, Fiona Danks maintains that many teachers do not incorporate outdoor learning experiences into their weekly classroom routines because they are not sure how to incorporate nature into their assignments (2007). This book provides teachers with innovative ideas on how to incorporate nature and the outdoors into almost any curriculum. It also discusses the importance of nature in furthering students learning and connecting students to their teachers, which Danks argues is essential to inspiring learning and getting young students involved in school (2007, p. 10). In addition, this source hits on the importance of using nature and hands-on learning experiences to build relationships and accountability with students, and the effects that these bonds have in boosting learning.

If every student were afforded the opportunity to learn about core subjects as they relate to one another in nature, more students would score higher on

standardized tests and have a deeper appreciation for nature and possibly education as well (Kirkland, 2008). Kirkland continues in proceeding chapters to support his claim that if all students were able to observe and record nature in a way that facilitates learning, it would help them to incorporate these findings to their own benefit as they learn to build inquiry and observation skills in addition to gaining better knowledge retention through experiences.

Giving teachers examples of schools that have used this teaching tool and have witnessed risen test scores from students will inspire them to advocate for financial support for these programs at their own schools (Littlejohn, 2005). The bulk of Littlejohn's study offers curriculum for high school students, often relating to science and English, which are designed to get kids outside and observing nature. This curriculum has proven to be effective in raising student's test scores as well.

#### *The Effects of Interdisciplinary Teaching*

Interdisciplinary learning has proven to have a positive impact on teaching styles and on relationships with both colleagues and students. Introducing an interdisciplinary element into a curriculum encourages all involved to develop meaningful links among fields in ways that intrigue and motivate both teacher and students. Heidi Jacobs explains in *Classroom to Concepts* that this type of teaching gives a purpose to study that goes far beyond the evaluation and memorization of information related to a topic. As a design element, it can push you and your students toward more powerful thinking and the ability to make comparisons that bridge disciplines, span eras, and encourage the application of knowledge (2004).

Furthermore, using an interdisciplinary unit in teaching can affect interaction among colleagues. When teams of educators must work together to develop effective units, they often feel a sense of collegiality and enthusiasm that would not be achieved if they were working in isolation. At Running Creek Elementary School in Colorado, a team of teachers developed interdisciplinary units. About five years after their collaboration began it was noted that, “the teachers are more creative, enthusiastic and collegial as a result of working on interdisciplinary units; they use time more effectively and have developed personal and professional pride in their teaching” (Jacobs, 1989, p. 42).

Using an interdisciplinary approach to teaching can also positively influence students. “Many educators agree that interdisciplinary units further the development of higher-order thinking skills (Concepts to Classroom, 2004).” In it’s recommendations for American Schools, the NAASP advised, “If teachers can establish links to the lives of young people naturally and contextually, why not heighten the interest of students and motivate them by explaining the importance that the [teaching] material holds for them?” (1996).

Patricia McGlashan argues that schools which support outdoor integration into formal learning in the classroom almost always experience increased test scores (2007). The results of this curriculum experienced increased test scores. This study gives an overview of several schools, all of which improved test scores among students involved in a science programs aimed at taking children outdoors to connect classroom material to nature. McGlashan gives examples of similarities amongst integrated curricula that have successfully found ways to increase learning.

Interdisciplinary teaching, specifically incorporating the outdoors into curricula, is argued by many educators to be a necessity. Richard Louv directly links the lack of time spent exploring nature in the lives of today's "wired generation" -he refers to it as a nature deficit- to some of the most disturbing childhood trends, such as the rise in obesity, ADD, and depression (Louv, 2005, p. 82-84). In addition, Louv discusses the ways in which learning about parts of nature that can be transcribed into a textbook without actually placing students in nature to experience it and explore it themselves. He holds that this leads to disconnect between these students as they get older, and the world that surrounds them. Louv goes on to explain that when students are thus disconnected from their natural surroundings, when they finally experience nature or hear about natural disasters on the news in foreign countries, they feel completely overwhelmed by the vastness of the world and thus, continue to disconnect from it. Louv reasons that student's lifelong disconnect from the natural world leaves them feeling helpless as if they are unable to make a difference in the world because it is too large and beyond their power.

David Orr discusses the improvements in standardized test scores that are apparent when students' learning is linked to relevancy outside of the classroom (2004). This source also contributes to the argument, presented in several previous sources, that when students are involved with nature and connect with it over time as an interwoven part of their learning experience, they learn to appreciate, nurture and protect their natural surrounding. Orr's work highlights the results of studies that have shown a strong relationship between the amount of time spent outdoors throughout school years, and the level of accountability or responsibility an adult

feels towards the natural world in which they live, and the amount of impact they feel that they are able to have upon it.

