The Pennsylvania State University
The Graduate School
Department of Horticulture

STUDENT PERCEPTIONS OF REAL WORLD APPLICATIONS
INCORPORATED INTO HORTICULTURE CURRICULA

A Thesis in
Horticulture

by
Bethany L. Mathie

© 2008 Bethany L. Mathie

Submitted in Partial Fulfillment
of the Requirements
for the Degree of

Master of Science

August 2008
The thesis of Bethany L. Mathie was reviewed and approved* by the following:

E. Jay Holcomb  
Professor of Floriculture  
Thesis Advisor

Dennis C. Scanlon  
Professor of Agricultural and Extension Education

Elsa Sanchez  
Associate Professor of Horticultural Systems Management

Daniel T. Stearns  
Professor of Landscape Contracting

Richard Marini  
Professor of Horticulture  
Head of the Department of Horticulture

*Signatures are on file in the Graduate School
ABSTRACT

Horticulture students are better able to demonstrate their abilities later in their employment if they are provided with the opportunity to develop real world skills and apply their knowledge during the learning process. The best way of making a connection between the real world and education is through the appropriate use of practical experiences as part of the curriculum. These experiences have been termed “Real World” applications or activities. “Real World” activities are a form of experiential learning in which the student is actively engaged in the learning process by performing exercises they may encounter in their future workplace.

Activities have been incorporated into horticulture courses at the Pennsylvania State University, which provide students with theses opportunities. The assignments require students to interact with actual clients and/or horticulture professionals to apply the knowledge obtained in the classroom to real problems or situations that occur in the horticulture industry every day. This includes traveling to a job site, evaluating the situation, and designing and implementing a program of work over a designated period of time. In today’s world with ever decreasing budgets and increasing professor responsibilities, one would question, “Is going beyond lectures and laboratory activities worth the extra effort?”

The objectives of this study were to 1) describe student perceptions toward “Real World Applications” in horticulture curricula, 2) determine the need based on student perception for “Real World Applications” in horticulture curricula, and 3) assess perception differences among horticulture students.

One hundred and six students from six horticulture classes at the Pennsylvania State University were surveyed to acquire their opinions toward the “Real World” activity
incorporated into their respective course. The survey instrument contained twelve questions that
utilized a Likert scale for the participants to rate their opinions. There were five questions to
determine the demographics of the participants, and an additional question asking students to
select which types of experiential learning techniques they would like to see in their horticulture
classes.

Results indicated that 82% of students felt the activities enhanced their understanding of
course information, and 90% felt the activities required them to apply their knowledge more than
then they would have in a laboratory setting. Overall, 90% of participants would like to see
more “Real World Applications” incorporated into their horticulture courses. There were no
significant differences among gender. However, there were unexpected differences among
students who had completed an internship versus those who had yet to do so. Participants who
had completed an internship rated their “Real World” activity experiences lower than those who
had not completed an internship.

It can be inferred that more inexperienced students appreciate the activities as it may be
one of the first opportunities for them to draw connections to their future careers. As found in
the literature, “Real World” activities were traditionally reserved for use in capstone courses
(Trede & Andreasen, 2000). Based on the research conducted in this study, these activities may
be more beneficial if incorporated into earlier core classes as well as the capstone courses.

After the results were analyzed, it was deemed that the survey instrument was not
sensitive enough to fully understand the participants true perceptions of the activities. If this
study were to be conducted again, it is recommended that the survey instrument be expanded to
include questions pertaining to the activities correlation to the course material, the participant’s
feelings associated with the activity, and the participant’s major and class standing.
# TABLE OF CONTENTS

LIST OF FIGURES ........................................................................................................ vii
LIST OF TABLES ........................................................................................................... viii
ACKNOWLEDGEMENTS ............................................................................................ ix

Chapter 1 Introduction ............................................................................................... 1
   Literature Cited ....................................................................................................... 4

Chapter 2 Literature Review ..................................................................................... 5
   Needs of the Industry ............................................................................................ 5
   Meeting the Needs ............................................................................................... 7
   Student Comprehension & Retention .................................................................. 9
   The Value of Experiential Learning ................................................................... 13
   Literature Cited ................................................................................................... 18

Chapter 3 Materials and Methods .......................................................................... 21
   Literature Cited ................................................................................................... 27

Chapter 4 Results ...................................................................................................... 28

Chapter 5 Discussion .................................................................................................. 43
   Literature Cited ................................................................................................... 49

Chapter 6 Conclusion .................................................................................................. 50

Appendix A Hort 269: Residential Landscape Planning ........................................ 52
Appendix B Hort 368: Landscape Planting Design ................................................ 55
Appendix C 2006 Hort 450: Greenhouse Management ......................................... 58
Appendix D 2007 Hort 450: Greenhouse Management ......................................... 61
Appendix E Hort 455: Retail Horticulture Business Management ....................... 64
Appendix F Hort 457: Interior Plantscapping .......................................................... 67
LIST OF FIGURES

