Teaching Plant Propagation Online©

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INTRODUCTION

Responding to the ever-changing opportunities offered by the Internet, the Department of Horticulture at Oregon State University (OSU) decided to offer an online degree in General Horticulture. With assistance from the College of Agriculture and Extended Campus, the first few courses were available in 2009. One of the required courses for this new degree was HORT 311 – Plant Propagation which would be offered Winter Term.

Since 2008, I taught the on-campus course in plant propagation, which includes a lab section where the students experience hands-on grafting, seed germination and seedling growth, cuttings, and layering. When asked to develop the online class in plant propagation my response was "How do I teach plant propagation online? What about the labs?" Frankly, I felt that this type of course could not be taught online and I resisted developing one.

As the number of online, degree seeking students continued to increase, I realized that I must come to terms with developing a plant propagation course. So I let go of what I was doing for the on-campus students and put myself in the position of the online student. My daughter had taken several online high school courses that gave me a little more insight into what was possible. In addition, support from Ecampus and other faculty who had developed online courses helped me to shape a vision.

The key was to let go of what I had done and focus on what I could do, or more correctly, what the students could do. Professional plant propagators reminded me that the most important thing to teach students is the basic science of plant propagation and the general practices used. Any skill a student would acquire would take a lot of time and practice; therefore, it was not a goal for this course.

Instead, seven learning objectives were developed specifically for the online students. These included:

1) Identify the key components of the six major plant propagation systems used worldwide to increase plants for the benefit of mankind.
2) Analyze the physiological and genetic principles underlying the selection and propagation of plants.
3) Summarize the relationships between propagation technique, genetic variation, and the concept of a cultivar.
4) Describe the advantages and disadvantages of the common methods used to propagate plants.
5) Recall how plants grow, their physiological and developmental characteristics and predict how these can be manipulated for successful propagation.
6) Prioritize the complexities of methods used to solve plant propagation issues.
7) Demonstrate an introductory level of evaluating successful methods of both asexual and sexual plant propagation for specific plants.

COURSE CONTENT

Ten weekly topic folders are used to organize the course into major plant propagation topics. This course is not self-paced and a student has frequent deadlines for assignments, exams and discussion participation. The current weekly topics are:

Week 1 – Plant biology and genetics.
Week 2 – Seed development, breeding, and production.
Week 3 – Seed harvesting, dormancy, and germination.
Week 4 – Seedling production systems.
Week 5 – Adventitious roots, stock blocks, and cutting treatments.

Week 6 – Cutting environment and propagation systems.
Week 7 – Graft union formation and successful grafting techniques.
Week 8 – Field budding and layering.
Week 9 – Specialized stems and roots.
Week 10 – Managing plant clones and micropropagation.

Introduction Videos
After reviewing several other online courses. I decided that a 5-minute introduction video would help students get a feel for each weekly topic. It would also provide the student with a visual connection to me. I videotaped myself using a Flip Video UltraHD 120 Camcorder and used iMovie software to edit the video. Each weekly video was shot at a different location (outdoor orchard, inside a mist house, etc.) that was related to the topic. It was a bit of work to do this but I had fun with it. I also discovered that I would not make a very good actor. But on the other hand, my Ecampus consultant had advised me that it was best to be human so that students would relate to me.

Reading Assignments
The required textbook for the course was Plant Propagation: Principles and Practices by Hartmann, Kester, Davies, Jr. and Geneve, 8th Edition. The reading assignments covered most of the book (Chapters 1-18), which contains a vast amount of information. To assist the students in their efforts, I developed a study guide that included terms and concepts they should focus on while reading the chapters.

Narrated Slide Shows
I used narrated slide shows to compliment the reading assignments and to help show students how the science and practice of plant propagation are inter-connected. In total, 19 slide shows were developed using Microsoft PowerPoint and Adobe Presenter software. Each slide show would typically run for 30 to 45 min. Developing these slide shows was one of more challenging components of the entire course. At first, I wanted to make it sound perfect but after 6 h of working on the first one, I gave up and just started talking like I would in the classroom. Again, my Ecampus advisor told me that was a great method to use and that students would feel more at home (or in the classroom) if I coughed and stuttered, now and then.

Video Clips
About 30 video clips are used to demonstrate plant propagation techniques, such as grafting, layering, and seed cleaning. Most of these videos were found on YouTube and a range of amateur to professional propagators produced them. Another set of 10 animated tutorials from Sumanas, Inc. demonstrate general biology concepts, such as genetics, which are essential for students to understand when collecting seeds or understanding plant mutations.

