

Teaching Tips/Notes



Enhancing Student Experience in Plant Sciences through Inquiry Based Learning

Many students at land grant universities start their undergraduate studies with an undecided major or switch from major to major during their undergraduate career. With so many competing and more lucrative career options, recruiting undergraduate students into Plant Sciences is a challenge. Developing and maintaining an interest in agricultural majors is equally important in retaining those students who do enter into agricultural fields. Innovative and entertaining ideas must be applied to motivate and attract students towards plant sciences. One solution is a needed paradigm shift from traditional textbook-focused instructional methods to of inquiry based learning, where students exploring challenging questions appropriate to the field (Crawford, 1999). Inquiry-based learning is an active form of learning and enhances students' self-engagement with scientific activities (Edelson et al., 1999) resulting in an open environment in which students design their learning through exploration with the subject matter. An essential component of inquiry-based learning is that students work independently to solve problems rather than passively receiving direct, step-by-step instructions from the teacher. The instructor does not provide knowledge, but instead helps students along the process in discovering knowledge themselves.

This note provides an example of how a fun-filled, hands-on inquiry based learning model implemented in a general education introductory plant science course helped stimulate interest about plants in non-agriculture major students at New Mexico State University. In addition, the project as designed promotes problem-solving, team-work and presentation skills among students.

In an effort to increase student interest in plant sciences and make students aware of 1) the tremendous variety of plants, 2) the importance of plants in daily life, 3) plant origins, 4) plant production and management practices, and 5) fun facts about plants, the instructor developed a multi-faceted project "Know Your Plant Project." For this project, student teams are assigned a "mystery" plant or plant product. To ensure students consider a global perspective beyond domestic plants and issues, assigned "mystery" plants and plant products include international examples. Each team must then identify the plant or plant product they are assigned, research various aspects and uses of the plant or plant product and create a presentation, including PowerPoint, for the entire class. Students were offered extra credit for including tangible objects in their presentations; many teams prepare and serve edible dishes to share with the class.

One key requirement for the "Know Your Plant Project" is that the instructor or teaching assistant of the course will not help in identifying the assigned mystery plant or plant product. Students are allowed to question faculty or students who are not directly linked with the course. Some mystery plants/plant products are seeds –student teams who receive seeds as their mystery product frequently choose to plant the seeds to try to identify the plants as it grows.

The "Know Your Plant Project" develops and measures presentation skills using a detailed rubric to evaluate presentations based on content, professional appearance, presentation skills and timely submission. The project also fosters team work: The project is assigned early in the semester and motivates students to work together and interact regularly to successfully complete the assigned project. Because the project requires students to interact with each other, students develop personal connections with others in the class and not just with those in their own teams. This is a particularly important element because students come to this class from various colleges and majors, rarely know each other and are not generally inclined to form personal associations. Students are evaluated for their individual contributions towards the group activity by the instructor and through confidential peer-evaluations. Peer evaluations are averaged and then included in calculating the final grade on the project. To ensure students are attentive during presentations, each team is required to contribute a list of questions to the instructor from their presentations. Questions are then selected by the instructor for inclusion on quizzes.

A reflective element is also included in the project. In the reflection students provide feedback to the instructor about their experiences in the team activity. A vast majority of students indicate the project is a positive experience. Students report that the project fosters interest and investment in a particular plant – that they engage in deeper research and learn much more about their assigned plant than what is

required or expected for the team activity. Many students also indicate that the project provides valuable lessons in teamwork, including cooperating and sharing responsibility with other team members. Finally students report that the project helps them learn how to find information and how to problem solve.

This "Know Your Plant Project" aroused student interest in the subject matter early in the semester and retained that interest throughout the semester. The results of the project demonstrate that inquiry based hands-on experiences are instrumental in 1) helping students connect abstract ideas to the real world, 2) building personal connections between students, and 3) generating and maintaining interest in agriculture and plant sciences. Through content-based inquiry and learning using the "Know Your Plant Project", students improve their teamwork and communication skills, as well as develop information literacy and problem solving strategies.

References

Crawford, B.A. 1999. Is it realistic to expect a preservice teacher to create an inquiry-based classroom? *Jour. of Science Teacher Education* 10(3): 175-199.

Edelson, D.C., D.N. Gording and R.D. Pea. 1999. Addressing the challenges of inquiry based learning through technology and curriculum design. *Jour. of the Learning Sciences* 8: 391-450.

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