Figure #1: The “Real World” Activity Corresponded to the Course Material ......................35
Figure #2: The “Real World” Activity Improved Understanding of the Course Material .......36
Figure #4: The Participant took “Real World” Activity Seriously as it Involved a Real
Client/Company....................................................................................................................37
Figure #5: The Participant felt it was Necessary to Meet the Client and Visit the Project Site ..38
Figure #6: The Participant Wanted to Discover the Information Related to a Project Rather than
Have it Provided to them ..................................................................................................38
Figure #7: The Project Reflects Something the Participant Would See in their Future Career..39
Figure #8: The Participant Felt Prepared to engage in the “Real World” Activity ..............39
Figure #9: At the Completion of the Activity, the Participant Felt Confident with Their
Decisions............................................................................................................................40
Figure #10: Participants Want More “Real World” Activities Integrated into Their Classes ....41
Figure #11: “Real World” Activities Allow the Participant to Apply Their Knowledge More
Effectively.........................................................................................................................41
Figure #12: Number of Internship Completion by Class..................................................42
LIST OF TABLES

Table 1: Demographics for all six horticulture classes utilized in the study ...............34
ACKNOWLEDGEMENTS

I would like to thank my committee members for their guidance and patience throughout my graduate experience, especially my advisor, Dr. Jay Holcomb, who read numerous drafts of my thesis and gave me a push when needed. I would also like to thank Dr. Kathy Kelley and Professor Martin McGann who allowed me to utilize their classes in my study.

In addition, I would like to extend my appreciation to my parents, Mary Jo and Bruce, for all their support throughout my education and in all aspects of my life. Without their support I would not be who I am today.

Finally, sincere gratitude to Ben Hellar for aiding in the writing process, attending to my computer issues, and bestowing unwavering support when needed.
Chapter 1

Introduction

Millions of dollars are spent each year educating the leaders of tomorrow at colleges and universities across the country. With so much money being spent on education, several questions come to mind; Are recent graduates adequately meeting the demands of the industry, are employers satisfied with the workforce these institutions are turning out, and should universities transform their curriculums to be more experience based rather then lecture oriented?

In a recent study conducted by Beidler, Iles, Nusser, and VanDerZanden (2006) 137 companies from the Associated Landscape Contractors of America commented on the efficacy of landscape contracting and horticulture curricula at colleges and universities across the county. The majority of employers were satisfied with their new employees; however they felt they were deficient in business knowledge application and related skills. When employers were questioned about the performance of recent graduates their answers were usually the same, the knowledge is there, however the ability to apply it is lacking. This opinion can be found in most career areas whether it is the education, medical, business, or other scientific fields. The horticulture field is not exempt from this problem. It too is feeling the criticism from employers of recent graduates.

An undergraduate education should provide students with the necessary skills, attitudes, and values that are critical for survival in the complex business world (Jones, 2000). According to Kraft and Kielsmeier (1995) the school experience should resemble the real world as much as possible. With this being said, why are many college professors still continuing to teach students in a traditional classroom setting with a lecture and possible laboratory experience? This does
not mimic the real world. The real world is full of unexpected problems, disagreeable group members, and ever decreasing budgets. Students need to be provided with experience-based learning using “Real World” applications in order to develop critical thinking skills that will allow them to apply their knowledge to broader situations.

The best way of making a connection between the real world and education is through the appropriate use of practical experiences as part of the curriculum. Experience needs to become the primary learning tool, a way of providing a broader context for theory and illuminating its pertinence, its limitations, and its relationship to other fields. Courses, which incorporate such activities, should use them as starting points to build a foundation for the development of general principles and methodologies. Instruction needs to become more inductive, reasoning from the specific to the general, thus students learn to utilize information from a particular experience and apply to a variety of situations (Lynton & Elman, 1987).

The topic of knowledge application is not new to the education system. Over the past twenty years, there has been a call from the government to reform education (Jones, 2000). Higher learning institutions are providing their students with a strong knowledge base to work from. They are incorporating more laboratory activities and group assignments into their curricula. Education reform is occurring in all areas of study and students are benefiting from it.

In a study conducted by Sanchez and Craig (2007), students in the horticulture systematics course at the Pennsylvania State University found working in collective groups enjoyable and useful to their education. They also suggested that the camaraderie acquired through the collaborative learning might have increased student participation and involvement in the lecture portion of the course, thus increasing the students’ overall education. The concept of collective groups being a fun learning environment is also supported by a study conducted by
Rhykerd, Tudor et al. (2006) where students indicated their group interactions with one another were one of the most enjoyable aspects of their experience based learning project.

