

Evaluation of Students' Response to Field Trips to HJ Andrews Experimental Forest

Summative Evaluation Report

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Introduction

The Andrews Forest Long-Term Ecological Research (LTER) site has a long-term partnership with the University of Oregon Environmental Leadership Program (ELP), providing service-learning opportunities for undergraduate students to facilitate field trips for middle school students to the Andrews LTER site. Under the direction and mentorship of Dr. Katie Lynch (co-director of the ELP), undergraduate students develop field trip lessons based on Andrews Forest research and creative inquiry. Dr. Lynch also supports undergraduate students by providing instruction in effective and research-based teaching skills tuned for outdoor education settings. The students' work is also supported by Schoolyard LTER coordinator and Andrews LTER scientist Dr. Mark Schulze. In 2023, six classes and 156 students total engaged in day-long field trips at the Andrews LTER site that involved forest ecology and tree identification, time to reflect on and connect with the iconic old-growth ecosystems, and discussions about environmental stewardship ideas that the students could implement both at the Andrews LTER site and in their homes.



Middle school students hiking in the Andrews LTER

The students came from three different schools, two of them rural schools with low socio-economic status in the Lane County Educational Service District and the other a Montessori school in the Eugene area. This report shares the results from an evaluation project led by Dr. Matt Nyman and Dr. Kari O'Connell that assessed the impact of the field trips on the middle school students. The evaluation was designed to also support the middle school students' own reflection and learning at the same time as gathering data about the impact of the experience.

Methods

We conducted a mixed methods evaluation of the impact of the Andrews LTER field trip experience on the middle school students using an 8-question instrument (Appendix 1). Survey questions were developed collaboratively with Drs. Lynch and Schulze. The evaluation was also informed by previous studies by ELP that measured the short-term outcomes of field trips on both middle school students and undergraduate course participants. Of the 156 attendees we received a total of 138 responses although not all the forms were complete, which explains why some questions do not total 138.

Following the field trip, we asked the students to first “imagine” the field trip to the Andrews Forest prompting them with three rhetorical questions about their experience and focusing on both their learning and how they felt during their experience. Questions 1-7 were short answer questions that asked them to close their eyes and reflect on various parts of the experience: what they remember, one word that describes their experience and what was happening during the experience, what they learned, what they want to learn, what they can do to help the environment and one thing they will share about the field trip with family and/or friends. Question 8 included four Likert-scale questions that asked the students about how they felt after the field trip. Specifically, the questions asked about their degree of agreement to questions of if they felt more connected, experienced a feeling of awe, a willingness to help others and if they felt curious about the world; these questions were developed based on published instruments developed to measure awe (e.g., Price et al. 2021, Yaden et al. 2018).

The student participants completed a paper survey immediately at the end of the field trip, which was facilitated by the University of Oregon undergraduate students. Survey data was entered into Excel spreadsheets for each field trip. For the Likert-scale questions (Question #8) we calculated the averages for each question for each of the five field trips and calculated the average values for the combination of all the schools together (Figure 1). We coded the written, qualitative data using thematic analysis (O’Connell et al, 2018). The written responses were entered verbatim into the spreadsheet and examined for re-occurring terms or themes, which were then counted to develop a frequency for the terms or themes. For each question this data from the different field trips was copied to a single spreadsheet and the frequency for the terms or themes was totaled for all field trips. Finally, the coded themes or terms were then grouped into broader categories; for instance, the tree category contained themes related to tree identification, medicinal use of trees, specific tree types, old growth vs. secondary growth, etc. This is the data that is represented in the histograms in Figures 2-8.

Results

Likert-scale Questions

The Likert-scale questions asked students their degree of agreement on a five-point scale to four questions with a score of 5 indicating strong agreement and a score of 1 indicating the student strongly disagreed with the statement. Results are shown in Figure 1 for if students strongly agree to strongly disagreed with statements about how they felt after the field trip. For the question on feeling of connectedness average scores ranged between 3.77 and 4.22 with an overall average of 4.04 for all schools. For having a greater feeling of awe scores ranged from 3.71 to 4.21 with an overall average of 3.97. Average scores for “I feel a willingness to help others” were between 3.72 and 4.09 with an overall average of 3.97. Finally, average scores for “I feel inquisitive about the world” were 4.07 to 4.46 and a total average of 4.26.



