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UW Academic Challenge and Engagement Study (UW ACES):

Earth and Space Sciences

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INTRODUCTION

Research on learning in college shows that learning is profoundly shaped by the goals, practices, cultures, and values of the academic disciplines[1], particularly the disciplinary practices in students' majors. Therefore, if we are to understand the kinds of experiences that students find intellectually rigorous (and, thus, engaging), we need to examine challenge in the major. Understanding challenge in the major is important because at every stage of their college experience, students report that they want to be challenged, that they perform better in courses that are challenging, and that they value classes that stretch their thinking and ask them to demonstrate learning more than they value classes that ask little of them.[2] Although learning about where students experience challenge is important, asking students to describe challenging learning experiences in their majors requires some prior understanding of how those majors operate. The Office of Educational Assessment (OEA) designed the UW Academic Challenge and Engagement Study (UW ACES) to accommodate these needs.

METHOD

Qualitative methods are recommended when researchers are seeking to understand the complex learning experiences of students, as well as the meaning they ascribe to those experiences[3]; therefore, we designed the UW ACES to be primarily an interview study.[4] Using a "citizen science" model, OEA asked departmental advisers if they would be willing to volunteer to interview seniors in their departments who came in to advising to apply for graduation. Advisers are knowledgeable about their academic programs, understand disciplinary practice in their departments, and are trusted by students in the major, so they have the best chance of gathering good information from seniors about their experiences in the major.

Sixty-six advisers from 33 undergraduate programs volunteered to participate. During the 2012-13 academic year, the volunteer advisers asked students if they would participate in brief (5-10 minute) interviews about challenge in the major. If the students agreed, advisers asked them to respond to four open-ended questions, entering students' responses directly into a Catalyst survey form that OEA researchers had designed for that purpose. The questions were as follows:

[1] Beecher & Trowler, 2001; Bransford et al., 2000; Beyer et al., 2007; Donald, 2002; Pace and Middendorf, 2004; Wineburg, 2001, 1991; Neumann et al., 2002; Shulman, 1988; Biglan, 1973.
[2] Beyer, et al., 2007.
[3] Merriam, 2001.
[4] One participating department asked students to respond to the open-ended questions in writing.

1. What do you consider to be the most challenging work that you had to complete in this major? And by "challenging" I mean doing the work that stretched your thinking the most. This can be anything—a project, a paper, an exam question, homework, something else you did related to the major.
2. What made the project/class/activity challenging?
3. What did you do or learn that enabled you to meet those challenges?
4. What do you think you learned by completing this project/class/activity?

In addition, advisers asked students in what course the challenging work took place and how many quarters they had until they graduated.

Researchers in OEA conducted training workshops in interviewing skills with all participating advisers, provided individual departments with survey customization if required, and monitored all resulting interviews, reporting back to advisers about the interviews they had conducted. By the end of the academic year, departmental advisers had interviewed 1,237 students. Students' responses were analyzed using a constant comparison method[5], an inductive process designed to let themes emerge, rather than imposing assumed categories on students' comments.

STUDY LIMITATIONS

If we interviewed students post-graduation, they would be likely to identify their capstone courses or their advanced senior-level courses as the ones asking for their most challenging work. However, because we wanted to attach the interview to a time when students would normally see their academic advisers, we interviewed students when they came into the advising office to apply for graduation, which often meant that they were two or three quarters away from graduation. Senior-level courses, particularly capstone or capstone-like classes, are those which students often say are their most challenging and satisfying. Although interviewing students as they applied for graduation meant that we might not gather information about late-senior year courses, we felt that it would be interesting to departments to learn the kinds of challenges that lead to and prepare students for those more advanced experiences.

EARTH AND SPACE SCIENCES DEPARTMENT RESULTS

The Earth & Space Sciences Department was one of the UW ACES' 33 participating departments. Noéll Bernard-Kingsley, Nathan Briley, and Dana Hansen asked 36 students if they were willing to be interviewed for the study and all but one of them agreed. This number represents about 69% of the 51 seniors in Earth and Space Sciences who graduated during the 2012-2013 school year.[6]

Students were asked which degree option—BA or BS—they were completing for their undergraduate degrees and within the BS degree which concentration they were completing. The overwhelming majority of interviewees (33 of 35, 94%) were completing a BS degree, and two participants were completing a BA degree.

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[5] Merriam, 2001.

