TEACHING+LEARNING STATEMENT / **CODY BUNTAIN**

Teaching may be an individual exercise, but rarely is the teacher isolated from the student. Rather, I view teaching as one aspect of the broader learning process. Far from individualistic, *learning is a fundamentally collaborative pursuit where success is a responsibility shared between peers, the student and the teacher*. The student's responsibility is to want to learn (and become the master[1]), and my role as a teacher is to foster that interest and construct an environment in which the student remains engaged. By tackling engaging problems, I can work with students to improve problem-solving skills and foster collaboration between themselves and the broader field. Following this perspective, I hope to guide a new generation of researchers and professionals as well as *individuals with whom I would be excited to collaborate.*

TEACHING PHILOSOPHY

My student-centric, engagement-focused philosophy has evolved from my experience while also borrowing from others, like Wing's thoughts on computational thinking, and covers six points.

Respect students as peers. Students should be treated with respect, regardless of background or proficiency, as we are peers in this collaboration. Given universities' increasing diversity and issues of diversity in technology fields, this respect is particularly important in making technology fields more accessible. Altruism aside, students who see their opinions valued may be a crucial source for new insights, research problems, and collaborations.

Explore the "why" before the "how." By presenting a topic's motivating problem, we demonstrate both a respect for the student's time and support student engagement. By framing a discussion around its motivating problem, we give students a chance to have a personal stake in the topic by exploring how *they* may solve it and their solutions' outcomes. We can then contrast these solutions with how others in the past have solved the problem, evaluate these solutions, and highlight the critical idea that *many problems have multiple paths to a solution.*

Approach problems from the top down. Related to my focus on the "why," I also think it is important to cast topics as a problem from the top down, starting with the high-level issue and slowly introduce details as the students understand more nuances of the problem. By relating the problem first to the student's experience, we can begin a discussion in a context the student can easily understand regardless of background. This problem-decomposition task is common in technology fields, and students will benefit from this exploration both within and outside my class.

Student activities are more effective than lecture. While I construct my lectures to be humorous and engaging, lecturing is essentially a passive learning method. Though lecture is critical for complex topics, I find allowing the students to explore a problem via a collaborative exercise, group discussion, or other activity often leads to more interesting and memorable exchanges. Where possible, my classes shift students' focus to each other and introduce topics or solutions via activities or prompt a lecture through a board game or other interactive event.

Assess courses via learning objectives, not grades. In developing courses, I find it is important to start from a foundation of concrete learning objectives, which help direct and prioritize material. Starting my courses with a diagnostic assignment to evaluate the students with respect to the learning objectives and following up with an end-of-semester diagnostic to evaluate how well *I* met the course's learning

[1] But not a master of evil.

objectives has served me better than simply judging letter-grade distributions. I can also then improve the next semester as my pedagogical skills evolve.

Teaching is itself a learning process. My current teaching philosophies differ from when I began teaching and will evolve over the next several years as students, technology, and my experiences change. Increasing student diversity and goals suggest one teaching method is unlikely to work for all my students. Likewise, students are increasingly requesting supplemental YouTube videos and lecture recordings to help them explore the material. The implication is that I must adapt both within and across courses to serve my students most effectively.

Experiences in Teaching

My formal teaching experience began in 2011 as a teaching assistant for an introductory programming course. This experience introduced me to the broad range of incoming students' proficiencies and is where I first experiment with my top-down teaching philosophy. Before beginning a lab exercise, I would walk students through a topic's application and how every-day activities were reflections of that topic. I discovered later that my presentations were shared among other sections of the course as students found them valuable. I then developed a workshop on social media and crisis informatics using this top-down strategy and targeted both novice programmers and experts. After running this workshop in several venues and continuously attracting attendees of varying backgrounds (journalists to government analysts to researchers), many commented on how starting with a motivation helped them realize the breadth of possible analyses. I have found this realization is common among many novices: They do not know what is possible at first and struggle to see how learning a particularly method is useful in a broader scope, and starting from this high-level motivation provides that context.

I have since taught as an adjunct lecturer and incorporated this top-down strategy in my courses. I have also had the flexibility to design and introduce learning activities to support these classes. In a second-level programming course, I used board games to introduce topics like algorithm development and object-oriented design. Besides students' enjoyment at killing fictional werewolves in class, their answers to exam questions often referenced these games to explain complex topics. In a computer networking course, I introduced activities of my design to illustrate peer-to-peer models and routing algorithms, and students scored better on questions referencing these topics than topics we covered via lecture and YouTube videos.

Beyond teaching, the past year has given me the opportunity to mentor a series of intern groups. This more personal interaction was a significant change from my teaching experiences and required different strategies. The more specific, technical nature of the internship and the application process meant our scope was narrower and my interns were generally more motivated than my students. In this context, I learned that a light touch was necessary; if I directed to specifically, the interns would become bored with the tasks, but if I was too loose, the interns would not accomplish much. Instead, I have found providing the high-level motivation, specific direction on a single task, and allowing each intern to explore a task of his/her own devising in parallel has lead to more engaged participation, higher quality research, and better end-of-term evaluations.

Future Teaching Plans

I am most interested in teaching courses on data science, network analysis, social media, text analysis, computational social science, machine learning, large-scale computing, programming, data structures, software design, and computer networks. I would be proficient in computer security, natural language processing, image processing, operating systems, and computer architectures. I am also interested in introducing a course on crisis informatics, social media, and data science.