Figure 1. Likert-scale data

Written Responses to Questions

In this section we will first generally describe the histograms of the coded terms. Some of the questions required single responses, so the totals are near the total number of surveys received. In other questions, students provided several answers that did not fit into one category, therefore the totals for that question are greater than the total number of surveys completed.

What Do you Remember from the Field Trip (Figure 2)

The most common feature that students remembered from the field trip included various information about trees. Most of these comments were around types of trees or identification of trees followed by more general information about trees such as students just listing the term “trees” or “learning about trees” but not being specific about learning to identify trees. Students also noted that they learned about the medicinal use of trees, the difference between old and new growth trees and phenology. Other categories included plants, climate, skills and setting, all of which were approximately 10% of the total responses. This included mention of items such as plant identification, what constituted lichen, plant growth, plant phenology, mentioning climate change or microclimates, learning how to use a compass and the beauty of the forest. Other items that students listed as remembering from the field trip include gaining new knowledge, information about Native American (including how their historical use of the forest) and information about forest animals.

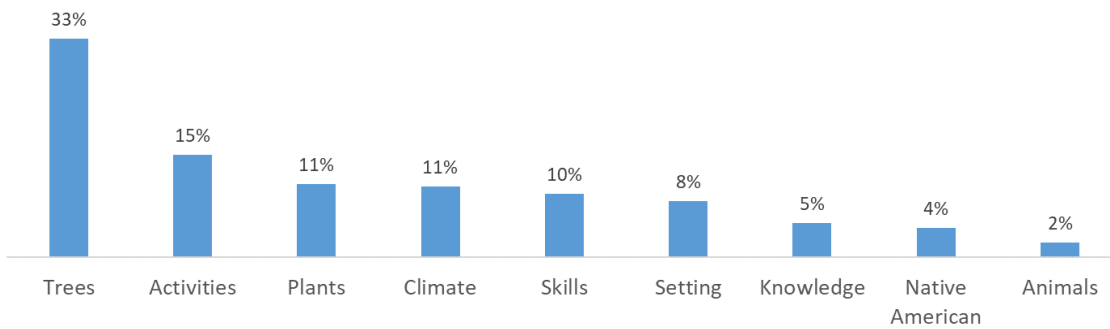


Figure 2. Frequency of responses to the question what do you remember from the field trip? (n=272)

One Word that Describes Your Experience During the Field Trip (Figure 3)

The second question asked students to write down one word that describes their experience during the field trip (Figure 3). 53% of the students responded with words that reflected a positive response to the event (Response to events (+)). This included words like fun (n=27), amazing (n=6), peaceful (n=5), exciting (n=4), interesting (n=4), awesome (n=2), beautiful (n=2), happy(n=2), cool(n=2), and intense (n=2). The next largest category was “response to events (0)”, which were words that relayed a neutral response to the experience including cold (n=16 – one of the field trips was very rainy), wet (n=3), experience, varied and “wooden”. The remainder of the categories had less than 6 responses with 6 students listing nature as the word that described their experience. Of note is that there were only three words in the category response to events (-) – boring (n=2) and disappointing (n=1).