[6] The number of undergraduate degree completions is based on the 2012-13 UW Profiles reports published by the UW Office of Planning and Budgeting (https://bitools.uw.edu/views/13-SummaryandTrendsDegreeAttributes_0/13-Dashboard#1)

Table 1 provides a summary of degrees/concentrations for students completing BS degrees.

Table 1. Option areas within BS degree (n = 33)

Geology	20 (61%)
Environmental	7 (21%)
Physics	5 (15%)
Biology	1 (3%)

Quarters to Graduation and Where Students Experienced Challenge

The majority of interviewees (74%) had two quarters to complete before graduation; 14% had just one quarter remaining; and 9% reported having three quarters before graduation.

When asked which courses in the major had presented them with the greatest challenges, students listed a total of 37 courses in the Earth and Space Sciences major, with one student noting three courses.

Students identified 11 200-level courses, 12 300-level courses and 14 400-level courses as the sources of their most challenging academic experiences. The list of courses in the major as well as the number of students who identified them (only one if not otherwise noted) were as follows:

ESS 205, Access to Space (1)

ESS 211, Physical Processes of the Earth (3)

ESS 212, Earth Materials and Processes (6)

ESS 213, Evolution of the Earth (1)

ESS 311, Geomechanics (2)

ESS 312, Geochemistry (8)

ESS 313, Geobiology (2)

ESS 400, Field Geology (7)

ESS 403, Global Tectonics (1)

ESS 411, Geophysical Continuum Mechanics (2)

ESS 414, Geophysics: Fluids (1)

ESS 418, Geoscience Communication (1)

ESS 454, Hydrogeology (1)

ESS 455, Stratigraphy (1)

The spread of courses in the major suggests that students experienced challenges across the Earth and Space Sciences curriculum, with a nearly equal distribution between 200-, 300-, and 400-level courses. However, as Table 2 shows, the spread of challenging courses is likely related to students' distance from graduation, as the majority (60%) of students in their final quarter in the major identified 400-level courses as the sites of their greatest challenges in the major.

Table 2. Site of greatest challenge by quarters until graduation (n = 34[7])

	200-level course	300-level course	400-level course
3 quarters left (n = 3)	33%	33%	33%
2 quarters left (n = 26)	35%	30%	35%
1 quarter left (n = 5)	0%	40%	60%

[7] One interviewee did not answer the question

In addition to the relationship between students' graduation dates and the courses that presented them with the greatest challenges, there were some differences by option area as shown in Table 3. As the table shows, students in the Standard/Geology and Physics tracks were responsible for all of the 200-level courses noted, as well as many of the 400-level classes. Students in the Environmental track primarily mentioned 300-level courses.

Table 3. Site of greatest challenge by option areas (n = 35)

	200-level course	300-level course	400-level course
BS Standard/Geology (n = 20)	30%	20%	50%
BS Environmental (n = 7)	0%	71%	29%
BS Physics (n = 5)	40%	20%	40%
BS Biology (n = 1)	0%	100%	0%
BA (n = 2)	0%	100%	0%

1. Students' Greatest Challenges

Students were asked: "What do you consider to be the most challenging work that you had to complete in this major? And by "challenging" I mean doing the work that stretched your thinking the most. This can be anything—a project, a paper, an exam question, homework, something else you did related to the major."

One strong and one minor theme emerged from students' responses to this question and we found no differences across option areas.

A course. Twenty-four students (69%) reported that an entire course presented them with the most challenging work in the major with eight of those 24 students specifically mentioning ESS 312, Geochemistry. Those students who noted ESS 312 explained that it was challenging for various reasons including the difficult concepts, chemistry background required, and challenging exams. ESS 212, Earth Materials and Processes was mentioned by four students each and the remaining responses were widely spread across the curriculum. In their own words:

- *So far it has been the work for ESS 311. It was a lot of intense modeling and numbers and equations, which is not my strongest suit.*
- *Global Tectonics was extremely valuable and taught me not just about tectonics but how to write papers. It was graded really harshly and lots of people dropped the class.*
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- *Geochemistry and everything related to the class.*
- *The core ESS courses are good and definitely stretched my thinking. They are structured in a good way to introduce you to the topics and the classes themselves (curriculum) are well organized.*
- *The Mineralogy class. There's a lot of material to be covered in the class, and it moves at a fast pace. It could even be split into two classes. It is very important to know for field Geology.*

