CORE COMPETENCY 1: Developing Discipline-Related Teaching Strategies

Interpretation/Reflection

Discipline-related teaching strategies are not only important in transmitting knowledge to students, but also are critical in determining what students ought to know and improving their overall engagement and enjoyment in a classroom setting.

As both a graduate student and an educator in a STEM field, I have had many firsthand experiences with a variety of teaching strategies—some have been ineffective (i.e., resulting in lower levels of learning) while others have been effective in enhancing student learning. For example, as an undergraduate student at Michigan State University, I participated in many large (i.e., hundreds of students) introductory biology, ecology, chemistry, mathematics, and physics courses. Most of the instructors of these courses utilized a traditional lecture teaching style, which, truthfully, was often dull and lacked any real interaction. I was first introduced to a more active style of teaching, which included in-class activities, group work, and frequent and consistent assessments during an Honors Calculus course in my freshman year of my undergraduate program. In that particular course, I noticed a difference in the amount of material I learned and my eventual mastery of that material, which I now attribute solely to the way in which the material was presented to me in that class.

As a developing educator, I have been privileged to learn from other seasoned and more experienced educators who, by example, support the use of active, discipline-related teaching strategies in their own courses. Thus, I have had opportunities to do the same in the courses I have taught or assisted with during the last few years. As a Master's student at the University of Washington, I was a teaching assistant in an introductory biology course, which, at any one time, had approximately 700-1,000 students. As is evident from this video, the lead instructor, Scott Freeman, Ph.D., used a variety of discipline-related teaching strategies in the lecture in order to ensure that his students were engaged and learning. Instead of utilizing traditional lecture teaching styles, Dr. Freeman utilized mini-lectures or a series of 10-minute presentations with probing questions instead of regurgitated, bulleted notes. On a daily basis, Dr. Freeman posed a series of questions to the class while the students engaged in peer-to-peer instruction and used iClickers to answer these questions. On a bi-weekly basis, Dr. Freeman set aside class time for students to work in pairs on group assignments, which were turned in, assessed by the teaching assistants, and awarded points. The summative assessments in this course—the exams—were highly integrative and included short-answer, modeling, application, and essay questions instead of multiple-choice questions. As a teaching assistant, I implemented similar discipline-related strategies in the laboratory sections I was responsible for leading.

As a current Ph.D. student (back at MSU!), I have made a genuine effort to build upon what I learned from some outstanding teaching mentors at UW to develop myself into a more effective educator. For example, I enrolled in a course, "PLB 802: Pathways to Scientific Teaching," and two massive open online courses (MOOCs) including "Course I: An Introduction to Evidence-Based Undergraduate STEM Teaching" and

"Course II: Advancing Learning Through Evidence-Based STEM Teaching," to continue developing my discipline-related teaching skills, strategies, and proficiencies. In these courses, I was introduced to new-to-me primary scientific literature that supports the use of active, discipline-related teaching strategies in enhancing student learning. In "PLB 802: Pathways to Scientific Teaching," I was asked to develop a full lesson plan for an introductory class in a STEM course with three other graduate students. Our instructor, Diane Ebert-May, Ph.D., requested that we structure our lesson plan according to a peer-reviewed scientific paper that details a "big idea in biology," using a discipline-related teaching strategy. This assignment was hugely impactful to me, for it taught me practical ways to bring real-world science (i.e., in the form of a peer-reviewed scientific paper) into the classroom (i.e., through in-class activities and peer-to-peer instruction) using a new-to-me discipline-related teaching strategy (e.g., the 5-E Framework).

Additionally, the two MOOCs have introduced me to other discipline-related teaching strategies. I have become particularly attached to the "Backwards Design" concept—a methodology by which an educator designs a course or curriculum by first setting learning goals and identifying big learning ideas, and then develops instructional methodologies and assessments—as an effective way to deliver material. Using this methodology, I believe that an educator can be sure the course is properly aligned in terms of learning objectives and goals, instruction, and assessments. I also enjoyed, and learned from, participating in local learning communities, which were fostered through the larger MOOC community. During the period of time each MOOC was held, I met weekly with other graduate students and faculty members to communicate with them and learn about other effective discipline-related teaching strategies. I was inspired to hear about the dedication other educators have toward making their courses and classroom settings more facilitative to improved student learning and academic and professional growth.

I have more learning to do, of course, but I am at the point where I believe I have enough knowledge to begin outlining a series of discipline-related teaching strategies that relate to and will be effective for students in my chosen area of study: fisheries science and management. I was fortunate to implement some of these strategies with another teaching mentor of mine, Dr. Rique Campa in the fall of 2016 in an introductory fisheries science and management course as part of my mentored TAR (Teaching-As-Research) project.