Furthermore, children relate what they learn in school to what goes on outside of school in the social and natural communities that surround them (D. Sobel, 2008). David Sobel provides educators with ideas about how to tie nature into outlined curriculum in any subject area and thus aims to encourage a better quality of learning for students. It was recorded by the Advisory Board for 'nPLAY, a childhood obesity foundation, that physically active students perform better academically (2008).

#### *Summary of Findings*

In summary, research shows that not only does an interdisciplinary teaching approach benefit students, but it benefits educators as well. This curriculum style provides a constant sense of renewal for educators and students alike and allows students to investigate areas of study in order to find deeper understanding and a true connection to the materials being taught. In addition, the research shows that interdisciplinary teaching enables students to perform better academically. While it seems that all of these studies have found that an integrated teaching style results in increased test scores and connection to peers and teachers alike, the research seem to raise one still very important question - what is it about an interdisciplinary teaching style and environment that betters student performance and overall academic success?

## **Research Questions**

In light of my review of the literature, I was left with several questions. The primary question that drove this research project is: What is the experience of the students in Tahoma High School's Outdoor Academy course? Secondary questions that I used to narrow my research included: How does teaching in an outdoor setting allow subject areas to be taught in an interdisciplinary way? In what ways does an interdisciplinary approach affect the student learning/experience in the Outdoor Academy? Additionally, I wanted to know how Outdoor Academy's approach to interdisciplinary teaching affects connection between students and teachers.

## **Methodology**

### *Method/Rationale:*

In responding to my proposed questions, this research project followed a qualitative case study approach. A qualitative case study is the study of a bounded group, using interpretive and observational methods to develop theory or evaluate the specific group within set boundaries. Thereby, a qualitative methodology provides researchers with the opportunity to study the outcomes of any given occurrence within its natural contexts.

This qualitative case study approach most accurately and efficiently allows me to draw conclusions about both my primary and secondary research questions because a case study is designed to answer "how" questions, where it is essential to the study to examine the conditions in their original contexts since they are vital to the outcomes under observation. Furthermore, it would be impossible for me to

have a true picture of the outdoor interdisciplinary learning process without considering the context in which this learning is taking place. Thus, it was crucial that I observe the students in Outdoor Academy while they are in action, record student experiences and learning outcomes, and interpret how the context, or environment of this type of classroom has an affect upon students' ability to learn and retain new knowledge.

### *Sample*

My data is based upon the students in the Outdoor Academy class. While this sample is rather large for a case study, approximately 86 students, this number of students provided better certainty concerning the interpretations of my observations. Having a large sample of students to observe and compare test results amongst ensured consistency in outcomes. For example, if test scores increased after a field trip on which core subject areas were all tied together in an interdisciplinary manner, then the rise in scores amongst 86 students was not just a fluke coincidence among a small handful of students, but rather, happened across the board in the academy. This type of large scale outcome would thus, better prove that the common denominator among these students, the Outdoor Academy field trip, must have had a generalized impact upon the student's learning.

While the academy is made up of 86 students, hundreds of sophomores apply to Outdoor Academy at Tahoma each year prior to class registration. The lucky students who are enrolled in Outdoor Academy each year are the product of a lottery. All of the students who apply to the academy are placed into a pot and names are chosen at random to ensure fairness. This past school year 488 out of 522



total sophomore students applied for Outdoor Academy. Of the 34 students that did not apply to be in Outdoor Academy, 14 were new students or were late to register and thus, unable to enter the lottery, and 12 were in some form of specialized education program, which prevented them from fitting the academy into their school schedule. This means that there were only 8 students entering into their sophomore year at Tahoma High School, located in rainy Washington that made the choice not to enter into the lottery for Outdoor Academy. The fact that Outdoor Academy students are selected at random and are not a cumulative product of any particular “type” of student, lent itself to my project nicely. These students, chosen by chance each year, continually outscore their peers in standardized testing; so what is it about Outdoor Academy that cultivates this result?

### *Instrumentation*

In order to assess the impact of interdisciplinary teaching upon student’s learning/experiences I observed the participants in the academy before, during and after scheduled group fieldtrips. While observing the students prior to the fieldtrip scheduled to coordinate with particular areas of study, I recorded their attitudes towards the subject or lesson being taught. In addition, I observed and evaluated student interaction with teachers prior to outdoor learning days. During the fieldtrips, I observed for specific words/actions/interactions among students and teachers to build a case for the culture or influence of this academy on student teacher bonds and also, deeper understanding of lessons. After fieldtrips, I kept track of the amount of lesson-related conversations and questioning taking place in various learning situations (i.e., large group discussion, small group discussion, free

time discussions, free writing), paying careful attention to which of these settings fostered knowledge based discussions and at which free form discussion level, the fieldtrip learning experiences were trumped by chatter unrelated to course content.

