

Evolution of Sense of Place Throughout a Field Trip

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ABSTRACT: Field-based learning for undergraduates is a critical component of geoscience education as it emphasizes the value of in-class course content, provides an opportunity for identity development and builds confidence. Fieldwork is currently taught devoid of human emotion. However the places taught in and about will inevitably become saturated by human experience since scientific analysis is only aspect of meaning that a place can amass. The *sense of place* encompasses the meanings and attachments that places hold for people by taking into consideration place attachment and place meaning. We posit that over the course of a fieldtrip student will develop a strong emotional connection to their surrounding environment. We used published surveys to assess place attachment and meaning in different students who participated on these fieldtrips. We observed a significant gain in place attachment among the American students, rather than the UC students over the course of the field trip. The American students also seemed to develop a stronger sense of place throughout the Cass fieldtrip versus the Westport fieldtrip. All of data suggests that the instruments and surveys used for this research are indeed sensitive enough for use within the context. We observed that female students exhibited a stronger correlation between their pre and post-test score for both types of students, as well as location. This indicates that female students' post-test scores are more dependent on their pre-test score. Furthermore, the female students consistently exhibited a higher shift, thus suggesting that their attitudes were more easily altered and thus were able to develop a stronger place attachment. Lastly, it was noted that male students generally scored higher on both the pre and posttests; however the male students' shifts were consistently less than the female students'.

INTRODUCTION

Field-based learning for undergraduate geology students is a critical component of geo-science education as it builds confidence, emphasizes the value of in-class course content and provides ample opportunity for identity development (van Der Hoeven *et al.*, 2011). However, most of the research to-date addressing field education has largely focused on the cognitive component and less on the experiential domain. The emotional aspect of learning is referred to as the affective domain and is comprised of three factors: emotion, attitude and motivation (van Der Hoeven *et al.*, 2011). Therefore, leveraging the affective domain can lead to an increased understanding of conceptual knowledge in students due to the “intrinsic motivation”.

In order to fully comprehend the students’ affective domain, it is essential to first understand the level of affiliation they feel for their fieldwork area as it directly relates to the students’ attitude and emotion. This is known as a *sense of place*, which encompasses the meanings and attachments that places hold for people (Semken & Freeman, 2008). Sense of place is often contextually bound (Semken & Freeman, 2008), which leads to the question of whether the sense of place can be altered and evolved along with the landscape. Furthermore, place-based teaching has potential to attract under represented groups, such as women and minorities, to science (Semken & Freeman, 2008).

Carlson (2000) believed that geoscience was essential because it increased the value of nature, which leads to the questions of whether or not nature can increase the value of geo-science education. Considering this previous work, we must now examine how a selection of geo-science students perceive and interact with their fieldwork area (in this case, Castle Hill Basin and Westport). Does the relationship between student and place change and evolve over the course of the fieldtrip? Based off of this interaction with the space, it is important to assess if the emotional connection differs between different types of students. Is there a correlation between whether or not the students’ attitudes change and gender?

Understanding how the students’ sense of place evolves throughout the duration of a fieldtrip has great implications on the broader benefits of field education. Contributing research to the affective domain will not only provide higher quality education, but also provide opportunities for students to develop a more complex sense of identity as it pertains to the natural world, an “ecological identity” (van Der Hoeven *et al.*, 2011).

METHODS

This work is most easily described as an ethnographic study, a method traditionally used by anthropologists when immersing themselves into a “culture-sharing group” (Wolcott, 1990; Feig, 2010). Students within a field camp undergo shared experiences and demonstrate shared patterns of observable behavior, thus a group of students during field camp is appropriate for an ethnographic study.

It is important to note that ethnography is not a purely empirical process, such as typically associated with geo-scientific research. Although some

geoscientists have expressed legitimate concern (Feig, 2010) about the reliability of a non-numerical methodology, some educational problems require qualitative approaches. This is due to the fact that the results are entirely dependent on the students' emotions and attitudes. For the noted reasons, this research project consists of mixed methods, incorporating both quantitative and qualitative data. Quantitative data taken from the surveys is the main source of data. Nevertheless the qualitative data, observations in the field and interviews, will play an important role in affirming the interpretations of the numerical data. Furthermore, ethnographic studies generally do not have hypotheses as this has the potential of biasing the observations.

