

My goal as an educator is to empower others to always be curious and provide them with the necessary skills to help them find high-quality answers to their questions. Given that we always have endless access to information via the internet at our fingertips, I am less interested in things like memorization. Instead, my goal for my students is to be able to parse good information from bad information, apply critical thinking, and ask the right questions. I am to provide others with tools, rather than rote knowledge, and in service of this goal my own teaching pedagogy hinges on systems thinking and above all making connections. I also aim to honor diversity as an educator: diversity in thought (everyone learns in their own way), diversity in perspective (we are all unique and must start somewhere), and diversity in identity (everyone deserves a safe place to learn). Finally, I prioritize accessibility, which is often challenging in a complex and jargon-rich field such as biology and is in service of both making connections and honoring diversity.

Since finishing my Ph.D., I have been engaging in a lot of informal mentorship to help both undergraduate and graduate students with coding R scripts. When helping someone with a new project, I find that I often don't know how to code the specific thing that they need to do either, but I do know how to ask the right question and consult the right resources to figure it out. Recently, a couple of students had a large data set comprised of GPS data from >200 turkeys and they needed to find the "final fate" of each individual bird; in other words, when and where did the turkey die? By hand, this task was a simple judgement based on variance in the location of the bird (i.e., finding when the bird was still for an extended period of time) which could be cross referenced with some known information about what happened to that bird (e.g., when and where the bird was harvested as wild game). This qualitative assessment of the data by hand would take a few minutes for each bird, and for a dataset of >200 individuals it quickly became an overwhelming and tedious task. I helped these students with translating those by-hand assessments into logical statements in R. In the process of that, we leveraged several valuable coding tools that will be part of their analytical toolkits when tackling similar objectives in the future.

Importantly, to accomplish the task of leveraging R to find the final fates of turkeys, I needed to meet those students where they had gotten stuck in the first place. In that example, our first step was to go over some basics like for-loops and conditional statements. Meeting a student where they are in their learning is essential, regardless of the subject or skill at hand. I've been playing roller derby since 2018, and as a veteran skater I often help with teaching people the basics of roller skating. When someone is struggling with a new skill, such as backward crossovers, I often end up having a conversation with them to figure out what is challenging for them. I'll watch them perform the skill to try and pinpoint the steps that are missing, and I try to break it down and explain it in different ways until something makes sense to them. Sometimes their "ah-ha" moment comes when I perform the skill slowly, others learn better from an example at speed, or when I talk through each movement of my feet. Teaching people how to code and skate have both taught me a great deal about value of sharing tools rather than just answers and the importance of being able to break down complex tasks into small parts that are digestible to whomever I'm teaching at that moment.

Making connections is an intuitive element of learning anything. Skills and knowledge build on one another, such as how a backward crossover is a lot like a forward crossover, and experience helps form the foundation for new lessons. During college, I worked as an instructor for environmental, place-based education trips for high school students to Yellowstone National Park, and one of the days on those trips was spent wolf watching. One group of students was from a small rural town in Montana where the relationship between landowners and wolves was tense. These students had a negative perspective on wolves and considered them a threat to livestock, which was the livelihood for many people in their community. One of those early, wolf-watching mornings, we listened to a podcast about a particular wolf in Yellowstone known as the "06-Female." In the process of reviewing her life, the hosts of the podcast inform listeners about the social behavior and ecology of wolves as well as some politically charged conservation issues, such as whether they should be hunted outside the park. Although this wolf evaded researchers trying to catch her in the park for years, the 06-Female was legally shot and killed by a hunter outside the safety of the park's boundaries. When the fateful end of her life was described to this SUV full of students, who were younger than most of the other groups, there was a thoughtful silence that will always stand out in my memory. We had done

other types of lessons and activities like mock debates to get students to consider the various perspectives on the controversies of wolves, but this moment had provided them with a change in perspective that was much more profound.

Experiential learning environments are so valuable for moments like the one in that SUV, when we were watching wolves together while exploring perspectives that maybe hadn't yet been considered. Learning in like this provides the opportunity for deeper memories than in a classroom and affords more teachable moments. Near Grand Forks, ND there are a few pocket populations of prairie chickens, a near threatened species in North America. During the spring, when I was teaching ornithology, I offered my students the chance to go see their leks where they perform their mating displays. We got up very early, drove in the dark to march through the muck and sit in the cold so we could watch them do their dance, which really must be seen in person to appreciate the deeply resonant sounds they make. While sitting quietly, we also got to observe the sharp-tailed grouse, with which the prairie chickens have been hybridizing, and see some nearly successful predation attempts by the nearby breeding pair of northern harrier hawks. Observing the prairie chickens was a planned teachable moment to learn about lekking behavior, but the overall experience was rich with many other opportunities to learn about bird behavior and ecology.

When it comes to ornithology, the importance of flight cannot be overstated; nearly everything about avian ecology, physiology, and evolution is in some way connected to flight. One of the labs that I developed when I taught ornithology was focused on the aerodynamics of flight. This lab is essentially a physics lesson, in which I breakdown the basic forces at play and how avian wings are engaging with each of those to fly. For part of this lab, I have the students make various paper airplanes to observe how changes to the wings and overall shapes affect the way the paper airplane glides through the air. With this basic understanding of aerodynamics, students can better understand why some birds are better at long distance flight, are more agile, or have more difficulty with taking off. It also provides a foothold from which students can learn about why feathers are so important for dealing with forces like drag. This lab was one of my favorites to teach, and an aviation student who was taking my class for his minor in wildlife biology let me know that this lesson was helpful even for him and that he'd wished these basics were taught like this in the aviation program. This lesson is also a good example of the interdisciplinary nature of biology as a subject. To understand avian diversity in wing shape, you need to understand the physics of flight. Similarly, to understand avian migration you'll need to touch on some other subjects like endocrinology and neuroscience, and to understand evolution you must have a foundation in genetics.

These subjects can be intimidating for some people: some subjects in biology, like genetics and neuroscience, can quickly devolve into acronyms and jargon that can be hard to follow even for experts like me. However, I firmly believe that if there is a simple way to say it, we should say it simply. In a college classroom, what is considered "simple" may vary a great deal depending on the students, which is why it's so important to meet students where they are and create a safe learning environment. Anyone who is learning is already in a vulnerable position and it's essential for the instructor to build the kind of trust that is necessary for that vulnerability. For some students, that means being available for questions or side conversations before or after class, for others that might mean reducing the cognitive load of the fear of being judged or evaluated. In college, I was once told that "cognitive dissonance makes you study harder" after asking for help from a professor. To this day, I could not disagree with that statement more. Evaluations should be a tool for providing feedback, not used to cause stress or fear.

As a final note, I want to acknowledge that cognitive dissonance can arise in a classroom for a whole host of reasons. Yes, we are here to learn, but we can't learn unless we are present, and as the authority in the room I see it as part of my job to make a space in which everyone can be present. This might look like acknowledging and discussing a distressing current event. It can also be something like me being open with them about where I am that day (maybe I have a visible bruise from a roller derby game that I should explain). I strive to create a learning environment in which individual identity is respected, so students don't have to carry the load of hiding parts of themselves while trying to learn. Like how biology is interdisciplinary, I see these things as all connected, and like a rogue sharp-tailed grouse on a prairie chicken lek, I look for opportunities to build a sense of community in my classroom.