

Incorporating Active Learning Through Teaching Garden Teams and Field Trips

Introduction

Fighting Food Waste and Loss (HOS 2333) is a new biological science general education class hosted by the University of Florida (UF) Horticultural Sciences Department, designed for all majors, students from horticulture and other colleges who are interested in learning and reflecting upon the major challenges in food and agriculture. The class explores the consequences of food loss and waste, ranging from important economic and social issues to lasting environmental problems, and through this framing, students learn about environmental and food sciences, postharvest biology, and communication technology related to reducing food waste. This course helps students identify the current and impending issues in food waste and loss, evaluate the economic implications of food waste, develop critical thinking skills, and identify strategies to reduce food waste and loss. Through active learning activities, group discussions, and field trips, students work together to develop an experimental design and practice interdisciplinary research approaches that synthesize diverse fields (including horticultural science, animal science, agronomy, environmental biology, food science & human nutrition, and public health), leading them to develop critical skills in the analysis of food waste problem.

Group study design and procedure

The design of this course allows students to not only learn about food waste and loss issues through discussion and collaboration in the traditional brick and mortar classroom, but it also provides students with a hands-on, active learning experience through growing crops in a teaching garden, and exploring new contexts during field trips. A long-term project was assigned in this course that aimed to increase active participation and synthesis of course content.

In this project, students were assigned into five groups towards the beginning of the semester, with each group focusing on growing one crop. These included green beans, broccoli, carrots, winter squash, and summer squash. The students were introduced to the teaching garden and taught general agricultural etiquette, as well as the necessary skills to successfully grow their crops. The crops' times to maturity varied, but took at least a few weeks for each group of students to grow and cultivate their crop. Students were given freedom in how much time and effort they put into their project, which was an essential aspect of the course, as it allowed students who may have taken interest in the subject to foster their passion of it. The freedom of this project also encouraged student collaboration and discussion with each step of the way, as a communal effort was beneficial to all groups in order to succeed in growing their produce.

The second portion of this active-learning project involved recording the decomposition of the cultivated crop, as well as creating a video demonstration of proper composting methods. Students were supplied with cameras if needed and were tasked with creating a time lapse video or slideshow of the decomposition. The decomposition portion of the project lasted anywhere from a week to a couple of months and was aimed at allowing students to understand the stages of decomposition and visualize subjects taught in class, such as the types of produce damage. Groups concluded their projects by presenting their experience and knowledge through videos and slideshows.

Additionally, students participated in a field trip to the UF College of Agricultural and Life Sciences Field & Fork Campus Food Program, to explore multiple varieties of composting operations used at the site (including windrow, three-bin systems, and vermicomposting), and discuss methods for small urban farms to minimize food waste.

A survey was conducted at the end of the semester when all work had concluded. It aimed to identify the extent of success in using the hands-on learning experience for this course (Table 1).

Table 1. Survey questions in the reflection in the teaching garden experiences of group study.
1. To what extent of importance do you feel that active learning in the teaching garden (ex. being able to see the crops and grow them yourself) improved your quality of learning?
2. My active learning experience in the teaching garden and field trip made me understand course materials in Fighting Food Waste and Loss better.
3. Interacting with the garden and field trip provided hands-on activities in understanding food waste and composting system.
4. Developing group project in teaching garden enhanced peer learning and teamwork inside and outside of the classroom.
5. I feel more interest in the course content because of our active learning experience in the garden that I would have not felt without that experience.
6. I feel as if I learned importance of fighting food waste and loss in the active learning experience of the garden that I would not have learned without the experience.
7. It is beneficial to spend time learning in the garden and field trip when I could be learning the content in a classroom.
8. Hands-on activities in teaching garden and field trips can increase engagement, improve problem solving skills, and foster creativities.

We provided this survey to 30 students in this class and summarized our findings. In conclusion, teaching garden and field trip experiences provided students with hands-on learning

opportunities that can increase their engagement and deepen their understanding of course content. Here are some ways in which these experiences can benefit students:

- **Active learning:** Students have a role in crafting their own learning process when they are engaged in hands-on activities like planning a garden, planting and deciding on how to tend the plants, and harvesting in a teaching garden, as well as through exploring a new environment during a field trip. This kind of active learning allows students to have an internal locus of control, which can increase student motivation and interest.
- **Real-world connections:** Teaching gardens and field trips provide students with real-world connections to what they are learning in the classroom. For example, a garden can help students understand the science behind plant growth and photosynthesis, and a field trip further incorporates the lesson, by helping students see the applications of their course content in a new site.
- **Multi-sensory impacts:** Field components can provide students with multi-sensory experiences that can help them retain information better. For example, a student who sees, smells, touches, and tastes the plants in a garden is more likely to remember the information than a student who only reads about the plants in a textbook.
- **Collaboration and teamwork:** These experiences can promote collaboration and teamwork among students. When working in a garden or on a field trip, students often have to work together to achieve a common goal. This can help students develop important social skills like communication, leadership, and cooperation.

Overall, teaching garden and field trip experiences are valuable tools for increasing student learning and classroom engagement. They provided opportunities for active learning, real-world connections, multi-sensory experiences, and collaboration and teamwork, all of which can help students become more engaged and successful learners.

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