Education evaluation and reform is occurring in all areas of study. However, after the review of numerous publications, research in the area of horticulture education is lacking in the area of student preferences toward education and the benefits of experiential learning. Previous research into experiential learning has shown that student knowledge retention increases when the student is able to directly apply information to a situation relevant to their chosen career path (Cantor, 1995). While other research into experiential learning combined with “Real World” applications has proven to be a positive learning experience for students in business (Brooks & Schramm, 2007) and social science fields (Markus, Howard, & King, 1993).

Currently, there are no studies focusing on the student perceptions of “Real World” applications incorporated into horticulture curricula. The objectives of this study are to 1) describe student perceptions toward “Real World Applications” in horticulture curricula, 2) determine the need based on student perception for “Real World Applications” in horticulture curricula, 3) assess perception differences among horticulture students.
Literature Cited


Chapter 2

Literature Review

Needs of the Industry

Today’s employers are looking for a workforce of thinkers, collaborators, and problem solvers. Employment opportunities in specific fields will constantly be changing; however, the criteria for employment will still be the same. “Employers are searching for graduates with strong abilities in problem solving, teamwork, communications, and leadership” (Carnevale, 2000; Jones, 2000). Unfortunately, one of the main criticisms that employers make of their new graduate workforce is that they depart from university full of theories, principles, and information, but are often ill-equipped to deal with the challenges of the workplace, such as problem solving, decision making, working in a team, or learning for themselves (Candy & Crebert, 1991).

Employers want graduates who have a general education, meaning that they have developed “abilities to acquire new skills and to develop expertise in them and abilities to treat new information as problematic and reach solutions that accomplish unfamiliar goals” (Evers, Rush, & Berdrow, 1998; J. S. Robinson, Garton, & Vaughn, 2007; Schmidt, 1999; Stephenson, 1990). Oblinger and Vernille (1998) wrote in What Businesses want from Higher Education that businesses want employees with skills required of the bachelor’s degree as well as skills in problem solving and decision making. Paulson (2001) summarized that the skills needed in the workforce for the twenty-first century in to four levels described in the table below:
Paulson’s Levels of Required Skills for the 21st Century Workforce:

<table>
<thead>
<tr>
<th>Levels</th>
<th>Examples of Skills</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Attitudes &amp; Personal Characteristics</td>
<td>Creativity</td>
</tr>
<tr>
<td></td>
<td>Responsibility</td>
</tr>
<tr>
<td></td>
<td>Flexibility</td>
</tr>
<tr>
<td>2. Essential Skills</td>
<td>Reading at a ninth grade level</td>
</tr>
<tr>
<td></td>
<td>Computer Skills</td>
</tr>
<tr>
<td></td>
<td>Team Skills</td>
</tr>
<tr>
<td>3. Integrative Applied Skills</td>
<td>Technology Applications</td>
</tr>
<tr>
<td></td>
<td>Critical Thinking &amp; Reasoning</td>
</tr>
<tr>
<td>4. Premium Skills</td>
<td>Ethics</td>
</tr>
<tr>
<td></td>
<td>Project Management</td>
</tr>
<tr>
<td></td>
<td>Comprehension of Contextual issues</td>
</tr>
</tbody>
</table>

Paulson’s list reinforces the need of students to learn more than just the required course material. An effective worker needs to be well balanced across Paulson’s fundamental levels of skills.

The newly graduated student is not necessarily equipped with all these skills. The problems that they are facing at work are “ill-defined, ambiguous, and open ended. Whereas, those faced at the university are fairly clearly prescribed, and the students are rewarded for the correct answers” (Candy & Crebert, 1991). The concept of being a good decision maker and problem solver are not specific to any one field. These existential qualities are recognized across the board as characteristics of quality, dependable, and competent employees.
In a study conducted by Siebert, Davis et al. (2002), employers and agribusiness undergraduates were asked to rate the most important priorities of an undergraduate education. The employers valued work experience and leadership experiences the most. Whereas, the agribusiness undergraduates considered grade point average and interview preparation to be most important. This shows a discrepancy between student and employer expectations of higher education, thus educators need to find a manner to combine the values of both groups and provide the student with a well rounded education.

David Berle from the University of Georgia conducted a study to evaluate employer preferences when hiring landscape horticulture students (2007). His findings were congruent with the national trend of ranking problem solving skills and leadership abilities as most important. “Employers value students who have specific knowledge of plants, pests, and technology, but they prize leadership skills above all else, and course content should reflect this” (Berle, 2007). Berle suggests incorporating problem-based learning and/or service learning into existing courses rather then create new courses to develop the personal traits desired by employers (Berle, 2007). There is no conclusive research that demonstrates these techniques are better at teaching technical content, but they are proven to increase problem solving skills, personal development, leadership, and communication skills (Steffes, 2004).