- *[The most challenging work was] probably drawing out all the topography maps in ESS 211.*

Field Camp. Seven students (20%) said that Field Camp was the most challenging aspect of the Earth and Space Sciences major. Six of the seven students who mentioned field camp were enrolled in the Geology option and one student was enrolled in the Environmental option. In the words of three students who identified Field Camp as challenging:

- *Field Camp (ESS 400) was physically challenging, taking all course work and making sure you recall it and can put it into action in the field. It was way different than a classroom setting.*
- *Field Camp was extremely challenging because they just kind of throw you out there, and most people don't have field experience.*
- *Field Camp (3 week option) hiking around in Montana. The three week option felt rushed in the field mapping aspect.*

A project. Three students (9%) explained that a project posed a particularly difficult challenge in the Earth and Space Sciences major. As the three students explained:

- *My group and I decided to build a Geiger counter for our project, it was really rewarding but it was hard to build.*
- *The final research project in Stratigraphy was most difficult because it was open-ended.*
- *The research project for Geobiology [was most challenging] because I don't have biology background.*

Other. In addition to the themes already discussed, individual students mentioned the following challenges:

- *[The most challenging aspect was] learning the MatLab program in one of my classes since I had never had any experience with the program before the class started.*
- *Nothing in particular, I have issues with time constraints. The 200 series were tricky because they were new and it was an adjustment to get used to the course work.*

2. What Made Those Activities/Classes Challenging?

Next, students were asked to note what it was about the activity or the class they had described that made it especially challenging. About 27% of the interviewees identified more than one reason the course or project they had described was challenging. One major theme and several minor themes emerged. There were no differences across option areas.

A lot of work in a short amount of time (10-week quarter). The most frequently given response—noted by about 31% of the respondents—was that the activities were challenging because they were required to complete a significant amount of work in a fairly short amount of time. The majority of interviewees (eight of 11) were referring to specific courses. In the words of five students:

- *[We] only had 3 weeks to do the project and there was a high quantity of work in a short amount of time.*

- *[It was] hard to keep up with the pace of the class. It was a combination of the amount of course work and the fact that we only had 10 weeks to cover it all.*
- *The pace of the class [made it challenging]. There is a lot to cover.*
- *The deadlines and the amount of work that needed to be completed [made it challenging]. The quantity of work and wanting to be a perfectionist made it tough to make deadlines.*
- *[It was a] combination of being constantly exhausted (crammed a lot into three weeks) and the work load is pretty high, that was to be expected.*

Understanding complex concepts. About 17% of the respondents spoke about the challenge in understanding complex concepts with three students each referencing 400-level courses and three mentioning ESS 312. Some examples of this category of response:

- *What they were teaching was important but how it was taught was very abstract. It didn't seem very applicable to Geology. The exams were really difficult and there was a lot of theory that was then applied to nothing in particular, which made it difficult to learn and understand. (ESS 312)*
- *All of the conceptual ideas that were presented were really hard to grasp. (ESS 312)*
- *[The material is] hard to conceptualize and far more math intensive than other ESS classes. [In addition}, the math preparation I've had wasn't sufficient. Personally, I needed more visual examples because that's how I learn best. I couldn't picture what was going on. I could do the math but didn't know what the math meant. (ESS 414)*
- *The concepts involved and the work load were a lot and there were very high expectations for the class. Having online lectures plus in-class lectures were a lot to handle. (ESS 454)*

Lacked sufficient background in foundational subjects. Four students—about 11% of the respondents—said that what made their work in the major especially challenging was not having sufficient background in subjects such as chemistry or biology that is needed to excel in courses such as Geochemistry and Geobiology. As three students stated:

- *It would have helped to have more chemistry preparation. (Chem 152)*
- *Lack of background in biology and the large time commitment in a short period of time. (ESS 313)*
- *[It was challenging] going into the class with too little knowledge of chemistry. (ESS 312)*

No previous field experience. About 11% of the students explained that the Field Camp was most challenging namely because they had no previous field experience to prepare them for the novel experience. For example:

- *[It was challenging because] I had no field experience before going. I didn't know much about field mapping.*
- *[It was challenging] having no background. I needed more preparation before field camp. The GIS part was not hard but the physical mapping in Montana (knowing what to look for) was difficult.*