Outdoor Academy is a relatively new addition to learning curriculums in the United States. Due to the fact that while there is much research that has been conducted on the effects of exposure to nature on younger children, but not much that has been done on the effects of nature incorporated curriculums at the secondary level, let alone as it has impacted interdisciplinary learning, this study aimed to provide a base point for the fundamentals of how Outdoor Academy courses impact student learning. I planned to conduct a case study that may later be used to provide a more generalized approach to how interdisciplinary outdoor curriculums assist or detract from student's understanding of lessons and core subjects. I began to build a case for outdoor academies by observing the students enrolled in Tahoma High School's Outdoor Academy program which incorporates three core subjects – English, science and physical education – into one class with all areas of learning intersecting and building upon one another.

In addition to observation of the students in Outdoor Academy, I conducted surveys among the entire class prior to outdoor learning experiences, as well as, following them. These surveys aimed to gage how much was gained by the outdoor experience that could not have been discovered by the students on their own in the formal classroom setting. Furthermore, these surveys asked the students to rate the lesson, their enthusiasm about the lesson or subject, and how well they think that their teacher was able to engage them, both before and after fieldtrips, to see if there

may be an increase in excitement about learning that plays a role in fostering learning in an interdisciplinary classroom that utilizes outdoor curriculum.

*Analysis/Validity:*

When analyzing the data from my qualitative case study on Outdoor Academy students at Tahoma High School, I dissected the surveys from the students as well as my field notes in search of similarities, differences and patterns among students' attitudes, conversations and test scores before, during and after fieldtrips. I looked for patterns in attitudes towards fieldtrips, teachers, peers and assignments, as well as among their interests. I wanted to see if there was something about these student's everyday lives that gave them an advantage, academically, over other students. I then observed to see if these said advantages are the product of something that Outdoor Academy provides for the students or if they are simply unique to the students that apply to be in Outdoor Academy. In addition, I attempted to categorize my findings in order provide evidence for each of my sub-questions.

Due to the fact that I have long been an advocate for nutrition, learning styles and the outdoors, I do have a bit of a personal bias in terms of my project. I have taken several courses at the university level geared towards learning about how nature plays a role in childhood development. While I have not researched this idea as much as it pertains to secondary students, I have always believed that a healthy lifestyle and a connection to the surrounding environment provide students with a sense of the ability to inflict change. Since I am aware of my own bias going into this project, I will be better able to monitor myself for possible interjections on it's

behalf. In addition, I have tried to root out bias in my observations and questions by constructing the observation frameworks carefully and collecting statistical data in a variety of forms.

## Data

The first two sections of my data are drawn from the 86 students identified as S1-S86. Each section of this data is from the same 86 students in Outdoor Academy at Tahoma High School. The final section of my data comes from HSPE 10<sup>th</sup> grade standardized test scores from the 2010 school year.

<b>Question</b>	<b>Yes</b>	<b>No</b>
Do you feel more connected to your teachers in Outdoor Academy than you do with the teachers in your other classes?	97.7%	2.3%
Do you feel more connected with your peers in Outdoor Academy than your peers in other classes?	98.8%	1.2%
Were the field experiences in Outdoor Academy beneficial to your academic success?	95.3%	4.7%
Do you feel that Outdoor Academy has prepared you well for your future both at school and outside of school?	100%	0%
<b>Total Outdoor Academy Students Polled</b>		86 Students

### *Initial Responses/The Questionnaire*

Students were asked to complete a questionnaire at the end of the school year asking them to reflect upon their experience in Outdoor Academy compared to the other, more conventional courses taken at Tahoma High School. I have included the unedited responses of some of the students where it is relevant to my analysis.

*Question 1: Do you feel more connected to your teachers and peers in Outdoor Academy than you do in your other classes at Tahoma? Please explain.*

Answers:

S2: Yes, I feel connected. I have made so many friends this year and it was amazing to be with the same group of people that are just fun to be around with. The teachers are so great; they will help you out with anything.

S9: Yes, we had to do stuff with them all day and if you didn't trust them then it would have been very hard for you. Also, the teacher's helped me with life issues and if you needed anything you could talk with them about it.