Meeting the Needs

In years past, the virtues of problem solving, decision making, and self directed learning were taught through apprenticeship. However, with today’s changing technological based society, students can complete their education without actively learning. Instruction may have
become more efficient, but at what cost to the learner? Active learning involves altering the learning environment from one where the student is passively taking in information over and over again to one where the student is given the opportunity to take a more active role and engage in their education. They can work in groups, openly discuss the course material in the classroom, participate in simulations, etc. Higher education curriculum designers need to reevaluate the benefits of active learning (Bruening, Lopez, & Dominguez, 2002).

Education institutions traditionally utilized a formal or professional approach to teaching and learning. Students sat in a classroom, listened to a lecture, and were evaluated either by examination or a written paper. There was little opportunity to interact with the professor or participate in class. However, as employers faced a deficiency of quality workers, universities began to take notice. They were turning out graduates that were not getting hired, or could not maintain a job. Educators soon realized that merely convening classes and granting diplomas was no longer a proof of competency (Paulson, 2001)

The essential skills desired by employers can be developed through a socialized learning environment where students openly interact with one another and the instructor. Students utilize the relationships they build with one another to supplement their own inadequacies in content knowledge. The instructor should not be the ultimate leader of the classroom, but a facilitator who provides opportunities and encourages student learning (Dewey, 1938). Einstein once said, “I never teach my pupils; I only attempt to provide the conditions in which they can learn.”

Given the concerns of employers across the country, education reform needed to occur. According to Paulson (2001) and Robinson and Robinson (1999) education has shifted from imparting skills to emphasizing results. The focus is now on “what people need to do with what they learn. Training is the means to the ultimate goal of enhancing performance.” Those
responsible for this change are the educators. Teachers need to prepare and conceptualize the
classroom as a setting for self-directed learning (Candy & Crebert, 1991).

In order for educators to be effective in creating a change in the education of college
students they need to comprehend what the employer specifically wants, and then find a way to
deliver the information. Acquiring industry demands is not a hard task; however the challenge
lies in changing the curriculum. As previously mentioned, Berle (2007) suggested that
instructors should incorporate activities into their courses to promote the traits desired by
employers. This would require instructors to change their approach to teaching.

**Student Comprehension & Retention**

In order to move from a traditional formal education setting to a more socialized and
(learner based) atmosphere one must comprehend the series of stages a learner progresses
through as they develop a knowledge base for a particular topic, etc. One of the best
explanations for this is Bloom’s Taxonomy of Educational Objectives. According to
McCormick and Whittington (2000), providing opportunities for students to be actively involved
in a class and to systematically work through the learning levels of Bloom’s Taxonomy can
enhance student learning.

Benjamin Bloom was a psychologist and authority in educational measurement. He
developed this theory while “translating the goals of instruction via concrete behaviors into
instruments of measure” (Joy A. Palmer, 2001).

Bloom’s Taxonomy is a series of 6 phases of information retention in which a person
progresses through on their way to fully comprehending a concept or idea. The older or more
experienced the student is will determine to what level they reach in the taxonomy. Usually the first few levels are utilized in grade school and middle school settings. As the student progresses through schooling, instruction and evaluation should occur at higher levels of the taxonomy.

Bloom’s Taxonomy is represented graphically in the figure below (Bloom, Engelhart, Furst, Hill, & Krathwohl, 1956):

The first level is knowledge. According to Bloom, Krthwohl et al. (1964), knowledge involves the recall of specifics and universals, the recall of methods and processes, or the recall of a pattern, structure, or setting. For example, a person views a metal frame structure covered in a clear plastic and recognizes it to be a greenhouse.

The second level of Bloom’s Taxonomy is comprehension. This is considered to be the lowest level of understanding in which the student grasps what is being communicated and can make use of the material. Testing is usually judged based on the accuracy at which the information is being regurgitated back to the educator (Bloom et al., 1964). To illustrate this concept a teacher explains that plants are grown in a greenhouse because it artificially simulates the environment in which the plant needs to grow. The greenhouse environment can be changed
to meet a number of different plant requirements. The student is then provided with a question asking what a greenhouse is and its purpose.

Application, the third level, is the use of concrete situations to explain information. These may be in the form of general ideas, rules of procedures, methods, theories, etc. The information needs to be applied to a specific situation for evaluation (Bloom et al., 1964). For example, a teacher has their students plant flowers in two pots. One pot will be placed in the school’s greenhouse while the other is put in the window of the classroom. The students need to water both of the plants daily for a period of three weeks and measure their height every three days. The children will learn that plants grow in response to water and light, and that the plant in the greenhouse will most likely be larger, but they do not necessarily know why.

The fourth level of Bloom’s Taxonomy is analysis which is the ability to recognize unstated assumptions, clarify communication by indicating how it is organized, check consistency of a hypothesis using given information and assumption, or identify elements included in communication (Bloom et al., 1964). At this level a student is trying to comprehend why something occurs in the manner in which it does. To continue with the greenhouse example, the students notice that the plants in the greenhouse grew larger and have more biomass than those in the windowsill. Those in the windowsill leaned toward the outdoors instead of growing upright. The students will conclude that sunlight in the greenhouse surrounded the whole plant, whereas the sunlight was more intense on the side of the plant in the windowsill that was closest to the outdoors, thus plants will grow toward the most intense light.