Mathematically challenging Four (11%) of the students said that high-level mathematics made their experience in the major particularly challenging[8]. As two students said:

- *The volume of information was a lot, the equations were difficult. Working in Matlab made it a little easier to understand but the modeling in general was the hardest.*
- *It was conceptually difficult and mathematically challenging. It's a good class, just very hard. (ESS 411)*

Strict grading practices. About 9% of the students said that their work was particularly challenging because of stringent grading which was discouraging. Two students remarked:

- *Everybody was graded the same and it was curved, but it was discouraging to get a paper back where everything was marked wrong.*
- *The midterms were ridiculously hard with really low averages even though they were all open notes and open book.*

Two students each spoke about the following as significant challenges:

- ***Mineral/rock identification.*** *Mineral and rock identifications were hard.*
- ***Writing intensive.*** *It was a three-credit course but there was a high concentration of writing. It easily could have been a five-credit course given the amount of work.*

Other: Eight students gave the following individual responses as to why the course/project was challenging:

- *The first time I took it the structure of the class was different and things the professor went over during lecture would be emphasized during the exams, mainly mineral identification. This time around there is a different professor and different things are being covered. The material covered during lab/lecture is different than what the professor is putting on the exams*
- *A Geiger counter is a very complicated thing to build—there are a lot of things that can go wrong. It's also kind of dangerous.*
- *The teaching format—the notes on the white board were hard to follow*
- *[Drawing out topography maps] wasn't so hard but it was pretty tedious and we had to do it over and over again.*
- *Parts of the class were theoretical and parts were quantitative. Having part of the class that was concrete and part that was theoretical allowed me to be more hypothetical and deductive.*
- *It was a combination of being constantly exhausted (crammed a lot into 3 weeks) and the work load is pretty high, that was to be expected. The additional health issues (whooping cough and bronchitis) while i was there didn't help either.*
- *Looking at problems in a realistic view instead of a theoretical way. Looking at the whole problem and the answer is not always a clear picture.*

[8] Students specified the following ESS courses: ESS 311 (2), ESS 411, ESS 414

Finally, one participant said:

- *The way each class focuses on a specific topic is nice.*

3. What enabled students to meet those challenges?

Most of the interviewees (74%) identified a single source of help for meeting the challenges they described. Regarding what enabled them to meet those challenges, students' responses yielded two strong themes, along with several minor themes. Again, there were no differences across option areas.

Opportunity to work with others. Approximately 26% of the students who were interviewed said that they could meet the challenges they had described as a result of working with other classmates in study groups, discussion sessions, and informal conversations. In the words of five students:

- *I worked with my friends on everything (e.g., homework, labs). If I would have done that class by myself it would have been a nightmare.*
- *I worked with my lab group outside of class and put a lot of extra time into the class, and it made learning the material a lot easier.*
- *That was one of the first courses that I started doing more group work in. Before that, the courses were a lot more individual. Group work and the labs helped with that.*
- *There is a discussion session every Thursday and we all talk about the homework and get help from each other. It's built into the class, so that helps.*
- *I worked with my group a lot and put a lot of hours in together looking at papers and other research projects. We pushed through it together as a group.*

Faculty members and TA's. A second major theme in students' responses to the question of what had enabled them to meet the challenges in the major was that working with faculty members and TA's had been beneficial. Approximately 26% of the interviewees mentioned that both professors and TA's were extremely helpful and often went out of their way to assist them in their learning. For example:

- *The TA was really helpful and I put in a lot of extra time to learn what I needed to learn.*
- *I also asked for a lot of help from the TA's and from whomever was professor at the time.*
- *I talked to the professors and TAs and went in for office hours*
- *I started going to office hours as much as possible. Having the TA's help sort out stuff and help in the field was awesome. Kudos to them.*
- *I went to office hours a lot and talked to the professor a lot.*

Time-management. Three participants (9%) commented that they met the challenges described by honing their time-management skills. As two participants stated:

- *I learned how to [use] my time better in order to do assignments in small chunks. I learned time-management skills.*
- *I took away from my other studies so I could focus more on the class and put more time into the class.*

Other: Two students each spoke about the following as helping them meet the challenges described:

- ***Hands-on experience.*** *The labs and field trips were really helpful because the lectures are good but getting hands-on experience you can apply what you learned in lecture.*
- ***Practice tests.*** *Practice tests were helpful, going through example problems and working through them.*
- ***Hard work/motivation.*** *I wanted to pass the class. Self-motivation, peer encouragement, and understanding staff/TA's.*