The qualitative aspect of this research consists of personal observations made of the students while in the field together. The quantitative aspect is composed of a number of surveys that were given to the students before their first day in the field (pretest) as well as after field camp had finished (posttest). These quantitative surveys allow for a larger sample size and address the concerns many geoscientists have expressed about purely qualitative analysis. One of the surveys originated from Williams and Vaske (2003) and is known as the *Place Attachment Inventory (PAI)* (Table 1). The other survey is known as the *Place Meaning Survey (PMS)* and was derived by Young (1999) (Table 2). These surveys were handed out to University of Canterbury (UC) students during a field trip in Castle Hill Basin (Cass). Additionally, data for this project was taken from Frontiers Abroad (FA) students, who were given to same surveys. The FA students completed the identical field trip as the UC students in Cass, however the FA students also completed the PMS and PAI surveys for a fieldtrip in Westport.

Place Attachment Instrument of Williams and Vaske (2003)

1. I feel (place name) is a part of me.
2. (Place name) is the best place for what I like to do.
3. (Place name) is very special to me.
4. No other place can compare to (place name).
5. I identify strongly with (place name).
6. I get more satisfaction out of visiting (place name) than any other.
7. I am very attached to (place name).
8. Doing what I do at (place name) is more important than doing it in any other place.
9. Visiting (place name) says a lot about who I am.
10. I wouldn't substitute any other area for doing the types of things I do at (place name).
11. (Place name) means a lot to me.
12. The things I do at (place name) I would enjoy doing just as much at a similar site.

Note. The even-numbered items measure place dependency, whereas the odd-numbered items measure place identity.

TABLE 2
Place Meaning Survey of Young (1999)

| | |
|----------------------------------|------------------------|
| Ancient | Ecologically important |
| Pristine | Fun |
| Scenic | Threatened |
| Beautiful | Crowded |
| Remote | Dangerous |
| Unique | Interesting |
| Important to preserve | Educational |
| Authentic | Tranquil |
| Privilege to visit | Spiritually valuable |
| Relaxing | Fragile |
| Important for Aboriginal culture | Wilderness |
| Overdeveloped | Historical |
| Tropical | Exotic |
| Unusual | Adventurous |
| Scientifically Valuable | Comfortable |

Data collecting occurred during field camp in Castle Hill Basin with a group of University of Canterbury (UC) students a week before their first semester of 2015. Informed formal consent from the students was required at the beginning of the week in order for observations to take place them as well as the collection of their surveys. The night prior to going into the field, surveys were distributed to the participants. Visual analysis of students in the field was taken at a distance by means of observation and drifting from group to group. This method was chosen in order to view as many groups as possible throughout the day. Furthermore, it was important that the students not associate the observations that were being done on them with their potential outcome in the course. Nevertheless, informal and unstructured conversations did take place while in the field. This was typically done in an attempt to understand the students' mental process and how they were feeling. Because these transactions were casual there is no exact transcription of the dialogue; however the general sentiment was recorded. However, most of the personal observations consist of descriptive notes relating to the students' attitudes in the field viewed from afar. When the fieldtrip had come to an end, another set of surveys (the exact same ones as before) was distributed to the participants again.

RESULTS

The answers given on the surveys were converted into a numerical system in order to calculate the averages and standard deviation of the pre and posttest scores for each individual student. The shift indicates the difference between the pre and posttest scores, thus giving us and of how much each student's answer changed throughout the course of the field trip. The correlation between the two sets of surveys was also calculated in order to expose how dependent the posttest scores

were on the pretests. This essentially measures how powerful and compelling the students first impressions were. Furthermore, the correlation percentage was also calculated in an effort to better illustrate the percentage of answers of the posttest that were correlated with the pretest scores. The p-value (right column) indicates whether or not this correlation is statistically significant, which is when p is less than 0.05.