S13: Yes, I feel like we grew closer together because we have been together for the whole entire year and made close friends out of this class.

S17: I feel more connected to the people on Outdoor Academy because it helped me to get along with more people and meet new friends throughout the year, so yes.

S25: I feel that in Outdoor Academy more people are connected because you are with them all the time. I do feel more connected to the teachers in Outdoor because they take their time to get to know their students, unlike other teachers that have a lot of students every period and don't take the time to get to know their strengths and weaknesses.

27: Yes! I feel like we are all family and all friends. I look forward to blue days every week and I've never been sad that a class was ending until this year. I have made so many friends through Outdoor that I probably wouldn't have talked to otherwise. I feel as if the teachers are also our friends and not just our teachers. I am going to miss the class so much next year.

S29: This class was way more fun than other classes. Other classes aren't as close at all and are really bring/typical.

S35: I feel a lot more connected to my teachers and my peers in OA. Mr. V, Ms. Burns, Krause and Hanson are some of my favorite teachers and I feel like I got closer to every other student in the class this year too.

S37: Yes! Outdoor Academy is a class many wish to be in and more importantly the students will not forget it. It was a great year with Mr. Vollrath and Ms. Burns. They are awesome teachers.

S39: Totally. So much of OA was getting to know the class and feeling comfortable with them, as with the teachers. I always had a good time and felt "at home," you could say in the class. In other classes, I get to know them for sure, but not nearly as well as you do when you spend all day with the same people and interact in the way we did.

S68: Yes most definitely! I wish all my classes were like OA because students have a closer relationship with their teachers and other students- we had more of a chance to bond with each other with the silly “team building” games we played and fieldtrips.

S77: Yes. I thought I wouldn't really have fun in this class, but I actually did. I met some really cool people that I probably would have never met if it wasn't for OA. Then I met the really cool OA teaches at Tahoma.

S83: I absolutely do feel more connected to the OA students and teachers than I do to other classes at Tahoma. Each teacher knew us students individually. Mr. Hanson, Mr. Krause, Mr. Vollrath and Ms. Burns do look at the students as a class, but they knew each student's personality too.

*Question 2: Do you think that the field trips taken in Outdoor Academy were beneficial to your learning? If so, in what ways? If not, why not?*

Answers:

S2: They were definitely a benefit because now I am ready to go out into the wilderness on my own and explore!

S5: Yes. The field trips were very beneficial because they taught me to be more respectful to the environment.

S8: Yes. They helped reinforce things that we learned in class like persistence and sustainability and stewardship. They also teach us how to work with our hands.

S9: I loved the field trips. Not only did I learn a lot about science this year, but then we went outside and used/did/worked with it. Then we wrote about it to really get the feel for what we learned and reflect about what we learned and saw.

S11: I think [the field trips] were pretty fun and were like a reward, but they didn't teach us anything.

S13: The field trips did benefit me because they made my emotional mind more powerful and made me realize that I could reach my goals.

S18: Yes, I think that the field trips benefitted my learning because we used many of the skills that we have been practicing in PE, learned about in Science and writing about in English and were able to use them in the field for real life experience.

S25: The OA field trips were all beneficial to me because I was more exposed to the surrounding community around me and I saw and learned about a lot of new trails and climbing places to explore.



S27: The field trips taken in OA taught me life skills that were not really the type of information that I would usually learn at school. I learned how to plant trees and spread mulch. How to stay focused when I could be goofing off. Work hard and play hard go hand in hand. How to be persistent and strive for accuracy. All these traits I knew about but never really practiced but on those hikes I learned a lot about myself and how to make myself a better person in the future.

S28: The field trips were awesome, I don't know if they helped me with my learning, but still.

S29: The field trips helped me because it gave me the chance to relax and it made me care more about the environment, which made me want to learn more about the environment because I actually care about it more.

S30: Yes, because [the field trips] helped us to get hands on experience with stuff we learned about in class.

S35: I feel the field trips do benefit our learning. I feel this way because of the fact that it is simply more fun to go outside in the real world and learn what we could be getting lectured about in class. The field trips allow us to apply it to more of a real world situation.

S37: Yes. I enjoyed going outside and planting trees and learning about certain environmental issues in the world.

S38: Field trips are very beneficial. They give us experience and allow us to learn physically. I know that I will not ever forget how to tie a fly, fly fish, rock climb, pack for hiking properly, hike,, and other little life lessons learned along the way. Because I believe actually doing something teaches students much better than just sitting in a classroom.

