To Observe Both the Forest and the Trees: Using Deep Listening, Drawing, and Reflections to Cultivate Inclusion and a Culture of Belonging in Introductory Environmental Science

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The wonder and joy found in playing outside in a mud puddle is a useful educational mindset for exploring the natural sciences; however, some students have not experienced much joy or play in the natural world. Introductory environmental science is often a gateway course for students interested in exploring the natural world, although not all students come in with expectations of belonging or feeling included. In my first day surveys, student concerns ranged from stereotype threats that they aren't good at math and science, to physical safety concerns in a world dominated by white cis male perspectives steeped in historically problematic patriarchal structures. In a voluntary self-reporting survey on the first day of class, students reported feeling only somewhat that they had a sense of belonging in the sciences (average value of 2.5 out of 5) but a greater sense of belonging in the outdoors at the beginning of the term (3.9 out of 5). Recognizing this, I decided to use aspects of play and joy to support student engagement by building off their current sense of belonging in the outdoors.

Phenology Friday

I started with one specific exercise, "Phenology Friday." Even this first exercise required me to recognize that learning to see the natural world through wonder required explicit teaching and learning. Each week, students return to a specific spot outside, to sit and quietly

observe for 25 minutes, fill out a template with their reflections and connections to each week's course content. This exercise left about half of the students feeling joy outside quietly sitting still, while about 10% of students felt this was a tedious practice, busy work, and did not recognize it as a course learning goal. I found that even this required me to teach students how to be in the outdoors. So, I moved to a scaffold with the added framework of Deep Listening, a practice developed by Pauline Oliveros whose experimental work Sonic Meditations had goals of "expanded consciousness" and "healing" (O'Brien, 2016).

I tapped into this powerful idea to encourage students who felt excluded from the outdoors to start by physically grounding themselves in the maple forests along Lake Winnebago. Each student was given an instruction guide to "find a quiet place to sit, such as a tree or a rock, and read the following passages silently. Spend the next 25 minutes observing your location. Take notes as necessary. Find a partner and share your observations for 10 minutes, then repeat in a new location. Reflect on your experience." They rotated spots so that students could practice in various locations. Students wrote descriptions of each location and answered these questions:

- What was the first thing you observed in your space?
- What was the first sound you heard in your space?
- What changed over the observation period?
- What was the most interesting sound you heard?
- Describe it in your own words.

This practice allowed classmates to exchange ideas and demonstrated that they have refinable natural world observation skills. In the guides, selected poems provide an opportunity to focus on reading while taking in their surroundings. With the integration of Deep Listening, I noticed improved engagement in the introductory class throughout the past 5 years, as evidenced by improved attendance in class and a higher rate of submission for weekly assignments, in addition to end of term feedback and evaluations on the course.

Self-reporting surveys were administered 6 months after the course ended to assess long term effects of Phenology Fridays, deep listening, and systems thinking (a holistic approach to investigate or observe factors and processes, that interact and comprise a wider dynamic system), which is a core habit of thinking in environmental sciences. In these surveys, students reported initially low understanding (2.6 out of 5) of systems thinking, which changed to 3.8 out of 5 after completing the course. Numerous students who had stated they were worried about passing a science lab class because they didn't fit in, shared how calm and meditative they found this exercise. Other students shared their surprise to find Phenology Fridays are one of their favorite class assignments, where they look forward to seeing how their spot changed each week. It is a small step towards capturing the joy and wonder we innately seek out as curious creatures.

Concept Maps

In recent course iterations, I added other elements of play to support students who might engage with stereotype threats about science and belonging. I started exploring ways to support student learning while engaging more students in the learning process. I added a Concept Map activity to encourage students to organize their notes and review course material each week, which served to promote consistent review of course material through drawings and sketches to integrate creative elements into their note-taking. This is consistent with other work demonstrating how concept mapping positively influences student engagement with course material, and increased collaboration in inquiry-learning settings (Bank and Daxberger, 2020). Drawing is a particularly useful approach for increasing student understanding as they translate topics from verbal to visual representations in their notes, and individual and collective concept mapping can increase student agency in their learning processes (Quillin and Thomas, 2017).

This weekly assignment remains a consistent part of this course and my advanced courses, with a majority of students reporting satisfaction in their concept maps and the connection they have made between topics throughout the course. Not all students found joy

in sketching concepts, and approximately 15% expressed end of term feedback suggesting less concept mapping. I observed the minority of disengaged students in class still benefitted from the consistent routine and expectations of this activity, in that they quickly organized to complete routine tasks, even if they felt less engaged or connected to the learning goals. Students were still required to show up to group work activities with their completed assignments, and this increased group participation across the classroom, providing benefits to student learning even if this was not their favorite component of the course.

After switching back from remote instruction, I found my students clustering into two groups: those craving connection and community and those wishing to be back on Zoom. In an effort to create a community learning environment open to students with wide-ranging backgrounds, interests, and comfort levels, I integrated the Concept Map idea into weekly class sessions. In small groups, students would either respond to a prompt asking them to draw out a key concept or challenging them to apply recent knowledge to a specific environmental context. It was wonderful to see students reaching out to explain concepts to their tablemates in increased engagement. By inviting students to opt into the larger engagement process with me and modeling the benefits of engagement using flexible approaches for completing some assignments like concept mapping, I saw my class blossom into a more welcoming and inclusive space.

There are some key timing components that need to be considered for the integration of Deep Listening and Concept Mapping as methods of engaging and reviewing course content. First, the invitation to the learning space requires thoughtful planning, especially for courses where students might feel disinclined to participate or feel they don't belong. I consulted with professors Leila and Brian Pertl, certified Deep Listening facilitators and experts whose pedagogy on Deep Listening helps nurture spaces that center creativity around student voices and their inherent musicality, providing a unique pathway for expression and collaboration. We met to talk through the Deep Listening process, share one of their Deep Listening guides, and discuss my aims of improving student engagement through these sensory experiences. This was

critical since my introductory course is one that often attracts students aiming to fulfil a general education requirement.

One of the goals of my course is that students feel a sense of belonging and could leave the course having honed their abilities to focus and observe the world around them, engage with sensory observations outside their standard mode of operation, and cultivate calm in their lives. The course modifications of Phenology Fridays and Concept Mapping brought students into the liminal space of learning, inviting them into the deep roots of a forest where the maples and hemlocks of hard science mingle with the ferns and fungi of poetry and art. Modeling the joy and wonder of the everyday around us, drawing connections, and building community are essential for creating inclusive learning spaces and inviting all students to hone their abilities as natural observers. Future iterations will continue to rely on Deep Listening and include a flexible rubric for assessing other types of creative work like nature-based observations leading to poems crafted by students on Phenology Fridays. By integrating specific inclusive practices, my classroom is now a richer environment for student learning, where students feel an increased sense of belonging while gaining content knowledge and increasing their potential for learning within the natural world.

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