| Place Meaning Survey (Max Score 150) | | | | | | | | | | |
|---|----|------------|-------------|--------------|---------|----------|-----------|--------|-------|--------|
| | n | Avg of Pre | Avg of Post | Avg of Shift | Std Pre | Std Post | Std Shift | Correl | % | p (<) |
| UCcass All | 31 | 90.29 | 95.94 | 5.65 | 19.51 | 14.73 | 21.61 | 0.23 | 5.17 | 0.2036 |
| UCcass Female | 6 | 88.67 | 96.33 | 7.67 | 3.20 | 8.12 | 6.19 | 0.60 | 35.68 | 0.0569 |
| UCcass Male | 25 | 90.68 | 95.84 | 5.16 | 21.75 | 16.05 | 23.55 | 0.23 | 5.08 | 0.2541 |
| FACass All | 23 | 104.00 | 112.13 | 8.13 | 8.39 | 15.13 | 12.19 | 0.59 | 35.24 | 0.0042 |
| FACass Female | 17 | 103.53 | 111.82 | 8.29 | 9.10 | 17.17 | 13.63 | 0.61 | 37.71 | 0.0091 |
| FACass Male | 8 | 103.63 | 113.00 | 7.67 | 8.47 | 7.95 | 7.71 | 0.45 | 19.80 | 0.0359 |
| FAWest All | 19 | 83.37 | 94.00 | 10.63 | 11.43 | 14.53 | 14.82 | 0.37 | 13.50 | 0.0058 |
| FAWest Female | 12 | 80.58 | 94.82 | 13.83 | 10.75 | 15.25 | 14.70 | 0.54 | 28.93 | 0.0148 |
| FAWest Male | 7 | 85.40 | 98.00 | 10.60 | 11.74 | 9.78 | 14.39 | 0.05 | .25 | 0.0497 |

The results from the PMS data do not exhibit many obvious trends; however it is apparent that the female students exhibit higher shifts than the male students. The UC female students exhibited a shift of 7.666, whereas the male students only had a shift of 5.16. Meanwhile, the female FA students displayed a shift of 8.294, whereas the male FA students only had a shift of 7.666. This trend was also true for the data collected in Westport. Furthermore, the female students also tend to have higher correlation percentages. The percent correlation of the female UC students was 35.68% versus their male equivalents, who only exhibited a correlation of 5.08%. This was also observed for the FA students (37.71% vs. 19.80% in Cass and 28.93% vs. 0.2537% in Westport).

Place Attachment Index (Max Score 60)

| | n | Avg of Pre | Avg of Post | Avg of Shift | Std Pre | Std Post | Std Shift | Correl | % | p (<) |
|---------------|----|------------|-------------|--------------|---------|----------|-----------|--------|--------|--------|
| UCcass All | 31 | 25.52 | 31.13 | 5.61 | 9.20 | 13.31 | 7.96 | 0.81 | 65.70 | 0.0581 |
| UCcass Female | 6 | 21.33 | 27.17 | 12.00 | 10.33 | 9.35 | 5.76 | 0.90 | 81.47 | 0.3292 |
| UCcass Male | 25 | 26.52 | 32.08 | 9.52 | 8.84 | 14.09 | 9.87 | 0.81 | 65.51 | 0.1011 |
| FAcass All | 23 | 32.39 | 39.70 | 7.30 | 6.59 | 7.00 | 5.26 | 0.70 | 49.23 | 0.0001 |
| FAcass Female | 17 | 30.94 | 39.18 | 8.24 | 6.17 | 7.18 | 5.76 | 0.64 | 40.55 | 0.0011 |
| FAcass Male | 6 | 34.63 | 41.17 | 4.67 | 6.57 | 6.85 | 2.07 | 0.95 | 90.921 | 0.1223 |
| FAWest All | 25 | 30.32 | 31.80 | 1.48 | 6.80 | 6.76 | 6.61 | 0.52 | 27.53 | 0.2734 |
| FAWest Female | 17 | 28.35 | 30.06 | 1.71 | 6.59 | 6.86 | 6.94 | 0.47 | 21.82 | 0.4649 |
| FAWest Male | 8 | 34.50 | 35.50 | 1.00 | 5.48 | 5.10 | 6.26 | 0.30 | 9.11 | 0.7111 |

The results from the PAI paired pre-post comparison show a gain in mean student PAI score for both types of students as well as location. This indicates an increased place attachment for the field area in which the students were studying.

The shift between pre and post-test scores for Westport is significantly lower than the shifts observed in Cass. The average shift for Westport was only 1.48, whereas the average shift for Cass was 6.07 (5.61 for the UC students and 7.30 for the FA students). Even the correlation between the pre and post-test scores for Westport is lower than that of Cass, suggesting that the answers from the post-test are relatively dependant from the answers given on the pre-test.

When comparing the UC and FA students using solely the data taken from Cass, two trends are apparent. The FA students exhibit higher pre, post-test scores and shifts than the UC students. Additionally, the UC students have a higher correlation percentage (65.7% versus 49.2%), thus suggesting that their first impressions deeply influenced their answers for their post-survey.