S39: Definitely. [The field trips] brought us out of the straight “learning area” and gave us, what I think, was a chance to think on things and have a good time, let us learn in our own way so to speak. I really liked them, honestly. It was a nice, fun break that kept me wanting to come back and keep going.

S54: Yes because [the field trips] gave me the chance to enjoy nature on the hikes we went on. Also, I realized that we are very privileged to have such beautiful views and landscapes living here in the Pacific Northwest.

S60: No not really. We mostly went on hikes which were fun but I think everyone was so tired that we just thought about getting to the top and then getting back down to the bottom. That doesn't seem very beneficial. However, there were some important lessons taught during the field trips. Never give up during the hikes. Take

care of your backyard during the log cabin [removing invasive species and planting trees].

S81: The field trips have benefitted my ability to persist in difficult situations. There were times on hikes when I felt like just giving up and going back down, but I did not give up just as we can not give up in life.

*Question 3: Do you feel that Outdoor Academy has prepared you for your future both at school and outside of school? If so, how? If not, why not?*

Answers:

S1: I think that it has made me learn to be a responsible student as well as learn to get along with lots of people. Also, I now feel more comfortable talking in front of people.

S2: Outdoor Academy has impacted me and will impact my future because we got to go outdoors and use our class subjects outside of the school which was an amazing experience.

S5: Yes, because the classes were integrated and that led us to be with friends that we normally would not be with.

S8: Yes, in this class we have worked with more people and so we get better at relationships. That is an important skill in the work place. It also helps us to learn how to work with different kinds of people.

S10: Yes, this class prepared me for my future because we worked on speeches in front of a group of our peers. Also, we worked on getting along with different people.

S11: Yes, I think that Outdoor Academy has impacted me for the rest of my life, even though I hate being called on in a large group, and talking in front of everyone, it will be something I can use as practice for the future.

S12: I think that OA has given me a glimpse into college level difficulty of work.

S13: Yes, this class has prepared me for college and given me good study habits, and it has shown me that I can reach certain goals that I thought that I could never reach.

S18: Yes, I definitely believe that OA has prepared me for the future because I have learned so many different things that I wouldn't have learned in regular classes. In OA there is a good mix of challenges and fun. I've learned to be persistent, how to write better essays, how to ask better questions and how to study and prepare for big exams once I get to college.

S25: I feel more prepared for school, I feel like I am a much better writer and feel like I am a lot more aware of my surroundings and what's going on around the world.

S29: Most definitely this class has prepared me for my future. This year I have not only learned more but I also learned how to connect with many different people that I wasn't great friends with or didn't even know before. I am not as shy anymore and have more persistence when it comes to hard things.

S30: Yes, I feel that with the integrating of PE and science into English I have learned a great deal more than I would have if I were in a normal English class.

S32: Yes, because it has taught me how to be more outgoing.

S35: OA has definitely prepared me for my future. I feel this way because ultimately my goal is to go to college and the lecture hall helped me to get experience in a college type setting with more students in one room.

S38: I feel outdoor has prepared me for my future out of school because a lot of our large group discussions were on current events. Also, in OA I feel we were held to a higher standard and gave us more freedom than other classes giving us the sense of the real world. Lastly, our field experiences gave us insight that other students not in OA did not get the chance to gain through real world experiences.

S39: OA has given me a somewhat wider outlook on my impact on society and the world, as well as a better idea of how the world works. I like the fact that we left our “comfort zone” at times and learned about other things, throwing them in there- it helped me learn a lot more in this way.

S50: OA was a great experience! I enjoyed all the field experiences as well as the AP Environmental science class. I especially enjoyed the integrated learning because it is a friendlier, different way to approach learning while in high school and the Lecture Hall gives students a chance to get out of the regular classroom. I think the Lecture Hall is also similar in a way to a college classroom setting since it’s set up the same way. I definitely feel more prepared to be in college because of the way we were supposed to give our BUFF presentations in the lecture hall and I will have to do that in college as well. We also learned a lot about the real world with the Science class that was offered because it taught us some current issues that need to be solved by my generation.

S62: Yes. Outdoor academy specifically because we were in the lecture hall which when I first walked in looked like a college atmosphere class.

S81: Outdoor Academy has prepared me for the presentations that I may have to do in College. I now feel more comfortable standing up in front of a crowd, especially with the buff projects and poetry portfolios done. At the beginning of the year I had

a huge fear of standing up in front of 86 people but now it feels like second nature to me.