Finally, five students gave the following individual responses regarding help in meeting the challenges posed by activities in the Earth and Space Sciences major:

- *Integrating my whole school experience and realizing there is more than one answer to a lot of the problems.*
- *I used google/internet to find similar courses and examples to get through coursework.*
- *No one else in the class was able to finish the test either. The shortcomings of the exam were normalized for the entire class.*
- *There were a couple review sessions after we turned in projects that were helpful.*
- *Still working on passing the lab.*

4. What did students learn by completing this project/class/activity?

We asked students what they felt they had learned by meeting the challenges they had described, and about 20% of the 35 interviewees mentioned more than one lesson learned. Two strong themes emerged from their responses, along with a number of minor themes. Consistent with the previous three questions, there were no differences across option areas.

Concepts/fundamentals of Geology. When asked what they had learned as a result of the challenges they described, 26% of the interviewees described various types of content knowledge related to Geology. The following quotations are examples of this category of response:

- *We learned a lot of fundamentals of Geology and mineralogy and that comes to play in almost all of my classes. It helped me with upper division classes because it built on the knowledge in my other courses.*
- *I have a better understanding of how we think about modeling things in the physical world.*
- *I have a better understanding of mechanics of processes and concepts of Geology.*
- *I learned about different ways to look at Geology through the chemical world.*
- *I have a better understanding of minerals and mineral structure.*
- *I learned skills to identify rocks and minerals.*

Geology field work skills/real-world application. Twenty-six percent of the interviewees mentioned that they gained a greater understanding of what a real job in Geology would be like, namely through their field work experience. In the words of five students:

- *I acquired practical skills for working in geologic fields.*
- *I have a better understanding of mineral identification while working in the field, what processes need to be done, and what to do to accurately identify a mineral and figure out what it is.*
- *Learning how Geology works in the real-world and the practical application of classroom concepts.*
- *I have a better idea of what a real-world job in geosciences (applied) is like. It didn't directly mimic the real world but was more applicable than taking a traditional class.*
- *I have a much better understanding of actual Geology and the enormous undertaking that is going out to an area and mapping it in 5 days.*

Better study habits/learning strategies. Four students (11%) explained that they acquired better study habits and refined their learning strategies as a result of their experience in the major. As two of them said:

- *Better study habits, even though I'm graduating. Probably better problem solving skills as well.*
- *I learned strategies for classes with a lot of material.*

Perseverance/hard work. Another four students (11%) explained that they learned how to persist through difficult challenges and the value of hard work. In the words of two students:

- *I learned definitely not to give up. Work with your professors and TA's—don't just sit there and get left behind.*
- *It was good practice at working hard, really putting the hammer down*

Confirmed/denied interest in Geology. Two students noted that the experience served to increase their interest in Geology but one of them also came to the realization that the field of Geology may not be a good fit for her. In their own words:

- *I gained a lot of knowledge about Geology field work and learned that it's interesting but might not be the right path for me. I have a lot more respect for people who do it.*
- *It was a really interesting class and I would be interested in taking another class on the topic in grad school to help increase my understanding of the topic.*

Two students each mentioned they had learned the following as a result of challenging projects, classes, or other activities:

- ***Working together as a group.*** *Working in groups in the class really helped me feel like I was more a part of the department. Learning to work in groups is important in real-life situations.*
- ***Writing skills.*** *I am a much better writer overall. I feel that I can approach arguments better, I gained skills of being able to assess information better, and can draw better conclusions from scientific information.*

Four students gave the following individual responses as to what they learned as a result of challenges in the major:

- *I got exposure to programming and MatLab that I had never been introduced to before and can be applied to whatever career I get into.*
- *Even if you completely fail the class you shouldn't freak out because the class will be curved and you'll be ok at the end of the quarter.*
- *[I] really learned that I don't know much about Chemistry.*
- *It was not just learning basic knowledge but how to observe, understand, and interpret my findings into a history of an area.*

SUMMARY

Interviewees in the Earth and Space Sciences major were most likely to mention a course as the site of their greatest challenge, with one-third of those students specifically listing Geochemistry (ESS 312). Students explained that Geochemistry was particularly challenging given that there was a lot of information to cover in a short time-frame and there was a certain level of chemistry expertise necessary to excel in the course. For example, one student remarked:

