

# Student Perceptions of an Online Introductory Horticulture Course



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## Abstract

The number of distance education courses available in American higher education has increased substantially over the past decade. The number of higher education students enrolled in an online course during the fall 2005 term was close to 17% of the total population of 17 million students (Allen and Seaman, 2006). The objective of this research was to develop and evaluate a one credit introductory horticulture course delivered exclusively online. This course has five modules covering the basic horticulture topics of: plant identification and characteristics; plant growth and development; the rooting environment; selecting plants for the landscape; and putting plants in the landscape. Eleven graduate students (37.9%), nine undergraduate seniors (31.0%) and nine adult learners (31.0%) have completed the course since fall 2006. Evaluations revealed an overall course rating of 3.90 (scale: 1=poor; 5= excellent). When asked what aspects contributed most to their learning, three themes were prevalent: the assignments (40.5%), the lectures (27.0%) and the asynchronous environment (10.8%). When asked what distracted from their learning four themes were evident: difficulty of the assignments and format (17.5%), wanting more in the lectures (15.0%), technical problems (15.0%) and problems with assignment feedback and grading (10.0%).

## Introduction

The number of distance education courses available in American higher education has increased substantially over the past decade. A report from the National Center for Education (2003) stated that 56% of all two and four year institutions offered distance education courses during the 2000-2001 academic year. Further, the number of higher education students enrolled in an online course during the fall 2005 term was close to 17% of the total population of 17 million students (Allen and Seaman, 2006). Student demographics in online courses include undergraduate and graduate students, as well as non-

traditional students and high school students. When asked why they chose an online course, many students cited needing to resolve scheduling conflicts or to meet an academic requirement (Cavanagh, 2006; Mansour and Mupinga, 2007). Although many students are enrolling in online courses, the literature supports the idea that students with self-discipline and motivation are better suited to the asynchronous environment (Waschull, 2005). Roval et al. (2007) suggest that students enrolled in online courses may self-select because they are more intrinsically motivated than their traditional counterparts.

After reviewing the literature on distance education courses and analyzing current distance course offerings at Iowa State University, a one credit introductory horticulture course to be delivered exclusively online was developed. The objective of this research was to evaluate this online horticulture course. The evaluation centered on student demographics, as well as how the online environment impacted course delivery, and what aspects of the course contributed or distracted the most from student learning.

## Course Description

The online one-credit course has five modules

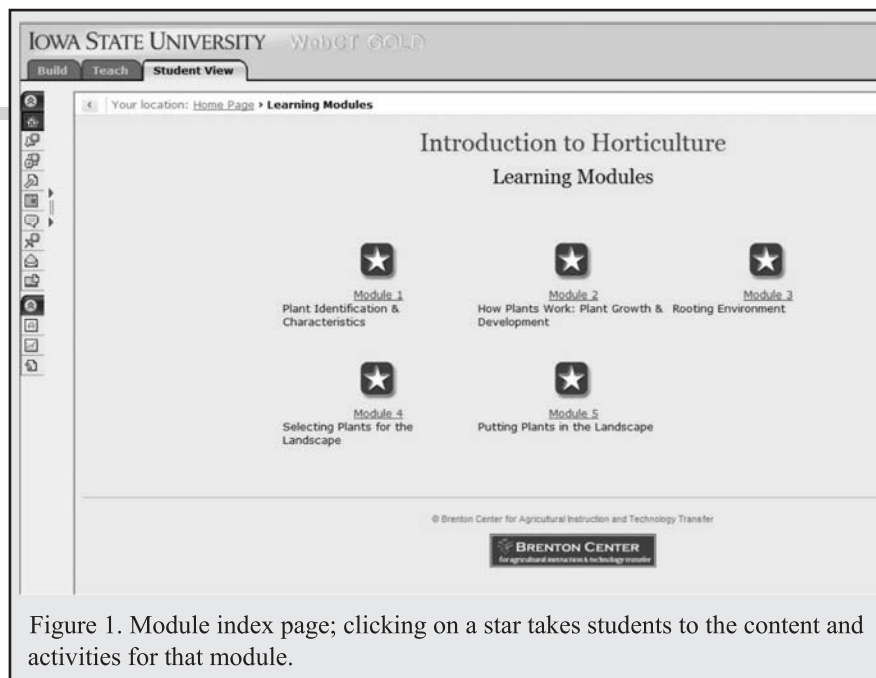


Figure 1. Module index page; clicking on a star takes students to the content and activities for that module.