These results also indicated that male students' tended to have a higher pre and post mean test score compare to their female student counterparts. Male students' also exhibited a lower mean shift; this trend was applicable throughout the two different student groups as well as different field locations.

DISCUSSION

Because there were so few definitive patterns observed among the PMS data, this discussion will focus primarily on the PAI data and trends. Furthermore, much of trends in the PMS data are simply microcosms of those observed with the PAI data. The results of the PMS data, indicate the female students generally have higher shifts than both the average and the male students. This discrepancy in shift implies that the female students' opinions about the surrounding environment are more easily changed. Furthermore, the female students also exhibit a higher correlation percentage. This larger correlation suggests that women hold more weight in their first impression because their posttest scores are far more dependent on their pretest scores than their male counterparts. Initially, it may seem counterintuitive that women exhibited higher shifts, while also demonstrating higher correlations between pre and post text scores. However, the two are not necessarily related.

The most significant observation deduced from the PAI survey is the fact that posttest scores were consistently higher than pretest. This suggests that students absolutely do develop an emotional connection with the environment and place they are studying throughout the course of the fieldtrip.

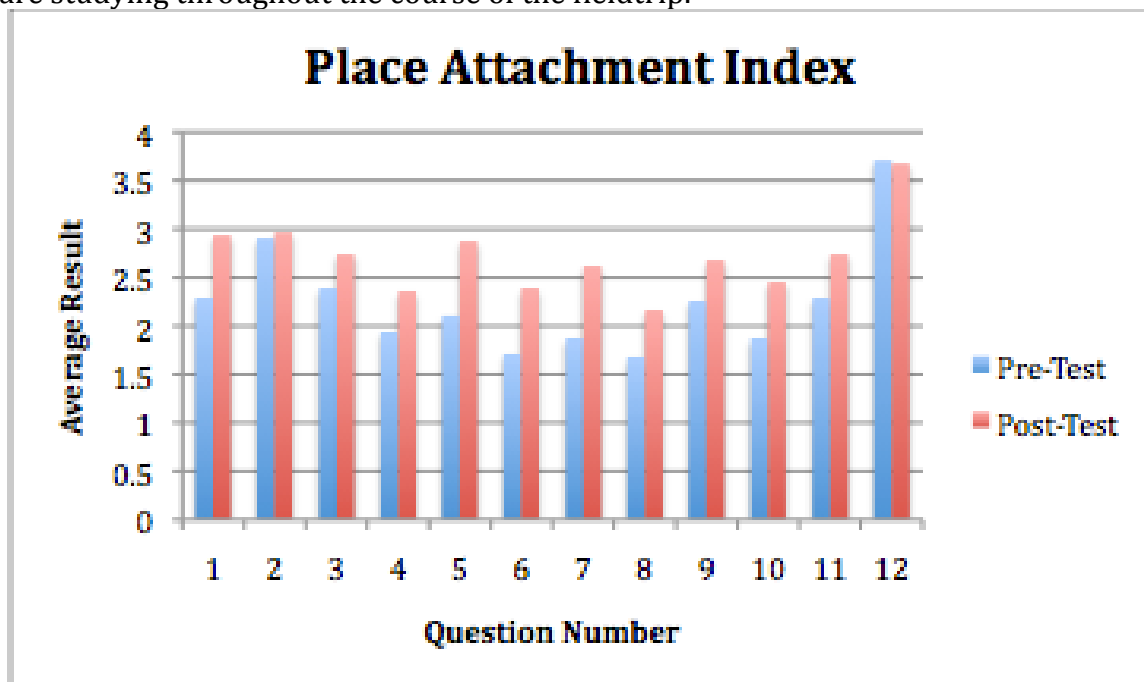


Figure 3. Histogram graph depicting the relation between pre and post scores for UC students in Cass.

As stated previously, there is a discrepancy between the PAI scores of Cass and those of Westport. The shift observed in Westport between the pre and post-test scores was much lower than that of Cass. This suggests that the students, both UC and FA, did not develop an equal level of attachment for each location. In general, all of the students seemed to demonstrate a stronger emotional attachment to Cass. One explanation for this difference could be a direct result to how each field program was taught. In Cass, the students were essential set loose in the field

mapping area, required to exert themselves physically within the field and expected to come back with their own interpretation of the geologic structures of the area. On the other hand, the Westport fieldtrip consisted of being driving around to different areas. The students never truly knew where they were going to at the start of the day, nor what they were expected to do until there were already on site. Furthermore, in Cass the students were broken up into small groups of four, whereas in Westport the students were usually divided into two large groups that seemed to change every other day. All of these factors could have caused the students to feel more of a connection with Cass and less of a connection with Westport due to the constant instability and uncertainty.