Level five is synthesis, or the putting together of elements and parts to form a whole. This involves the process of working with pieces, parts, and elements and arranging or combining them to create a pattern or structure that was not there before. This includes written
and oral communication, producing a plan to test a hypothesis, and forming an appropriate hypothesis based on analyzing facts and/or modifying a hypothesis based on new facts (Bloom et al., 1964). For example a student hypothesizes that fertilizer can compensate for lower light levels in relation to plant growth. The student places one plant in a high light environment and waters the plant regularly. They then place another plant in a lower light area, but provide fertilizer weekly with the watering. The student collects information from the plants and adjusts their hypothesis accordingly.

Evaluation is the final level of Bloom’s Taxonomy. This stage involves judgments about the value of material and methods for a given purpose. It could also be quantitative or qualitative judgments about the extent to which materials and methods satisfy data. It is an explanation for the results acquired from a study (Bloom et al., 1964). To finalize the example, the student designs an experiment to determine if there is a difference among fertilizers and their affects on plant growth. They have selected the plants, fertilizers, location of plants etc. They then determine a constant application rate and record their findings. The data is then analyzed and conclusions can be made. Once the conclusions are drawn, the student needs to evaluate why the results occurred in the manner in which they did.

As stated earlier, as a student becomes more educated, they become more capable of obtaining higher levels of the taxonomy as long as they are provided with the opportunity to do so. Levels 3-5 are usually found in high school and college settings. However, Level 6 is usually reserved for independent studies in college and graduate school. To develop the skills in college graduates that are desired by employers, educators should focus their curricula at levels 4-6. By engaging student learning at the higher levels of Bloom’s Taxonomy not only are the student’s comprehending the material at a higher degree, they are also developing problem
solving and analyzing skills that can be applicable to other situations whether it be another course, a personal situation, or a situation in their future careers.

**The Value of Experiential Learning**

Lectures and traditional examinations commonly used in most university settings can be cross referenced to Bloom’s Taxonomy levels three and four, application and analysis, respectively. However, innovative lecturers, curriculum writers, and professors have begun to implement a variety of practices designed to “equip students with relevant job-related skills and to ease their transition” into the real world. These ideas include “field trips, problem-based learning activities, internships, co-operative education practices, joint ventures in teaching, the use of simulations”, and many other techniques (Candy & Crebert, 1991). All these practices fall under a general heading of experiential learning, a topic first proposed by John Dewey in 1938, but not fully appreciated and accepted till much later. Experiential learning can also be classified as a form of active learning as it engages the student in the course rather than learning passively (Walter & Marks, 1981).

“John Dewey is generally recognized as the most renowned American educator of the twentieth century; however his ideas never really permeated the classroom realities” (Joy A Palmer, 2001). Dewey created numerous works, his most well known being “The Child and the Curriculum,” “The School and Society and Curriculum,” and “Experience and Education” (Dimitriadis & Kamberelis, 2006).

According to Dimitriadis and Kamberelis (2006), Dewey posited that knowledge was fundamentally practical or instrumental – developed to solve problems that human beings
encountered in the world. He believed that the purpose of education is the intellectual, social, emotional, and moral development of the individual within a democratic society. Dewey defined an educative experience as one that broadens one’s horizons of experience and knowledge and leads in a constructive direction toward intelligent action. “Education must thus be experienced-based and not externally imposed because there is an intimate and necessary relation between the processes of actual experience and education” (Dewey, 1938). He recognized that experiences build on previous experiences, and he insisted it is a teacher’s responsibility to determine the direction the experience is headed for the student. In Dewey’s mind it is the goal of the teacher to provide opportunities for experiential learning to happen (Dimitriadis & Kamberelis, 2006).

Experiential learning is most effective when it satisfies these three principles (Walter & Marks, 1981):

- The student is fully integrated into the lesson
- The lesson is clear and relevant to the individual allowing the student to develop a sense of responsibility for their own learning
- The learning environment is flexible and responsive to the participants immediate needs

By following these principles, a student will engage in an activity to develop skills as long as they can determine some personal significance from the experience. Once the student becomes engaged in the activity, their choices will determine the outcome of the activity. The educational setting should be flexible enough to allow students to make their decisions and experience the results. At this stage the student has increased their awareness of the situation at hand and personal growth will occur. The underlying central tenet of experiential learning is that one learns best by doing, thus student participation is the key (Walter & Marks, 1981).
The five most common methods of experiential learning are simulations, exercises, group interactions, role playing, and body movement (Walter & Marks, 1981). According to the study conducted by Rhykerd, et al. (2006) the use of simulations, games, and contests to provide experiential learning activities in agricultural curricula have been shown to enhance student learning. Learning activities and instructional techniques commonly utilized in agriculture cap stone courses include projects and case studies, issue analysis, small group work, oral and written communication, and industry involvement (Crunkilton, Cepica, & Fluker, 1997).

