

Application for the Truly Innovative Teaching Award

Section 1: Contact Information

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I will be able to attend the gala on April 30, 2020.

Section 2: Innovation and Application

My teaching innovation was to develop novel interactive activities in the Introductory Plant Science (Agro/Hort 100G) curriculum, taught in fall 2018, using the ***Technology-Enhanced Active Learning (TEAL)*** classroom in Hardman Jacobs Hall (HJLC 228). Agro/Hort 100G is a course that is rotated among other faculty in the Department of Plant and Environmental Science. I will be teaching it again this fall. Previous semesters, due to the size of the class (90 - 100 students), this course was held in an auditorium with auditorium style chairs equipped with small arm desks. In this location, I observed that my attempts at group work were not successful as a result of restrictive seating which limited movement in the auditorium and made it impossible to get into groups. In addition, the lack of a large screen made it difficult to share videos or slides and the bad sound acoustics impeded discussion. Students seemed unmotivated, bored, and unengaged throughout the semester. This observation led me to seek out better ways to engage my students in this unique plant science course.

Introductory Plant Science is an Area III Laboratory Sciences General Education course required for horticulture and agronomy students, and it is also an option for students not majoring in science. This course attracts students from across departments and colleges. More than half the students enrolled are not majoring in a science-related field, rendering this course as possibly the only lab science course students will ever take in their lives after high school. The course has been a popular course due to the highly interactive laboratory assignments. However, the location of the lecture was limiting the types of activities presented during lecture for all faculty teaching this course. Since there are more than 90 students, the room that was normally used to accommodate the large class was the Gerald Thomas Hall auditorium which is not outfitted to be a classroom. There are no white boards, no desks or chairs that can move, and the only screen available for sharing videos was tucked away in the back of a large stage. After teaching in the auditorium, the end of semester student evaluations referred to all of these limitations as complaints and distractions to the learning environment.

To address the concerns of the classroom, for the fall 2018 semester, I moved my class to the Technology-Enhanced Active Learning (TEAL) classroom in Hardman Jacobs. The classroom is a remarkable learning space that offers the opportunity for students to become interactive, move, regroup if needed, participate and engage in the learning process. Subsequently, my curriculum changed to take advantage of the TEAL room.

In the TEAL room, students are always seated in groups of seven to eight making group activities effortless. Using a **flipped classroom approach**, every class period included at least one hands-on group activity where students would have the ability to discuss or brainstorm the plant science concepts. Students were encouraged to work in groups, utilize the whiteboard space for brainstorming and use the computers to look up references, as well as to formalize their thoughts in a common group document. After three to ten minutes of activity, the groups were asked to share their group document on their computer screens with the class. The ability to display each group's ideas with one click is an awesome feature of the room. Not only did this provide a form of interaction between groups, but students became comfortable with their peers at the table and beyond their table. Furthermore, many of these groups resulted in study groups for the rest of the semester.

Flipped Classroom Activity. For the majority of the students in the class (science and non-science majors), the concept of plant cell structure can be an intimidating topic, however its importance to plants and all life on Earth is essential to the course. To teach this topic, students are required to read the plant cell book chapter ahead of time, I present a short ten-minute lecture on plant cell structures and students proceed with group work. Each group is given a set of plant cell parts that they must draw on the white board wall while labeling the assigned cell organelles. The groups are then instructed to "peer" review the cell diagrams of the neighboring group while answering questions. While the "peer" reviewing is occurring, I visit the groups and listen to their discussion and reasoning on whether the diagrams are accurate or not and their answers to the assignment questions. At the end of class time, we come together and reflect as a large group. **By the end of the class, students have seen and discussed plant cell structures at least three times.** My goal is to use the TEAL room to provide students with assurance and confidence that they can learn and do plant science. This is one example of making plant science interactive in the TEAL room.

Fun Friday Activities. In order to encourage attendance and participation on Fridays, every Friday, I schedule "Fun Fridays" which is a concept that a colleague started in his classes and that I have used before. However, the technology in the TEAL room intensifies "Fun Friday" activities, making them energetic, dynamic and more informative. One particular group of "Fun Friday" activities that were modified were the "Great Debates" where students debate two controversial topics in plant science: 1) Genetically Modified Organisms (GMO) versus Non-GMO Breeding, and 2) Conventional Farming versus Organic Farming. These debates happen on two separate fridays. Before class begins, students submit one supporting and one non-supporting fact for each side. In class, supporting and non-supporting facts are read for each side. As a class we rank the facts from 'most supporting' to 'least supporting' for each side. At this point, each group must utilize the TEAL classroom laptops to find a scientifically peer-reviewed article to validate the facts. Each group is able to share their laptop screen with the entire classroom. The "Great Debate Fun Fridays" are rich with learning tools and knowledge. **In**

two 50-minute class periods, students learn three valuable scientific tools: 1) learn what GMOs, breeding, conventional farming and organic farming are, 2) practice discussing both sides of controversial topics, and 3) learn how to use the internet to find valid peer-reviewed scientific references.