Another possible reason why FA students exhibited less of a connection to Westport than they did to Cass is because the novelty of the coast had receded because the FA students had already mapped Kaikoura a week before. Therefore, when comparing Cass and Westport to what the students had previously studied, Cass made a much larger impression due to its extreme contrasting environment to Kaikoura. Furthermore, this discrepancy in shift could simply be a result of the fact that in general geologists tend to prefer mountains. Alison Jolley conducted a number of interviews with the UC and FA students and found that when posed with the question "Where is your favorite place in the mapping area?" most students, and even the professors, responded that they enjoyed climbing to the tallest point in order to gain perspective. This overwhelming predilection for mountains could also justify the discrepancy in shift between Westport and Cass.

Not only is the average shift of Westport lower than that of Cass, but also the correlation percent between the pre and post-test score is also lower. The correlation percent for Cass is 58.6845% (65.697% for the UC students and 49.233% for the FA students). This suggests that the posttest results for Westport are less dependent on the pretest scores and first impression. This is likely the consequence of shuttling the students around in vans and exposing them to a number of different landscapes. Because the Westport fieldtrip was packed with so many varying environments, the students' first impressions held less significance and were not enhanced throughout the course of the week, thus causing the correlation percentage between the pre and posttest to be lower than that of Cass.

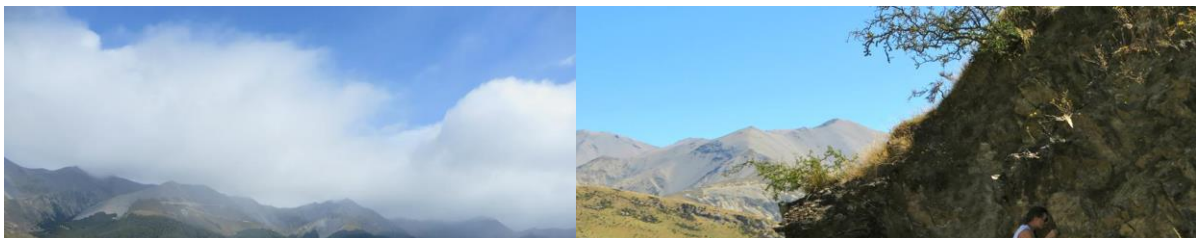




Figure 1. Images of Cass. A (view from sows back; a student frolics in the mountains of Cass), b (student takes strike & dip), c, d (broken river)



Figure 2. Images of Westport.

Comparing the students within a particular location showed yet another discrepancy; the FA students exhibited higher pre and posttest scores than their UC counterparts. Both sets of students attended the Cass field trips; they completed this fieldtrip at different times but were expected to accomplish identical tasks. Not only did the FA students exhibit higher scores, but they also had a higher average shift when comparing all of the students. Initially it might seem discordant that the FA

students exhibit a stronger emotional connection to the New Zealand landscape than the UC students. However, it is possible that the UC students have become accustomed to the landscape, so much so that their emotional connection exhibits an apathetic and blasé sort of attitude. Contrarily, upon entering Cass the FA students were likely amazed by this new environment and so their pre and posttest scores reflect this intense sensation. The greater shift of the FA students suggests that they developed a stronger emotional connection to the Cass mapping area than the UC students. An explanation for this could be that the FA students were able to develop an instant connection with Cass because it was one of the first places in New Zealand that they studied. Therefore, without having much knowledge of the remaining parts of New Zealand the FA students didn't have a lot to compare it with and thus immediately became attached to where they were based on their circumstances.

Furthermore, the FA students exhibit a lower correlation percentage than their UC counterparts, thus suggesting that their posttest results were less dependent on their first impressions. This is likely another result of the FA students having spent very little time in New Zealand. None of the students had yet to develop any concrete ideas about the landscape, and so throughout the fieldtrip their impressions of the environment changed. This ultimately resulted in a lower correlation percent between the pre and posttest scores. The UC students had ample time to develop opinions concerning the New Zealand scenery and therefore tend to adhere to their first impression with determination. This explains why the UC students' shifts were lower, as well as their higher correlation percent values.

