

Appendix D: Participant experiences

1. Participant experiences coming into the course

While all participants expressed that the class readings and concepts were new to them, they held differing levels of familiarity with the main themes of the course.

BHW and SL had been exposed to thinking critically about science during their previous studies. However, neither had heard of science studies, nor encountered the specific ideas discussed during the course and in the readings. During BHW's previous coursework in interdisciplinary science she had learned about the evolving nature of science, and that nothing is ever definitively "proven" or "final" and seemed very aware of the role of value judgments in the human sciences.

I don't think coming into this course there was any question in my mind that if something had relevance for policy and involved human subjects and stuff like that, there would be more value judgments within different stages of the research process. (BHW)

SL completed her undergraduate degree at a small liberal arts college in the United States and had previously taken courses including topics like the history of the eugenics movement, conservation policy, and environmentalism, and which involved critically examining what science is and how it is done.

I think that I already had a kind of a critical lens towards science or at least towards the people who conduct science...I think broadly, science has been a force for good but people who conduct science have oftentimes been bad people and done bad things... (SL)

BHW and SL also suggested that the course may have self-selected for students already interested in understanding the role of value judgements in science, and that they would be curious to know how a student who was more "opposed" to the idea of science as a social enterprise would respond to the ideas taught in the course.

Meanwhile, for GG and JA, who had both transitioned from natural science programs to an interdisciplinary environmental research program, the course readings and concepts were new and different from anything they had encountered in their previous academic work. They were both recommended by their supervisor to take the course and described the “disciplinary divides” between their previous science programs and current interdisciplinary research experience. They described their experience taking the course as “challenging” and “exciting” and envisioned it as a transition to a new way of thinking about science. GG, who previously completed her undergraduate studies in chemistry, described having a “rigid” and “idealistic” view of how science should be done. Attending the seminar allowed her to see things from “different perspectives” and challenge her assumptions about science from her previous work and study. She also suggested that the course would be particularly useful to students immersed in a more natural science-focused environment. She pointed out that her undergraduate studies gave her a vision of science moving “linearly” from research to policy. During the course, however, she came to terms with the idea that the process was more fluid and involved multiple different parties and perspectives.

I think it would have been very, very good for me to take this in a pure natural science environment because you do just get stuck in your ways of thinking and if you don't even get to see how other disciplines think about things or do things you kind of remain restricted within these boundaries. (GG)

JA viewed his experience of the course and his new interdisciplinary PhD program as a time of change, where he was moving away from one “community” of scientists to another. In his interview, he set this up as a transition from a more “rigid”, natural science disciplinary environment which emphasized notions of “real science” and the “value-free ideal” to an interdisciplinary environment where scientists advocate for knowledge integration and public involvement in science.

2. Participants' changing views of science and science studies

When the science students were asked to consider if taking the course had changed their views of science or caused them to evolve in any way, the answers varied between participants and over the course of each interview. While BHW previously mentioned that she did not find

the course concepts entirely new or “ground-breaking”, by the second interview her opinion had shifted.

I think I've spent a lot of time recently thinking about this idea that even scientific facts are socially constructed and I know that was introduced early on in the class [but] I was skeptical of the extent to which it applied to all sciences...(BHW)

In all three interviews, SL expressed finding it challenging to connect course concepts or readings directly to her own research in geology.

I'm still having a hard time connecting it to my research exactly, which is on like the alteration of rocks that happened 100,000 years ago and no people were around. (SL)

This finding may have resulted from writing her final assignment on the monitoring of volcanic activity, a topic only tangentially connected to her own research. SL was very aware of the impact of social values on the geosciences and critical of the eugenic aspects of its history. Nonetheless, she felt that discussions of values pertained more to broader, more general discussions of geology and found it difficult to relate them to her own research. Even so, she expressed concern about the lack of diversity within geology and pointed to the practical difficulties of thinking through and addressing such issues.