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covering the basic horticulture topics of: plant identification and characteristics; plant growth and development; the rooting environment; selecting plants for the landscape; and putting plants in the landscape (Figure 1). The course objectives include: understanding basic plant anatomy, physiology and nomenclature; understanding characteristics of rooting environments for horticultural crops; identifying characteristics of healthy nursery stock; and developing the ability to determine appropriate site selection criteria and proper planting technique.

Each module includes a lecture created in PowerPoint (Microsoft Corp., Redmond, Wash.) with an audio overlay (Figure 2), a discussion board activity, an assignment, and a quiz. The audio files that accompany the PowerPoint lecture slides were recorded with a headset microphone using Audacity software. The audio files were synched with the lecture slides using Breeze (Macromedia, Adobe Inc., San Jose, Calif.). Module 1 (Plant Identification and Characteristics) and Module 2 (Plant Growth and Development) also have drag and drop self-test components (Figure 3) which allow students to test their comprehension of the material. The questions and problems posed in each discussion board activity are open ended. In order to complete the assignment students must research the question or problem using course materials as well as outside resources to develop a recommendation. They post the recommendation to the course website where it is subject to peer evaluation as well as instructor evaluation. For example, in the Rooting Environment module, students answer the following question in the discussion board activity:

Sally Farmer wants to know which locations in her new backyard would be best for her flowers and her vegetable garden. There are two areas she is considering: Area A and Area B. Area A is mostly heavy clay with drainage problems. The areas will pool water after a light rain event. Part of the area gets full sun; the rest of it gets partial sun. Area B is very sandy and is part sun/part shade over the entire area. The plants Sally wants to grow in her garden are listed below.

Your task is to evaluate the two possible locations. Make a decision about where the gardens should go. In your response, explain why Sally should plant her garden in one location or the other.

The assignments for each module provide an opportunity for students to apply what they have learned. Many of the assignments require the

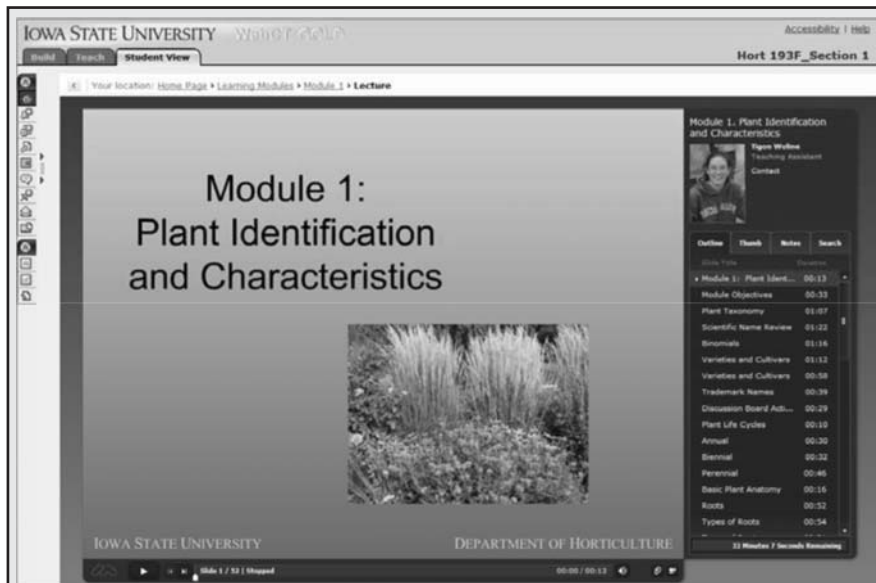


Figure 2. The lecture portion of each module consists of several slides with text and images, as well as an audio tract that narrates the lecture slides.