<b>10<sup>th</sup> Grade HSPE Scores: Tahoma Sr. High School 2010</b>	<b>School's Avg. Score</b>	<b>Avg. OA Score</b>
Reading	89.1	93.5
Writing	90	96.3
Science	61.4	70.61

### **Data Analysis**

The primary question that I posed when beginning my research into integrated learning was; what is the experience of the students in Tahoma High School's Outdoor Academy program? While test results are arguably very important when considering the effectiveness of any teaching curriculum, it is equally important to first better understand the experience of the students involved in the curriculum. In order to find out more about the experience of the students in Tahoma's Outdoor Academy, I issued a questionnaire to the students at the end of the school year which asked the students to reflect upon their year spent in Outdoor Academy compared to their other, more traditional, courses that they were enrolled in at Tahoma the same year.

In this questionnaire, the students were asked to answer yes or no to the question, "Do you feel more connected with your teachers in Outdoor Academy than you do with your other teachers in your general education courses at Tahoma this year?" All 86 students in the Outdoor Academy were polled and 97.7% of students polled responded with a "yes" answer to this question, while only 2.3% of students

responded “no.” Additionally, students were asked if they feel closer and/or more connected with their peers in Outdoor Academy than with their peers in their other classes at Tahoma to which 98.8% of students responded “yes” and only 1.2% of students responded “no.” The questionnaire also provided an area for students to explain their answers if they would like to. One student, S25, explained, “I do feel more connected to the teachers in Outdoor because they take their time to get to know their students, unlike other teachers that have a lot of students every period and don’t take the time to get to know their strengths and weaknesses.” Another student, S39 stated, “So much of OA was getting to know the class and feeling comfortable with them, as with the teachers. I always had a good time and felt ‘at home,’ you could say in the class. In other classes, I get to know them for sure, but not nearly as well as you do when you spend all day with the same people and interact in the way we did.” S68 said, “I wish all my classes were like OA because students have a closer relationship with their teachers and other students- we had more of a chance to bond with each other with the silly “team building” games we played and fieldtrips.” Similarly, S83 also explained, “I absolutely do feel more connected to the OA students and teachers than I do to other classes at Tahoma. Each teacher knew us students individually. Mr. Hanson, Mr. Krause, Mr. Vollrath and Ms. Burns do look at the students as a class, but they knew each student’s personality too.” Here the recurring answer among the students was not only that they felt more connected with their teachers and students in Outdoor Academy in comparison to their other traditional classes at Tahoma, but furthermore, that the students noticed the teachers’ efforts to understand each student on a personal



level, both their personalities and their “strengths and weaknesses” as S25 put it. The fact that such a majority of students not only felt a stronger bond with their teachers and peers in Outdoor Academy but also noted that the environment of the classroom was the primary factor contributing to the fostering of these relationships seems to indicate that teachers are better able to connect with students and understand their academic needs when given the opportunity to spend time outside of the traditional classroom together in an environment that enhances learning, engages students and teachers in conversation, and provides new experiences for both students and teachers to share.

Next, I wondered if the students felt that the field trips taken in Outdoor Academy not only benefitted their student-teacher relationships, but also their academic lives. The questionnaire asked the students, “Do you feel that the field trips taken in Outdoor Academy were beneficial to your learning?” 95.3% of students polled answered, “yes,” while 4.7% of students answered “no” to this question. One student who answered “no” to the question explained that, “We mostly went on hikes which were fun but I think everyone was so tired that we just thought about getting to the top and then getting back down to the bottom. Yet, in light of such criticism, there were some important lessons taught during the field trips. Never give up during the hikes. Take care of your backyard during the log cabin [removing invasive species and planting trees].” While this student was one of four students that answered “no” to the question of if the field trips taken were beneficial to learning, even they seem to find the trips to be positive and capable of teaching “important lessons,” although they may not see the connection to

academics in the classroom. Additionally, another student that answered “no” to this second question said, “I think [the field trips] were pretty fun and were like a reward, but they didn’t teach us anything.” Similarly, another wrote, “The field trips were awesome, I don’t know if they helped me with my learning, but still.” Although four students responded “no” to field trips being beneficial to their learning, none of the students when expanding on their “no” answers indicated that they disliked the field trips or thought that they detracted from their overall learning. In fact, the “no” students all found them to be either a “nice reward,” good for “teaching important life lessons,” or were simply “awesome” in general. This information tells us that while some students did not see a connection between their classroom lessons and the lessons learned outdoors, all students found the field trips to be a positive experience.