> *[It was] hard to keep up with the pace of the class. It was a combination of the amount of course work and the fact that we only had 10 weeks to cover it all.*

Students also commonly noted that Field Camp was a particularly challenging part of their experience in the Earth and Space Sciences major. Not only were they required to apply complex concepts from the classroom in a real-world situation but it was also physically demanding. Moreover, most students agreed that nothing in their past experiences prepared them fully for the qualitatively different Field Camp experience. As one student said:

> *Field Camp (ESS 400) was physically challenging, taking all course work and making sure you recall it and can put it into action in the field. It was way different than a classroom setting.*

A sizeable minority of students explained that the classes and/or activities (e.g., projects) were challenging given that they were required to comprehend complex concepts that were often abstract and difficult to understand. Moreover, some students commented not only on the conceptual challenge but the mathematical challenge as well. One participant remarked:

> *[The material is] hard to conceptualize and far more math intensive than other ESS classes. [In addition}, the math preparation I've had wasn't sufficient. Personally, I needed more visual examples because that's how I learn best. I couldn't picture what was going on. I could do the math but didn't know what the math meant. (ESS 414)*

When asked what enabled students to meet those challenges summarized above, approximately one-quarter of the students stated that the opportunity to work with others was crucial to their success. As the students' comments in the box that follows this section illustrate, interviewees talked about the value in taking part in study groups and discussion sessions, as well as informal conversations with their classmates. They also spoke of the camaraderie that developed among their peers in pursuit of a shared goal. As one participant said:

> *We pushed through it together as a group.*

Several students also cited faculty members and TA's as helping them to meet the challenges they faced.

In closing, the sample size was relatively small; nonetheless, the data collected reflect the goals of the Department of Earth and Space Sciences which aims to further the understanding of Earth, the solar system, and their histories. When interviewees spoke of challenges in the major, they commonly identified other disciplines including mathematics, chemistry, and biology, reflecting the department's aim to provide strong interdisciplinary training.

Given that a sizeable percentage of students seemed to be somewhat overwhelmed by both the pace and rigor of some classes as well as their background preparation (e.g., Chemistry preparation for Biochemistry), it may be useful for the department to examine the course prerequisites and set student expectations accordingly. Similarly, it may be beneficial to provide students with additional preparation for their Field Camp experience (e.g., mapping background) to ease their transition into the experience and facilitate learning in what students report is a rich and challenging experience in the field.

Research on student learning shows that when there are challenges for students and they receive the needed support to meet those challenges, students are more engaged in their coursework and subsequently learn more as compared with coursework that is considered easy. Earth and Space Sciences majors' responses to the UW ACES interview questions indicate that they were challenged by the coursework and, by and large, found success to be gratifying.

Two Students' Responses to All Four Questions

Course where greatest challenges occurred: ESS 212

Q1. What was the most challenging work you did? *The Mineralogy class. There's a lot of material to be covered in the class and it moves at a fast pace. It could even be split into two classes. It is very important to know for field Geology.*

Q2. Why was it challenging? *[It was] hard to keep up with the pace of the class. It was a combination of the amount of course work and the fact that we only had 10 weeks to cover it all.*

Q3. What helped you meet that challenge? *Study groups! There were a lot of people in that class but it starts to weed some people out that decided they don't want to be ESS majors. We would get together and study as a group.*

Q4. What did you learn by meeting that challenge? *We learned a lot of fundamentals of Geology and mineralogy and that comes to play in almost all of my classes. It helped me with upper division classes because it built on the knowledge in my other courses.*

Course where greatest challenges occurred: ESS 313

Q1. What was the most challenging work you did? *Geobiology was fun and the way the professor taught it allowed for a lot of individual creativity. He gives you enough information so you know where to start but makes you figure out the rest.*

Q2. Why was it challenging? *Parts of the class were theoretical and parts were quantitative. Having part of the class that was concrete and part that was theoretical allowed me to be more hypothetical and deductive.*

Q3. What helped you meet that challenge? *That was one of the first courses that I started doing more group work in. Before that the courses were a lot more individual. Group work and the labs helped with that*.

Q4. What did you learn by meeting that challenge? *Working in groups in the class really helped me feel like I was more a part of the department. Learning to work in groups is important in real life situations.*

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