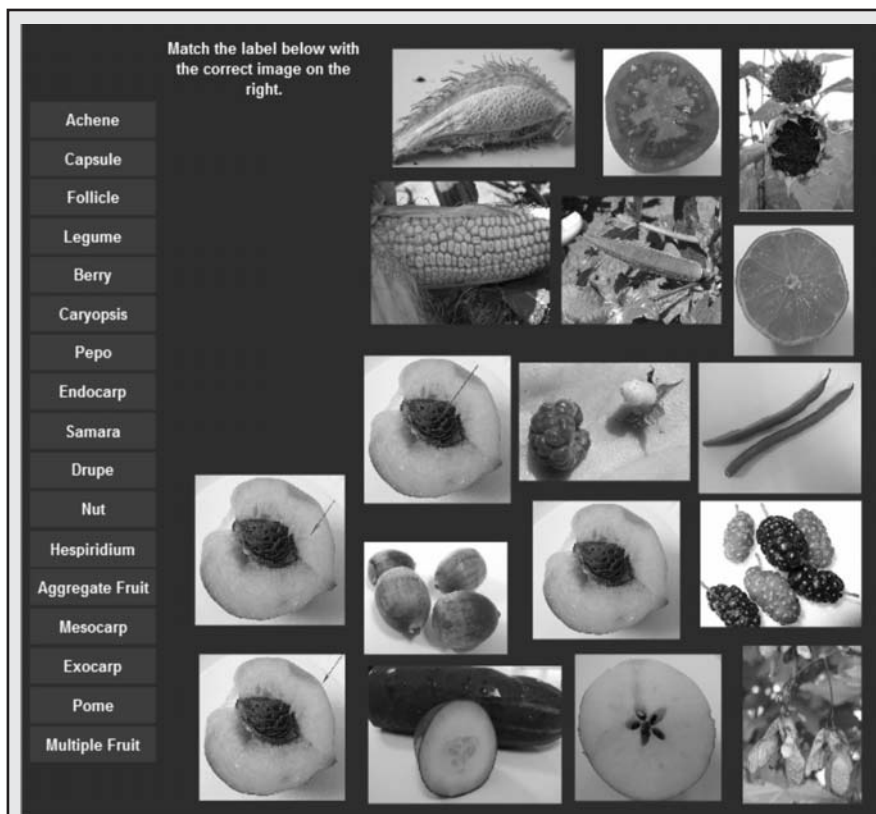


Figure 3. Example of drag-and-drop style self-test for students to evaluate their comprehension before taking the quiz. Students match the labels on the left with the correct images to the right.

students to explore their environment, looking for examples of horticulture they might not have considered before. For example, in the Plant Identification and Characteristics module students visit their local grocery store to determine how many different types of fruit, as discussed in the module, they can identify. In all cases, assignments are submitted as a Microsoft Word (Microsoft Corp., Redmond, Wash.) document. Each assignment is reviewed, comments are added using the comment insert feature in Microsoft Word, and the documents are returned to the student with a grade. Using the comment feature allows the instructors to provide detailed feedback on assignments.

The quizzes are a combination of multiple choice, fill-in-the-blank, and true-false questions. Each module quiz has fifteen questions that primarily test the acquisition of key ideas and facts. As students complete each module they process information they have learned in multiple ways: the quizzes test their recollection of facts; the discussion board activities require application of the knowledge; and the assignments incorporate previous knowledge with new knowledge in a synthesis question.

After completing the five modules and the corresponding assignments, students complete a final exam covering all five modules. The exam is a combination of multiple choice, true-false, and short essay questions and requires students to demonstrate an understanding of key ideas and facts as well application and synthesis of this information.

## Materials and Methods

Using a modified Iowa State University course evaluation, a 27-question evaluation was developed for this course. Questions were designed to gather information on student attitudes and perceptions of the online course. The evaluation consisted of 23 closed-ended and four open-ended questions. The closed-end questions were formatted into a 5-point Likert-type scale (Likert, 1932) where respondents specified their level of satisfaction with a statement. The 23 questions were grouped into six categories; student information (6), general course information (8), learner engagement (1), assessment and measurement (1), course technology (5) and

learner support (2). The four open-ended questions asked students to describe: aspects of the course that contributed most to their learning; aspects that distracted from their learning; improvements that should be made to the course; and other horticultural topics they would be interested in learning about in this distance delivery format. The evaluation was distributed to the 38 students enrolled in four sections of the course between September 1, 2006 and August 15, 2007. Data was entered using Excel (Microsoft Corp., Redmond, Wash.) and descriptive statistics were computed.

## Results and Discussion

Across the four course offerings, 29 evaluations were returned and useable for a 76% response rate. Eleven graduate students (37.9%), nine undergraduate seniors (31.0%) and nine adult learners (31.0%) completed the course. A majority (52.9%) of students did not reside in Iowa and only 17.6% were enrolled in a degree program at Iowa State University. The location of both the graduate students and adult learners were widespread across the country.

Respondents ranked their prior experience in the horticulture field as 2.45 (5=high; 1=low), however, they had a relatively high interest in the subject area (3.76). After completing the course, 58.6% of respondents reported they would take another horticulture course online.