Student motivation, attitude and engagement have greatly improved with incorporating more interactive tools in my class. My lecture time has been reduced drastically without compromising learning objectives. The end of semester evaluation feedback was positive, encouraging, and rated higher than previous semesters taught in the auditorium. ***Because I shared my positive experiences teaching Agro/Hort 100 in the TEAL with other faculty in my department, all Agro/Hort 100 instructors have now moved their course to the TEAL room.***

Section 3: Relationship with the Teaching Academy

My first workshop at the Teaching Academy was ten years ago during my doctoral studies. At that time, I sought out a Teaching Academy workshop writing group to help motivate me to write my dissertation. I learned valuable skills and the writing schedule helped me finish my dissertation in 2009. When I returned to NMSU as faculty in 2016, the first thing I did was seek out the Teaching Academy workshop schedule. I knew they would help me become a better instructor, advisor, mentor and overall scholar. The first workshop that I signed up for was the “How Learning Works” book discussion. This was a refreshing course where I learned different teaching methods for different types of learners like those in Agro/Hort 100G Introductory Plant Sciences.

Every time I walk into a Teaching Academy workshop or seminar, I know that I will walk out with a new teaching tool or a new perspective that will make me a better educator. On April 16, 2018, Dr. Michele Shuster led the “*TEAL Classroom: What is it and why would you want to teach in it?*” workshop. She presented the many uses of the room and the improvements it had on student success in her biology course. I immediately knew that this room would improve student success and engagement in my Introductory Plant Sciences course. After the workshop, I immediately contacted Dr. Shuster and asked if I could observe her course in the TEAL room. Dr. Shuster is an exemplary educator and her use of the TEAL room was natural and encouraging. I attended her course twice and became convinced that I needed to move my class to the TEAL room.

Section 4: Evidence of Effectiveness on Student Learning

The improved attitudes of students in the TEAL room Introductory Plant Science was evident based on their enthusiasm to get involved with plant science outside of the classroom. The course was so effective that a student transferred from the College of Arts and Sciences to the College of Agricultural, Consumer, and Environmental genetics and biotechnology degree. Select student comments taken from the end of the semester course evaluations:

She had the class do hands on activities.
She made Agriculture fun! I honestly was considering adding agriculture as my minor because she made the course so interesting.
Her greatest contribution would be how interactive she is with the students.
Enthusiasm and originality in making the class interactive and stimulating, very unique course.
Dr. Guzman was very effective lecturer and did a great job making some assignments very interactive.
I thought she did a great job of including videos and activities to keep the material interesting. I would not change anything.
Dr. Guzman made the class fun and mentally stimulating!
Her greatest contribution was having in class lecture and putting as much information on canvas that helped the students for the upcoming exam, she also provided fun and interesting assignments for her students to do almost every Friday.
I am not an ag major of any kind, and she made the material easy for me to understand even though this is a new subject for me.
Energy. Relationships with students particularly with newer technical aspects of teaching and excellent use of room.

The motivation to learn plant science was initiated in the TEAL classroom by encouraging students to participate in their own learning. This was evident when several students joined HortForum, the horticulture club. Students, for the first time, became engaged with plant science opportunities outside of the classroom. The TEAL room allowed to recruit and retain plant science students at NMSU. Further evidence of this was the decreased number of withdrawals. Three people withdrew from the course in 2017, while only one person withdrew in 2018.

Due to the diversity of the students' disciplines in Introductory Plant Sciences, my goal was to teach the basic principles of plant science and encourage students to appreciate how it contributes to our daily lives. The TEAL room facilitated my goal and in summary, student responses to the following questions were consistently higher in 2018 with the new implemented TEAL room assisted activities, than they were in 2017.

Question	% Responding Excellent in the auditorium (2017)	% Responding Excellent in the TEAL room (2018)	Gains from the auditorium to the TEAL room
Degree to which subject matter was made stimulating or relevant.	70	79	13%
Teaching of this course as compared to other courses taken this semester.	71.6	81.4	14%
Logical thinking and problem-solving ability.	53.3	65.1	22%
Appreciation of the subject matter and discipline field.	58.3	79	36%