While only four students did not see the field trips as beneficial academically, the majority of students (95.3%) felt differently and stated that “yes, the field trips taken in Outdoor Academy were beneficial to learning.” S8 explained that, “[The field trips] helped reinforce things that we learned in class like persistence and sustainability and stewardship. They also teach us how to work with our hands.” S8’s listing of “persistence” seemed to be the most popular benefit of field trips mentioned by other as well, with 21 of 86 students listing it as one of the major lessons taken away from field experiences. S9 stated that, “I loved the field trips. Not only did I learn a lot about science this year, but then we went outside and used/did/worked with it. Then we wrote about it to really get the feel for what we learned and reflect about what we learned and saw.” Another common theme

throughout the responses to this question was that the outdoors gave the students the chance to put PE, science and writing all to practical use outside of the classroom, which was mentioned 14 times throughout the 86 student responses. Another such example of this notice of curriculum integration into field experiences was explained by S18, "I think that the field trips benefitted my learning because we used many of the skills that we have been practicing in PE, learned about in Science and writing about in English and were able to use them in the field for real life experience." Again, the integration was noted by S35 who stated, "I feel the field trips do benefit our learning. I feel this way because of the fact that it is simply more fun to go outside in the real world and learn what we could be getting lectured about in class. The field trips allow us to apply it to more of a real world situation." With so many students pointing to real world experience as an essential piece of their learning, we see that field trips allow the students to make the connection between the things that they are taught in the classroom and their relevancy in the real world. Students have clearly fallen heavily on the side in favor of field trips being an important learning tool and while there are many different types of learners, including those few who do not benefit or see the connection between real hands on experiences and their academics, the majority would agree that getting hands-on experience, and connecting with the community, and the outdoors offers an added element that can not be as organically simulated in the classroom.

The next question posed to students on the reflective questionnaire was; do you feel that Outdoor Academy prepared you well for your future both at school and outside of school? Without a single waiver, 100% of the 86 students polled said that

“yes” Outdoor Academy did prepare them well for their future. Of the 63 students that wrote out an explanation for their answer to this question, 19 mentioned that Outdoor Academy helped them to prepare for their future at college because of the level of difficulty of the materials presented in the class, the variety of courses and the larger class size that met in a lecture hall setting for a portion of each day. S18 said that, “I definitely believe that OA has prepared me for the future because I have learned so many different things that I wouldn’t have learned in regular classes. In OA there is a good mix of challenges and fun. I’ve learned to be persistent, how to write better essays, how to ask better questions and how to study and prepare for big exams once I get to college.” Similarly, S35 explained, “OA has definitely prepared me for my future. I feel this way because ultimately my goal is to go to college and the lecture hall helped me to get experience in a college type setting with more students in one room.” These two responses are very similar to the other responses, which mentioned college preparation as a major benefit of having completed the Outdoor Academy course.

Since 100% of the students polled agree that Outdoor Academy has helped them to prepare for their future, we must next look at the standardized test scores to see how these students rank academically compared to their 10<sup>th</sup> grade peers at Tahoma who did not get chosen in the random lottery to join the Outdoor Academy. According to the 2010 HSPE results, at Tahoma High School the average reading score on the HSPE (including those in Outdoor Academy) was an 89.1%, while the average amongst Outdoor Academy students was a 93.5%. This increase in scores between the total school average and the Outdoor Academy average test score

means that the student in Outdoor scored over 5% higher in reading than did the 10<sup>th</sup> graders overall. In addition, on the writing portions of the HSPE, the school's average score was a 90%, while Outdoor Academy's average test score was a 96.3%. This means that, again, Outdoor Academy outscored the school's average by over 5%. Finally, on the science portion of the test, Tahoma's average test score was a 61.4%, while the average Outdoor Academy score was a 70.6%. This indicates that Outdoor's science students scored more than 15% higher on the HSPE science section than did their peers.

### **Implications**

As educators, we should all strive to be life long learners and to prepare our students to follow suit. Through this research I have shown that:

- Students in Outdoor Academy scored higher on standardized tests than their peers.
- Most students in Outdoor Academy feel a closer connection to their teachers and peers in the academy than to those in their other, more traditional classes.

When analyzing the outcomes of this research it seems that when teaching, outward experiences should also be inward experiences when it comes to learning. What we encounter in our lives every day should teach us about ourselves. One of the most exciting aspects of Outdoor Academy is that the students get to take each experience, whether it be hiking, biking, rock climbing, fly fishing, planting trees or removing invasive species, and learn to

see that there is always much more to learn than what we immediately perceive. The Outdoor Academy classroom at Tahoma High School was far from traditional, but sometimes what is traditional is simply not what is the most innovative and effective for each individual's learning style when it comes to education. Schools are not monopolies on learning, there is not simply one correct, "teachable" way to teach or to learn, and teachers are not robots designed to spew information and truth. Each student must be *taught* to be responsible for their own learning, and they must *learn* to look for it everywhere: in classrooms and books as much as in rivers, on hiking trails and in the dirt. Outdoor integration learning programs bring students to nature, which as the increased test scores for Outdoor Academy students prove, can be a fantastic teacher if it is allowed to do so.