**Table 1. Respondent scores to selected questions about general course information, learner engagement, assessment and measurement and course technology (5)**

	Question	Average Response*	Standard Deviation
General Course Information	Clarity of student responsibilities and requirements was:	3.86	1.03
General Course Information	The organization of the course material was:	4.21	0.77
General Course Information	The course content was:	3.93	1.03
General Course Information	The time allowed to complete each modules and its assignments, quiz and activities was:	4.14	1.16
General Course Information	The reading materials were:	3.28	1.28
General Course Information	Readability of the content was:	4.10	0.72
General Course Information	The amount of information presented in the modules was:	3.97	1.18
Learner Engagement	The course's ability to stimulate my thinking more deeply about the subject was:	3.72	1.00
Assessment and Measurement	Evaluation and grading techniques (tests, papers, projects, etc.) were:	3.86	1.22
Course Technology	Navigation of the teaching tools was:	3.93	0.88
Course Technology	The audio clips associated with the modules were:	3.79	0.98
Course Technology	This tool is an effective way to deliver information.	4.14	0.79
Course Technology	The interactive format of this tool aided my learning.	3.72	0.96
Course Technology	I prefer this web-based format to traditional learning environments.	3.24	1.41

\*Responses measured on a scale of 1=poor, 2=fair, 3=good, 4=very good and 5=excellent.

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Table 1 summarizes responses to questions on general course information, learner engagement, and assessment and measurement. Respondents rated all 14 of the questions between good (3) and very good (4).

Respondents ranked their comfort level with learning via a web-based format as 3.86, and overall found the course format and technology used to create the course content valuable in their learning. Respondents felt the online format was an effective way to present the course information (4.14), that the navigation of the individual modules was clear (3.93), and that the interactive format of the course aided in their learning (3.72). Further, they gave the audio clips associated with the PowerPoint slide lectures a high rating (3.79). Interestingly, although respondents gave this course an overall rating of 3.90, they only rated their preference for a web-based format to a traditional learning environment as 3.24. Lee and Nguyen (2007) reported that students who enroll in online courses often cite being distracted by family, feeling alone and the faster pace of online learning as drawbacks. This may explain in part why students in this study rated their preference for online learning relatively low.

Responses to the four open-ended questions provided valuable information to the researchers. This information has been, and will continue to be, incorporated into future course offerings. Responses to the questions about what aspects contributed most, or distracted the most, from their learning were categorized by theme (data not shown). The percent of total responses is listed in parenthesis. When asked what aspects contributed most to their learning, three themes were prevalent: the assignments (40.5%), the lectures (27.0%) and the asynchronous environment (10.8%). Examples of responses to this question included: "The assignments forced me to look back at the lecture material and really helped me gain a better understanding of the course content." And, "The audio lecture was extremely beneficial and a great teaching tool." And the "Freedom to choose the best time to learn the material." Lee and Nguyen (2007) also reported that an advantage to online learning is the flexibility and convenience as compared with traditional classrooms.

When asked what aspects distracted most from their learning four themes were evident including: the difficulty of the assignments and the format (17.5%), wanting more images and printable versions of the lectures (15.0%), technical problems (15.0%) and issues with assignment feedback and grading (10.0%). Examples of responses to this question included: "Possibly have a printable notes sections." And "I found the feedback from instructors on assignments was lacking. Nice examples, good work; types of answers don't tell the student much." And "Assignments were more extensive than the information presented within the modules; I had a hard time

with the assignments that were at a higher level of horticulture than what this class represented."

Respondents provided valuable feedback on how the course could be improved. Again responses were grouped by theme and the three most common themes were: wanting more in depth content information in the lectures (23.5%), wanting fewer technical/server problems (17.6%), and inclusion of additional credible resources or tips on how to find credible resources for the outside research (11.8%). The technical and server problems reported in this study are similar to Mansour and Mupinga's study (2007) where they reported that computers and course management software distracted students from learning. One major difference between responses to this study and other published results has to do with the online learning community. For example, many studies report students feeling disconnected from other learners and the instructor (Lee and Nguyen, 2007; Lim et. al., 2006; Mansour and Mupinga, 2007). That issue was not listed as a limitation or something that needed to be improved for this course.

Another difference is in the workload associated with the course. Lim et al. (2006) reported that the workload in online courses is more than what students expect, yet respondents in this study wanted more in depth information.

The comments have been helpful in refining the original course. To provide more interaction between students and with the instructor, the discussion board activities were modified to include a portion that requires students to evaluate and respond to a peer's posting for the assignment. Evaluation rubrics were developed and shared with students so they understand how they are being evaluated. Summers et al. (2005) suggest that students in the online environment may require a detailed explanation of evaluation and grading methodology to better understand what is expected; where as face-to-face students are able to ask questions to supplement the written assignments. Modifications have also been made on how students receive feedback on assignments including a PDF with the assignment and associated instructor comments.

Recently a sixth module about professional development and new employee training has been added to the course. The discussion board activities have been removed for this audience but the other components remain in place. This new six-module course is available to members of the Iowa Nursery and Landscape Association to assist with their employee training programs.

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