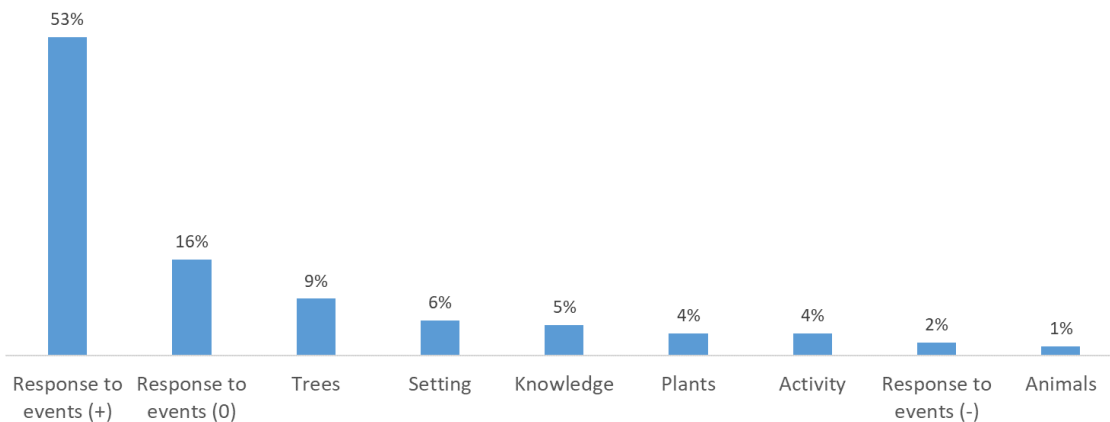


Figure 3. Frequency of responses to the question picture one word that describes your experience during the field trip? The response to event (+) means that students respond in a positive manner to the question; response to events (-) indicates the responder express some dissatisfaction with the outcome and response to events (0) means that the response was viewed as neutral, with no positive or negative connotation. (n=138).

Describe the Moment When the Word Came into Your Mind (Figure 4)

Figure 4 shows the frequency of answers to the question where students described the moment when the word in question 2 (Figure 3) came into the students' mind. The most common response was during activities that included observing the forest, during the sit spot, walking or hiking, being present or relaxing (usually during the sit spot), talking, drawing, and writing. Learning about trees was the second most common moment followed by learning different skills like doing science and using compasses. The positive response to events (Response to events (+)) included when students were having fun, were peaceful, joining community and having an adventure. The negative response (Response to events (-)) focused on being wet and cold. Some students indicated that the word came to mind during all events. Fewer students noted that the word came to mind during learning, either general gain of knowledge or learning about plants.

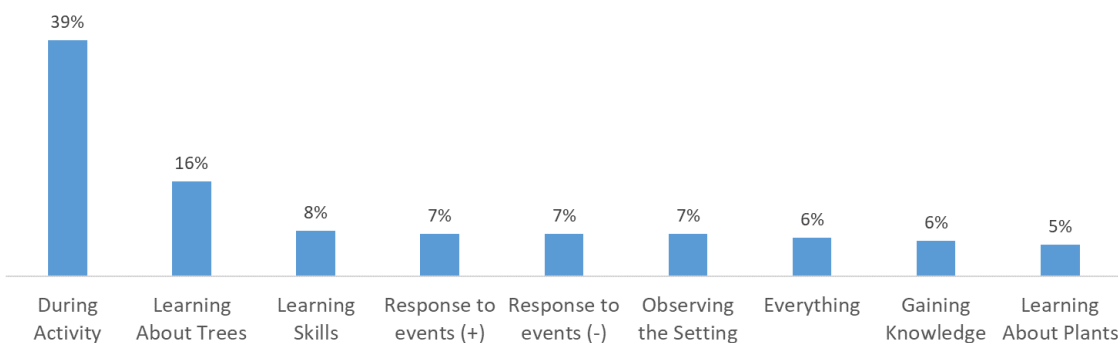


Figure 4. Frequency of responses to the question “describe the moment when the word came to your mind” (n=119)

Describe What You Learned (Figure 5)

We next asked students to think about what they learned during the field trip, which could have included a “concept, something about yourself or something new from or about someone else.” Over one half of the responses were something about trees. The inset histogram in Figure 5 shows the topics within the tree category, which include tree identification, types of trees, general characteristics of trees, other details about trees and the use of trees, namely the medicinal use of trees. Categories that had more than 10 responses include climate (microclimate, climate change), plants (phenology and plant identification), Native American (including history of Native Americans in the forest and Native American words), positive response to events (which including having fun), and skills (using compasses).