To take experiential learning a step further, some professors are partnering with industry, corporations, and professionals in the field to develop activities that mimic responsibilities that a student will experience upon entering the workforce. According to Paulson (2001) postsecondary institutions must reach a working relationship with businesses and industry to create educated competent workers for the twenty-first century. Paulson (2001) and J. S. Robinson et al. (2007) state that corporations are willing to aid in partnering with higher education institutions in an effort to teach the necessary skills needed for industry success. Carnevale, Gainer, & Villet (1990) and J. S. Robinson et al. (2007) concluded that educators need to do the following in order to make education more relevant to the future career of the student:

- Teach future employees decision and problem solving skills, how to learn, how to think a job through from start to finish, and how to work with people to get the job done.
- Link teaching of academic subjects to real world applications
- Work with employers to strengthen the link between learning in school and learning on the job.
When pairing university courses with community and industry interactions, some may argue that this form of experiential learning falls under the category of problem-based service-learning. Furco (1996) utilized the definition of service learning from the Association of Service Learning Education Reform in his works. He states that “service-learning is a method of learning that enables school-based and community-based professionals to employ a variety of effective teaching strategies that emphasizes student centered, interactive, experiential education. Service learning places curricular concepts in the context of real-life situations” (Furco, 1996).

Research has been conducted to study the student benefits in participating in service learning projects. In a study conducted by Brooks and Schramm (2007) economics students at the University of Vermont felt that they acquired strong people and processing skills, as well as strong information gathering and analysis skills after the completion of a service-learning project. The students also felt empowered when they realized they could identify what they needed to learn from the course (Brooks & Schramm, 2007). In a different study conducted at the University of Michigan, students in a Contemporary Political Issues course reported that they learned to apply principles from the course to new situations after completing a service-learning semester project (Markus et al., 1993).

In a study conducted by Trede and Andreasen (2000) 214 students from a capstone agriculture education class at Iowa State University were randomly surveyed regarding their experiential learning experiences with respect to class learning activities and instructional techniques. The researchers utilized a descriptive survey design consisting of four parts to collect their data; perceived benefits of the course, comparison of experiential learning activities in the course with other completed courses, perceived quality of the learning activities and
instructional techniques used in the course, and demographic data. A Five-point Likert scale was used to measure the perceived benefits of the course and also the perceived quality of the learning activities. Their findings are described below:

- The highest rate instructional technique was the use of a “Real Farm” laboratory rather than a “case study computerized farm.” This activity allowed students to visualize the actual application of their decisions, analyze them, and evaluate them in a practical context.

- Team work and group decision-making skills were the most beneficial and should be continually emphasized throughout the course.

Researchers at Illinois State University designed and implemented a contest that provided students with an opportunity to gain hands-on experience with crop production and marketing. “The contest was based upon the theory that student comprehension is increased through critical thinking exercises and application of course concepts to real-world situations” (Rhykerd et al., 2006). The contest occurred over a period of two years and challenged four university undergraduate student organizations to select and implement a crop production and marketing strategy for soybeans and corn, respectively (Rhykerd et al., 2006). The goal was to determine the largest return to management while being environmentally responsible. “The impact of the contest was qualitatively evaluated by having the students reflect upon what they had learned. This reflection occurred during focus group discussion and responses to open ended questions” (Rhykerd et al., 2006). The results of study are as follows:

- The contest encouraged experiential learning by requiring students to make real farming decisions and act upon their decisions.

- Students believed that the contest participation enhanced their social and leadership skills.
• Students were provided with a deeper understanding of the topics than would have been possible in a classroom setting, where concepts are easily dismissed or forgotten.

• Students felt the most beneficial aspects of the contest were development of leadership skills, privilege of hands-on experience, decision making experience, and the real-life applications.

Literature Cited


Chapter 3

Materials and Methods

During a period of two years, students from five horticulture courses offered by the Department of Horticulture at the University Park campus of the Pennsylvania State University were surveyed to obtain their perceptions toward the incorporation of “Real World” activities into their horticulture classes. The horticulture department offers two undergraduate majors; horticulture and landscape contracting. Courses from both majors were utilized in the study to ensure an adequate representation of students from the department. The courses involved in the study were Hort 269: Residential Landscape Planning, Hort 368: Landscape Planting Design, Hort 450: Greenhouse Management, Hort 455: Retail Horticulture Business Management, and Hort 457: Interior Plantscaping.