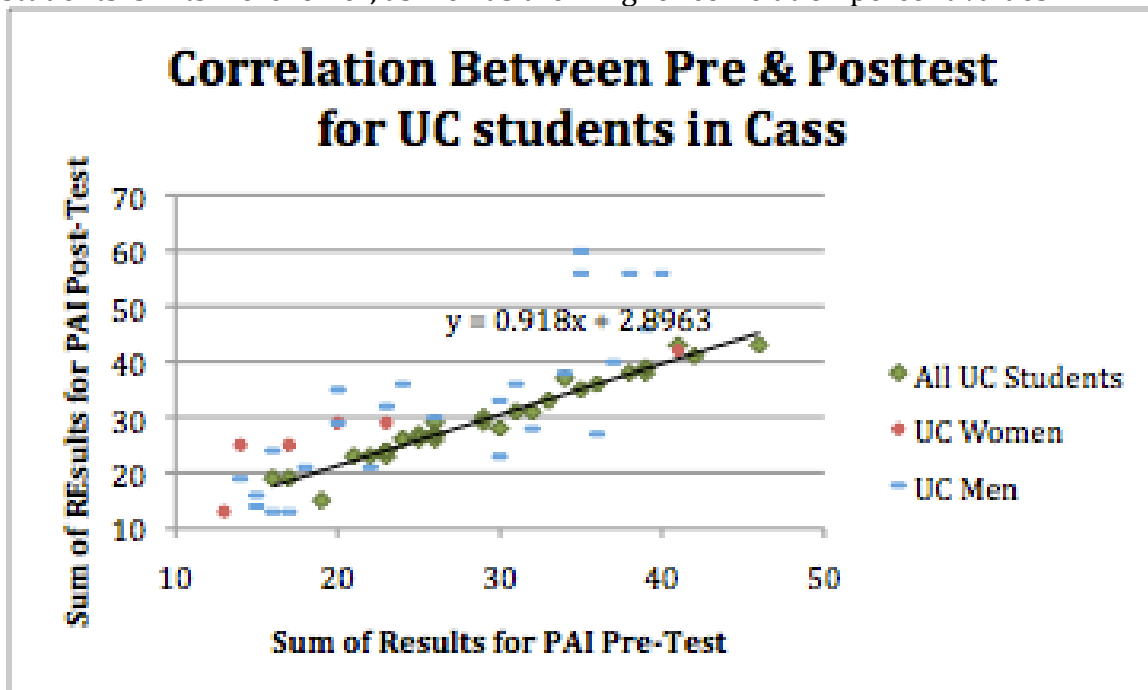


Figure 3. Scatter plot graph depicting the high correlation UC students exhibited between the pre and posttest scores.

The final observation of this data resulted in a comparison between the

female and male students. As stated previously, the men exhibited both higher pre and posttest scores. However, the women consistently appeared to have higher shifts. These trends hold true across both sets of students, FA and UC, as well as for the different locations. A possible justification for why male students tended to have higher PAI scores could be because men might feel more comfortable answering “strongly agree”. Meanwhile, the women might have been less inclined to circle “strongly agree” and therefore leaned towards more neutral answers. The larger shifts that the women exhibited are likely the product of women having being more emotionally mature and thus more capable of developing a connection with a place.

CONCLUSION

The PMS survey did not provide any major patterns of interest and therefore the remainder of the paper focused primarily on the results of the Place Attachment Index survey. This data clearly shows that students do develop a place attachment throughout the course of a field trip due to the fact that posttest score were consistently higher than pretest scores on the PAI survey. We also observed that the students’ place attachment was dependent on the location of where they were studying. This is likely due to how the course is taught within the different fields as well as the visual impact of the landscape. Furthermore, different types of students exhibited different patterns; UC students score were lower than the FA students’, however their pre and posttests were much more correlated than the FA students. This suggested that students were accustomed to the environment were less awe-inspired by the environment able to make much more solid first impressions. Lastly, we noticed that there were distinctive differences between the scores of the female and male students. Men exhibited higher pre and posttest scores. Meanwhile, women’s shifts were consistently greater, suggesting that their attitudes are more easily changed. Now that these patterns have been observed, future work would be to correlate the students’ place attachment with their motivation and how this affects their ability to learn.

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