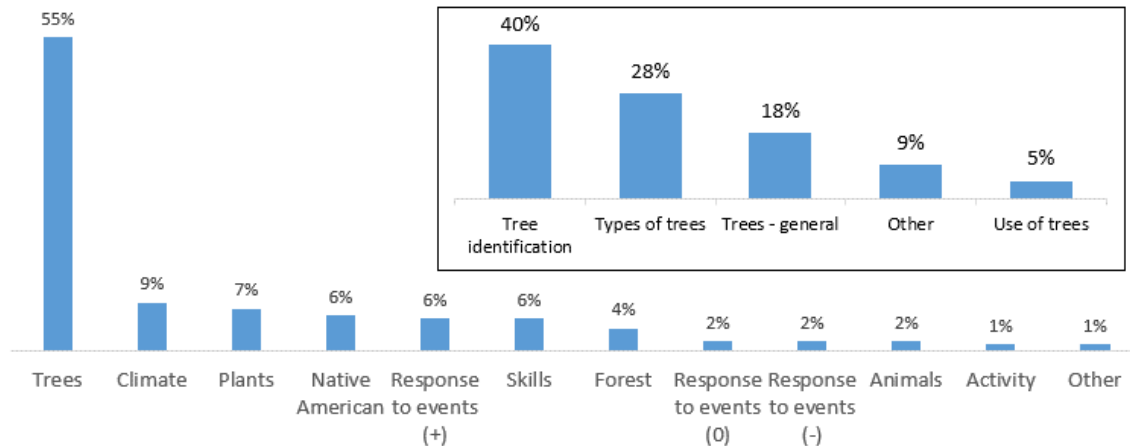


Figure 5. Frequency of responses to the question “what did you learn”. The inset histogram shows the frequency of specific items related to the tree category (n=176)

What Are you Curious to Learn (Figure 6)

Our next question asked about what the students may be curious to learn more about after their field experience. This question had 17 different categories, eight of which had fewer than 10 responses (and are not shown on the histogram in Figure 6). This includes more about climate and climate impacts, skills (namely using the compass), the river, forest, specific science concepts, specific activities they did, and fish. For the tree category students were interested in learning more general facts about trees and how to identify trees, about specific types of trees (mostly the Pacific yew), how long it takes trees to grow and how trees can be used as medicines. For plants, the main areas of interest were plant identification, phenology, and more information about mushrooms. Students were also curious about the types of animals that lived in the forest. For the Native American category there was interest in the history and living conditions for Native Americans who use to live in the forest. In the setting category students were interested in the history of the forest. And, finally, there were nine responses where students were not curious at all.

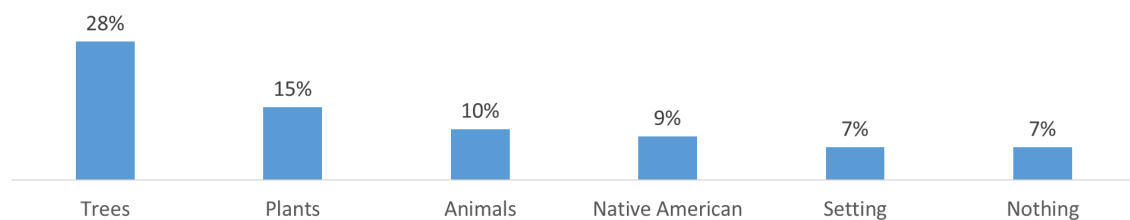


Figure 6. Frequency of responses to the question “what are you curious to learn” after the field trip experience (n=135)

What Can You Do to Help the Environment (Figure 7)

We were interested in students’ ideas on how they could help the environment because this topic was a focus of the field trip. The most common response was “do not litter,” which we also heard during our visit for one of the field trips. Personal behaviors included items such as: compost,

monitor energy use, be careful and kind, eat organic, make better choices, vote, walk, and respect environment. The next five categories include specific actions: reducing consumption, preserving resources, recycling, planting vegetation and gardens and education. Categories with fewer than 10 responses (and not included in the figure) included alternative energy, staying on the trail, I don't know or nothing, climate justice, bike, and punitive actions.