Furthermore, my research in Tahoma's Outdoor Academy has shown that students test scores improve when they are connected to the classroom content/material in new ways, and that they also accelerate academically when they are connected to their teachers and to their peers. The amount of time that I was allotted to do this research within places some confines on knowing in which ways and to what degree teacher-student connections impact learning. However, I think that on a small scale, based on this class of 86 students at Tahoma, a correlation between student-teacher and student-

peer connection, and the students' overall academic achievement can be drawn.

## **Conclusion**

This research project aimed to gage the effectiveness of interdisciplinary teaching on the students in Tahoma High School's Outdoor Academy. This study provided at least a base point for the fundamentals of how this specific Outdoor Academy course impacts both the student's ability to retain (test) the information being taught, as well as the student's feelings of connection to their teachers and peers as support systems in their educational lives. Through the student's surveys, as well as my own field observations, I was able to interpret some of the ways in which weaving core subject areas together, and providing practical application for new knowledge build both enthusiasm for learning, and accelerated learning among Outdoor Academy students which is demonstrated in their higher standardized test scores in all subject areas taught in the academy. This study was successful in providing some foundational evidence in favor of layering subjects as they relate to one another and pairing learning with field experience for students as a cheaper means of raising test scores. It is my hope that this information, paired with others before it, might be used to persuade school districts, parents and voters alike to continue to financially and otherwise, support class fieldtrips and integrated learning programs in order to provide a better quality and experience with learning of both students and teachers alike.

## References

- Breaking ranks: changing an American institution: a report of the National Association of Secondary School Principals in partnership with the Carnegie Foundation for the Advancement of Teaching on the high school of the 21st century.. (1996). Reston, VA: The Association.
- Broda, H. W. (2007). *School Yard Enhanced Learning: Using the schoolyard as an enhanced learning tool, K-8*. Portland, Maine: Stenhouse Publishers.
- Concept to Classroom: Course Menu. (n.d.). THIRTEEN - New York Public Media. Retrieved November 10, 2010, from <http://www.thirteen.org/edonline/concept2class/index.html>
- Cornell, J. (1998). *Sharing Nature With Children: The Classic Parents' and Teachers' Nature Awareness Guidebook*. (Vol. Second Edition, Ed.). Nevada City, California: DAWN Publications.
- Danks, F, & D. Schofield. (2007). *Nature's Playground: Encourage Children to Get Outdoors*. Chicago, Illinois: Chicago Review Press.
- Jacobs, H. H. (1989). *Interdisciplinary curriculum: design and implementation*. Alexandria, VA: Association for Supervision and Curriculum Development.
- Jacobs, H. H. (2004). *Getting results with curriculum mapping*, Alexandria, VA.: Association for supervision and Curriculum Development.
- Kirkland, J. (2008). *No Student Left Indoors: Creating a Field Guide to Your Schoolyard (Take a walk series)*. Portland, Maine: Stenson Publishers.
- Littlejohn, G. (2005). *Teaching Green - The High School Years: Hands-on learning in grades 9-12*. ( Tim. Grant, Ed.). Portland, Maine: Stenhouse Publishers.
- Louv, R. (2005). *Last Child in the Woods: Saving Our Children from Nature-Deficit Disorder*. Chapel Hill, North Carolina: Algonquin Books.
- McGlashan, P, & K. Gasser. (2007). *Outdoor Inquiries: Taking Science Investigations Outside the Classroom*. Portsmouth, NH: Heinemann.
- Orr, D. W. (2004). *Earth in Mind: On Education, Environment and Human Prospect*. Washington, Washington, DC: First Island Press.
- "Pacific Education Institute — Learning By Doing: Initiatives, Programs, and Projects." *Pacific Education Institute — Home*. Pacific Education Institute. Web. 15 Feb. 2011.



Ratey, John J., and Eric Hagerman. *Spark: the Revolutionary New Science of Exercise and the Brain*. New York: Little, Brown, 2008. Print.

Sobel, D. T. (2008). *Childhood and Nature: Design Principals for Educators*. Portland, Maine: Stenhouse Publishers.

Ward, J. (2008). *I Love Dirt*. (Vol. I, Ed.). Boston, Massachusetts: Trumpeter Books.