I think it has definitely shaped the science but it's one of those things where there's no control group...so I think that's part of solving the problem...how do you make people see that something is a problem when it's actually their norm. (SL)

Similarly, when asked to consider the role of funding on scientific research, she suggested that funding pressures could affect “the questions that we ask and what we ultimately do with our results”, even if the “process” stayed the same. Wong and Hodson (2010) point out that the practicing scientists they interviewed were similarly aware that sociocultural factors influenced the development of science, and even identified how research funding, cultural interests and national priorities could affect research more broadly. They nevertheless found it challenging to identify how the science was actually “conducted differently” in their own fields due to changing sociocultural contexts. In SL’s case, she was willing and able to see

the value of diversity in the geosciences and critique the ways in which funding pressures could influence the choice of research topic. However, she still struggled to see the direct applicability of science studies to her subspeciality or research.

I think the biases and values I need to be aware of are more involved in like how you treat your collaborators and other people that you work with...we just didn't quite get to how my biases informed the way that I think about thousands of years old rocks.
(SL)

Furthermore, SL's choice of case-study suggests that she was under the impression that she had to choose an example where the societal relevance or context dependence was clear and obvious—and indeed, she ultimately viewed science studies' greatest potential for contributing to the sciences in more public-facing areas of inquiry. This begs the question; could a reformulation of the case-study assignment, perhaps accompanied by some examples, help students who work in basic science to identify a case-study that enables them to explore the applicability of course concepts to their field of research?

For JA and GG, many of the course concepts and themes were directly relevant for their own research. GG suggested that while she previously had a “surface level appreciation” of science and didn't take many critiques of science “very seriously”, the course allowed her to develop a more “holistic” view of science. She initially struggled to come to terms with the idea of scientific research being subjective or value laden. She was also finding the process of moving to a more interdisciplinary way of thinking quite challenging at times.

I just kind of reached a block where the kind of differences between where I was coming from, a hard chemistry and this kind of like fluid interdisciplinary way of thinking were just so different for me that I really struggled to move past it. (GG)

Through the course and her final assignment, however, she was able to confront her previous education and training in chemistry, and to accept that “different ways of thinking and interdisciplinary ways of thinking could be valid”. She also pointed out that it was important for the public to also have realistic expectations of science and scientists.

Yeah, it's not the answer to everything. We need to know...when [science] is appropriate to use and when it's not. (GG)

JA similarly suggested that if scientists were more willing and able to openly admit the limitations of the sciences, it would be easier to moderate the expectations of the public and “calm the tension when science fails to deliver what people expect”.

I think for the longest time people had very high expectations of science...I think it puts pressure on scientists. Yet, everything that is done has limitations, it's all about uncertainties. (JA)

When asked during his second interview to consider if his views of science had changed or evolved because of the seminar, JA struggled to answer the question, describing it as a “work in progress”. He pointed out that while he still believed science was the “epicenter of finding solutions to most of the problems we have”, he now more clearly saw the limitations of scientific knowledge in solving complex issues.

When the science students were asked to consider if taking the course had changed their views of science studies the response was generally positive, though they all mentioned that they had never heard of or encountered it before the course. SL suggested that her undergraduate education had prepared her to understand and appreciate science studies, though she struggled to see its relevance for her own work.

I think I've always had a positive view of the humanities; I have a positive view of science studies now that I know what it is...but I also recognize that that's probably because of my liberal arts background and had I gone to a school that I just focused on science for all of undergrad, maybe I would be a little more dismissive. (SL)

Meanwhile, BHW described her views of science studies changing throughout the semester, especially from early in the course where she found herself disagreeing with some of the earlier, more “constructivist” arguments presented in the assigned podcast episode about the Science Wars. This comment was the only one in the study which perhaps comes closest to what Labinger (1995) and Labinger and Collins (eds.) (2010) have referred to as scientists’

fundamental issue with science studies—its “relativism/constructivism/subjectivism”, which they contrast with the “realism/rationalism/objectivism” of science. BHW also acknowledged that several of the texts and discussions throughout the term presented a more “nuanced view of how science can be critiqued without just saying that it's almost garbage and it's no better or no different than other forms of knowledge”.