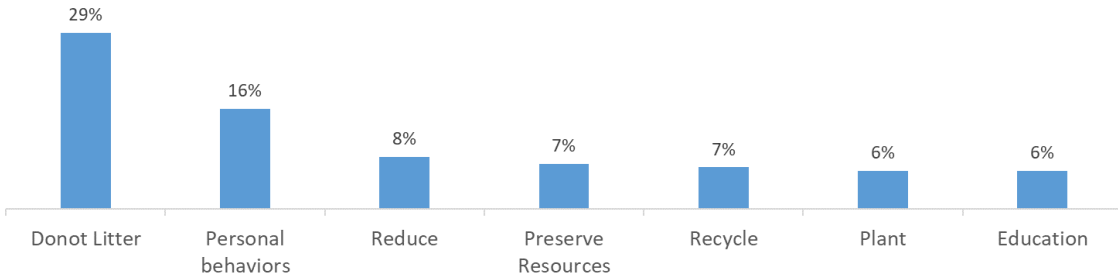


Figure 7. Frequency of responses to the question “What Can You Do to Help the Environment” (n=177)

What is One Thing You Will Share about the Trip with Family and/or Friends (Figure 8)

Like questions 1, 4 and 5, the most common response to what students would share was something about trees. This includes items such as individual tree types, snags, ages of trees, medicinal use of trees, the size of trees and the idea that trees need care. The most popular forest/setting category response was “setting”, which typically did not have additional qualifiers. For the positive response to events category the most common response was that the experience was “fun” followed by “everything”, “a cool experience” and “interesting.” Responses that had multiple but fewer entries included details about plants (plant identification, phenology) and some negative responses to the experience like boring, disappointing and “nothing.”

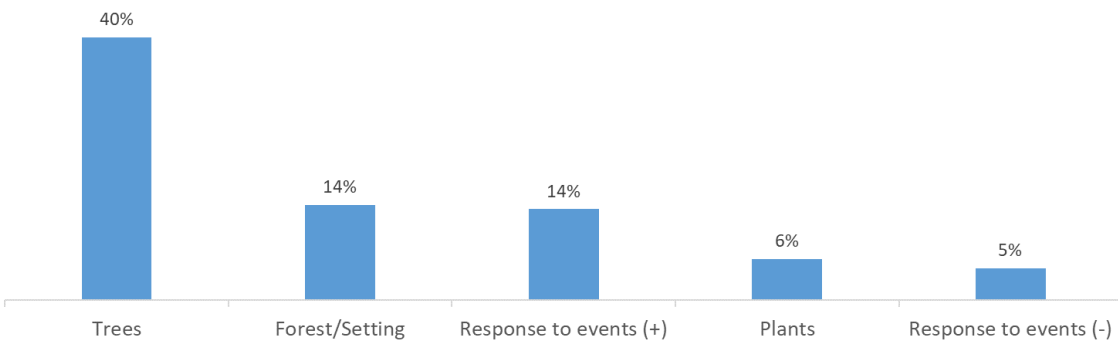


Figure 8. Frequency of responses to the question “What is one thing you will share about the trip with family and/or friends” (n=145)

Interpretations and Implications

- Based on data from the Likert-scale questions, the field trip experience increased students' feelings of connection and awe, willingness to help others and being inquisitive about the world (Figure 1).
- Most of the students reported that they had a very positive experience during the field trip. This is supported by the results from the question where we asked students to tell us one word to describe their field trip experience (Figure 3). Responses included fun (n=27), amazing (n=6), peaceful (n=5), exciting (n=4), interesting (n=4), awesome (n=2), beautiful (n=2), happy (n=2), cool (n=2), and intense (n=2). When we asked students when they formulated these words the most common response was during the activities, which is another indication that supports that the students had a positive experience (Figure 4). There were very few negative reviews of the field trip recorded in any of the questions. Perhaps the greatest number of complaints came from students who attended the field trip that occurred on a very wet day when there were statements about being cold and wet.
- Students learned a lot about trees during the field trips! For four of the written questions "trees" was the category that had the most responses. This includes questions about what they remembered, what they learned, what they were curious about and what they were going to share with friends and/or family. Further, learning about trees was the second most frequent category for the question on what they were doing when the "word" to describe their experience came to mind.
- The "sit spot" was an important time for students' reflection as it was mentioned as one of the prime moments that students mentioned where they visualized a word that described their experience. The sit spot was also mentioned as the time when students relaxed and described themselves as being more present. Clearly, this is an important field trip activity, and we encourage the instructors and staff to continue to use this technique.
- At first, we were somewhat surprised that the most frequent response to "ways we can act that consider the environment and living things" was "do not litter" (Figure 7). Reducing littering is certainly an important environmental action but seemed slightly disconnected to the overall forest field trip experience. Notably, even though there was a unit on climate justice only four students listed this as a response to this question. We believe that there are several issues at hand with respect to this data: 1) during our visit to the field station we did hear instructions about not littering in the forest. Clearly students took this to heart and connect this action strongly with the field trip experience; 2) this connection may, in part, reflect the notion that middle school students are more "in the present" and when asked about environmentally focused action tended to replay the most immediate (and important) action that they heard that day; 3) attending to littering is a task that is both concrete and doable, which may have resonated with the students; and 4) we did a brief literature search on how (or if) middle school students conceptualize climate change processes and possible human responses. Several studies investigate attitudes and responses to climate change for children ages 8-19 and have proposed an "adolescent dip" where there is less attention and