Hort 269: Residential Landscape Planning is a fundamental course required for juniors entering the landscape contracting major. The “Real World” activity in this course was the main project for the class and carried throughout the entire semester. At the beginning of the course the entire class was assigned to a real client whose property was studied throughout the semester. The students were taken through the steps of landscape design from site inventory and analysis to creating a master plan for the site. At the beginning of the semester, the students met with the client to discuss their goals for the property and acquire a feel for their personalities. They then surveyed the property to prepare a site inventory and analysis which all future decisions were based on. Over a period of several weeks, the students studied and applied the elements of design to the property to create several possible designs for the client. Eventually
each student selected one design for their master plan. At the completion of the semester, the students presented their master plan to the client. Surveys were administered to the class on December 17, 2007 upon completion of the project.

Hort 368: Planting Design, offered during the spring semester, is the capstone course for the landscape contracting major. This course brought all the components of landscape design and implementation together, but focused specifically on plant species selection and placement within the design. Students in this class were assigned several projects to complete throughout the semester, two of which were client-based. The students were broken into small groups and assigned a client to work with. At the completion of the project, the design was presented to the client just as it would be in a professional setting. Surveys were administered to the class on April 23, 2007 upon completion of the project.

Hort 450: Greenhouse Management is a junior/senior level course offered during the fall semester. The curriculum of this course familiarized the student with the various components, tasks, and planting options associated with operating a greenhouse. The “Real World” activity incorporated into this course involved conducting an energy audit of a commercial greenhouse. Prior to visiting the greenhouse, the students studied heating and cooling systems, energy conservation strategies, and heating cost calculations to prepare for the audit. The class was divided into teams of 4-5 students and assigned a specific commercial greenhouse. The students met with the greenhouse operator prior to the visit to discuss potential problems and future goals of the facility. The groups then visited the site to conduct the audit. Once the analysis and recommendations were made, they were presented to the greenhouse operator as a written report and to the rest of the class as a poster. Data collection for the fall
2006 semester occurred on December 13, 2006, and data collection for the fall 2007 semester occurred on December 14, 2007.

Hort 455: Retail Horticulture Business Management is a junior/senior level course offered during the fall semester and is required for the landscape contracting majors in the management option. According to the instructor, students outside the department have occasionally enrolled in this course; typically they have been Agribusiness majors. The goal of this course was to familiarize students with the responsibilities and challenges of operating a business in the green industry. At the beginning of the semester the class was divided into groups of 4-5 students and asked to develop a marketing plan for a client. The client owned and operated a very successful landscaping firm in the area, and was entertaining ideas of starting a retail garden outlet as well as a nursery to support his current operations. The client presented his current situation to the class and also shared his goals for the future of the business. Throughout the semester, the students utilized the course information to develop a plan to improve the business. At the completion of the project, each group provided the client with a presentation and written marketing plan for developing a retail garden outlet. Surveys were administered to the class on December 14, 2007 upon the completion of the project.

Hort 457: Interior Plantscaping is offered every other year during the spring semester. This course focused on the use and management of plants indoors to enhance interior areas. The “Real World” activity in this course was a unique experience for the class. They were asked to develop a four season color rotation of plants for a condominium community. The setting was an atrium-like area that was connected to outside by grates in the skylights. According to the professor, this activity was more challenging then those in the past, but it was the opportunity that was available at the time of the course offering (E. J. Holcomb, personal
communication, Feb. 8, 2007). The class was divided into groups of four to complete the task. The class as a whole traveled to the site and met with the owner and condominium board to discuss their goals and concerns. At the completion of the project, the groups provided the client with a written plan, planting plan, and computer generated picture of what the area could potentially look like. Students were surveyed for their opinions on May 1, 2007.

The five courses involved in the study were selected based on their preexisting curricula. Each class had a “Real World” activity already incorporated into the curriculum. Data collection from each class was obtained at the completion of the activity, which usually corresponded with the end of the semester. Not all classes were offered during the same semester, thus only one semester’s worth of data was collected from each class with the exception of Hort 450: Greenhouse Management where two semester’s data was obtained.

For each of the five courses utilized in this study, the instructors were responsible for securing clients for their respective classes. In most cases, the clients contacted the instructor to help with the course. All of the instructors evaluated the clients and their property or business to ensure it was suitable for class inclusion. Although the instructors have a set criteria and goal for the “Real World” activity, as the client will change from semester to semester, the experiences will differ as well. Each client brings new goals and challenges for the class, thus no two semesters will have the same activity within the course.

As previously mentioned, the students were surveyed about their experiences with the “Real World” activity at the completion of the project. This time was selected as the experience would still be fresh in their minds. The entire class was asked to voluntarily complete a survey concerning their perceptions of the project they had just concluded. Each class was read the same script that explained the purpose of the study and directions for
participation. Each student was provided with a consent form and survey and allotted ten minutes to complete the task. Surveys that were not accompanied with a signed consent form were disregarded from the study.