Assignments
I use two categories of assignments for the class. The first category involves writing assignments about the major implications of plant propagation. The second involves a plant propagation activity and writing a report on the results of that activity. Activity assignments for the on-campus students will often focus on lab exercises. Designing assignments specific for online students required a bit more creativity on my part. One of these activities requires the online students to find a plant with seed on it and harvest the seed. They have to clean the seed and review the literature to discover if any seed dormancy exists and what the pre-germination treatment would be. Of course, they must also be able to identify the plant from which they collected the seed. The student documents the process by submitting images of the parent plan and the cleaned seed along with the literature review. The activity assignments are popular with the students. A few times, in order to complete the seed collection assignment, students have had to dig

down a few feet into the snow to find a suitable plant! Other activity assignments involve developing plant propagation profiles for local plants and completing one of the layering techniques on a suitable plant.

Discussion Board

The "Discussion Board" is the place students interact with one another on a regular basis, sort of like texting or Facebook®. They discuss a plant propagation topic related to the material introduced that week and are given an opportunity to express their own thoughts. Once again I was skeptical about this activity but my Ecampus advisor said that I would be surprised at the level of participation. And I was more than surprised; I was amazed at their knowledge and thoughtfulness regarding the topic. It was a channel for each student to feel like they had something to share and the social barriers that exist in a classroom were removed. Often one or more students would share their own experiences or help explain a concept to another student or even provide information on where to obtain propagation supplies and the potential availability of local hands-on workshops. While they are required to make one original post and one response to another student's original post, they often would make several additional posts. One weekly discussion topic "Discuss strategies to conserve plant genetic resources" inspired 86 total posts.

Rarely do I enter the discussion, thus allowing students go without fear that I will comment about their posts. I do follow the discussion to make sure that proper etiquette as outlined in the guidelines is followed and to assign grades. Just as with any in-person conversation, discussion boards have the potential to produce rudeness, disrespectful behavior, and hurtful comments. I have yet to have a problem with this even though we do discuss some controversial topics.

Mid-Term and Final Exams

Two mid-term type exams and the final exam are used to complete the student evaluation of learning process. The other tools that used are the weekly discussions and assignments. Unlike the on-campus students that have to show up at set time for an exam, the online students can select a time over a range of several days. As mentioned earlier, many of these students are employed and the attraction to an online course is the degree of flexibility in time management. Though once they select a time to take the exam they have to compete it in the same amount of time as the on-campus students.

CONCLUSION

In the beginning, I was skeptical and reluctant about developing and teaching an online plant propagation course. It took working part-time for about 6 mo. to complete the course development of all new course materials such as narrated slide shows and introduction videos. It took only about a month after the first course was offered that I realized it was going to be successful. I could see the excitement, energy, and enthusiasm most of the students had for plant propagation through their assignment writings and interaction on the discussion board. Several of the students mentioned how they have been waiting a long time for such a class to be offered online. A few students commented that the course contained too much information and was difficult for them to cover everything, especially those who were employed full-time.

The online plant propagation class is a 4-credit course that is available for degree and non-degree seeking students. Currently, there are 84 students across the country enrolled in the online General Horticulture degree offered by OSU. About half of these students are located east of the Rocky Mountains. Enrollment in the winter term of the online plant propagation class is expected to cap at 30 students. It is interesting to note that in previous terms, many of the online students are actively employed in the nursery and landscape industries, vineyards, conservation agencies, or in agriculture.

To learn more about this and other online degrees offered by Oregon State University, visit the Ecampus website at: <http://ecampus.oregonstate.edu>

QUESTIONS AND ANSWERS

Douglas Justice: How much time do you have to put in online with the students and, secondly, how does student performance on exams compare between the online course and one that's delivered in person?

Richard Regan: It took 6 mo. to develop the course. There's a tremendous amount of upfront work. The course has a schedule like regular courses, that is, students can't show up online any time they want. I spend relatively little time with the students during their weekly online discussion assignment. There may be 80 posts on a particular topic under discussion and I contribute none. I let them go just making sure they all follow the online etiquette rules we've established (e.g., improper language, treating each other with respect, yelling by posting with all capital letters, etc.). On the assessment, which is the exams and written assignments, the online group excels on the written exams in understanding the concepts presented in the course. Online students evidently feel much more secure sharing their views because they are using a computer to express themselves. The students taking the course in person do better answering practical questions on the exams.

Peter Gregg: Do former online students have access to any information related to the class?

Richard Regan: That's a good question. They don't have access to course materials once their online course is finished. They are able to make copies of materials during the time they're enrolled in the course.