willingness to act in response to climate change impacts (e.g., Lee et al., 2020). The reasons for this correlation between age and decreased response to climate change impacts include the fact that adolescents realize the inconvenience in acts that are required to confront climate change, that the lower concern for others and lower interest in nature represent a state of more hedonistic values for this age group, and the reduction in concern and action is a coping strategy at a time when adolescents feel less empowered, especially in regard to seemingly intractable, large-scale issues like climate change. Researchers acknowledge the need for more research to further flesh out the reasons for the “adolescent dip”.

- We believe that this data on students’ responses to the question “what they can do to help the environment” provides some guidance for future field trips. Specifically, we suggest that instructors during their discussions and perhaps different exercises emphasize a range of environmental behaviors that can benefit the environment and/or decrease impact. For example, instructors could discuss both the need to not litter in the forest and the larger scale processes of recycling. Or instructors could discuss some of the local research and how it applies on a larger scale; regional, national, or global. A key would be settling the students into something that is actionable and doable while also fostering a more global mindset about how individuals and individual action can impact the environment at a larger scale. This could be the subject of one of the modules that students develop for their coursework and use during the field trip. A bottom line is that the field trips to the Andrews Forest offer an opportunity for introducing environmental and ecological issues at a variety of scales and we encourage students and faculty to consider leveraging this opportunity.

Future Work

We enjoyed working on this project and having the opportunity to coordinate with University of Oregon faculty and students and Andrew’s staff. We would like to entertain the possibility of continuing this work, and here are some ideas that we would like to jointly consider:

- Although we gathered some good data from the surveys we believe that more planning and collaboration with ELP and Andrews could lead to a deeper and broader set of questions, which would require modification of the current survey.
- Recalibrating the evaluation would require an earlier start to the collaboration; perhaps this would allow more interactions with the undergraduate students who conduct the field trips. And perhaps we might want to learn



Middle School students learning to use compasses during field trip to Andrews LTER

more about the impact of the course and interactions with students on the undergraduates. (We propose this without knowing the extent of ELP evaluation efforts).

- We also wonder about potential work with other LTER sites that may have or wish to establish similar programs.

References

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Acknowledgements

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Appendix – Survey

School:

Date:

Before answering each of the questions, close your eyes and spend some time imagining your field trip at Andrews Forest. What did the forest look like? What were you excited about? What stop or piece of information most intrigued you? Try to return to how you felt during the field trip and give yourself time to remember the details of the experience.

1. What do you remember from the field trip?
2. Close your eyes and picture one word that describes your experience during the field trip today. Write down that word.
3. Close your eyes and picture the moment that describes the word that came into your mind in question #2. This moment could be an interaction, an observation, or anything else. Describe this moment.
4. Close your eyes and recall something you learned today. You may have learned about a concept, something about yourself, or something new from or about someone else. Describe what you learned.
5. Close your eyes and consider what you want to learn more about now that you have had this field experience in the Andrews Forest. Explain what you are curious to learn.
6. What can you do to help the environment?
7. What is one thing you think you will share about the field trip with family and/or friends?
8. Please list the extent to which you agree or disagree with the following statements. (SA = strongly agree, A=agree, N=neutral, D=disagree, SD=strongly disagree)

After this field experience....	SA	A	N	D	SD
I have a greater feeling of connectedness.					
I have a greater feeling of awe.					
I feel a willingness to help others.					
I feel curious about the world.					