This study utilized human participants and was therefore subject to approval by The Pennsylvania State University’s Office of Research Protection. Upon examination of the data collection methods, the Office of Research Protections deemed the study exempt from IRB approval being that it posed no threat to its participants. The survey instrument consisted of 12 statements pertaining to the “Real World” activity completed in the respective course. The survey was designed with the input of the participating course instructors and was reviewed by a statistician in the Department of Agriculture and Extension Education at the Pennsylvania State University.

Participants were asked to rate their feelings toward the “Real World” experience on a five-point Likert-like scale (1=strongly disagree; 5=strongly agree). With the exception of the 2006 Hort 450: Greenhouse Management class, the questions on each survey had the same content; however the “Real World” activity was referred to by the name utilized in the course to avoid confusion by the participant.

The survey administered to the 2006 Hort 450: Greenhouse Management class was the initial survey for the study. It contained only 10 statements pertaining to the “Real World” activity and several of the questions were worded differently from those on the later surveys. The initial survey was redesigned to improve clarity and achieve more accurate results. The results from the 2006 Hort 450: Greenhouse Management Course was combined with those from the other courses when the questions were a direct content match. The results from the unmatched questions will be independently reported and discussed.
In addition to the 12 statements on the final instrument, the survey contained 3 questions (gender, class standing, and internship status) to determine the demographics of the participants. It also contained 2 questions to determine if other courses both inside and outside of the horticulture department were utilizing “Real World” activities in their curricula. The last question on the survey asked the participants to select from a list which additional activities and resources they would like to see added to their courses. This list of activities was devised based on the popular methods of experiential learning suggested by Candy and Crebert (1991) and Walter and Marks (1981) that correlated to the higher levels of Bloom’s Taxonomy.

The obtained data was analyzed using SPSS version 15. Frequencies and means were the primary form of interpretation. A T-test was utilized to determine significant differences between gender and internship completion.
Literature Cited


Chapter 4

Results

The total number of students asked to participate in this study was 121. However, 5 students chose not to participate, and 10 surveys were deemed unusable as they were not fully completed or completed incorrectly. The total number of participants in the study was 106 students. Of the 106 participants, 72 students were male and 34 were female. The inequality in gender was very evident in Hort 269: Residential Landscape Planning where the female population only made up 4.3% of the class. The Hort 455: Retail Horticulture Business Management course provided the closest balance in gender with 40% of students being female. There were 6 graduate students taking the courses. During the fall 2006 semester of Hort 450: Greenhouse Management, there were 4 student observers from Mexico, who participated in the course activities. Of the 106 participants, 52 students had completed their graduation required internship at the time of data collection (Table 1).

Of the 106 participants, 94.3% agreed that the “Real World” activity for their respective class corresponded to the course material. The mean from the Hort 457: Interior Plantscaping course of 3.86 was the lowest of all courses and illustrates that the students were not certain the activity matched the course curriculum (Figure 1). There were no significant differences between male and female students or those who had completed internships verses those who had not.

About 82% of the participants felt the “Real World” activity improved their understanding of the course material. The courses with the lowest means were Hort 455: Retail Horticulture Business Management and Hort 457: Interior Plantscaping with means of 3.85 and
3.62 respectively. The other four courses in the study yielded means of 4.28 or higher (Figure 2). Again, there were no statistical differences among gender or internship completion.

Of the total participants, 90% agreed the “Real World” activity required them to apply their knowledge more than they would have in a classroom laboratory setting. There were no significant differences between the means of the six classes (Figure 3). There was a practical difference between the means of male and female students where female participants had a mean of 4.67 verses the male mean of 4.38. There was no significant difference among internship completion.

Of the total 106 participants, 78.5% reported they took the “Real World” project more seriously compared to other class activities because it involved an actual client/company rather than a simulation. Two courses, Hort 368: Landscape Planting Design and Hort 455: Retail Horticulture Business Management had substantially lower means of 3.88 than the other courses. The remaining four courses had means of 4.14 or higher (Figure 4). There were no significant differences between gender or internship completion.

About 90% of participants agreed that it was necessary to meet the actual clients and visit the project site to complete their “Real World” activity. The students of Hort 455: Retail Horticulture Business Management provided a mean of 3.80 for this questions which was comparatively lower than the other 5 courses (Figure 5). There was no significant difference among gender. However, there was a practical difference among those who had completed an internship verses those who had not. Students who had completed an internship yielded a lower mean of 4.40 than those of who had yet to do so (4.74). Hort 368: Landscape Planting Design had the second lowest mean of 4.04 for this category. Both Hort 455 and Hort 368 had a higher number of students who had completed an internship (Figure 12).
Surprisingly, 50% of participants reported that they would prefer to discover the information related to a project rather than have fictitious information provided to them. All of the course means were low with the exception of Hort 457: Interior Plantscaping and the 2006 session of Hort 450: Greenhouse Management. Their means were 4.37 and 4.0 respectively (Figure 6). There were no differences among gender or internship completion.

Of the 106 total participants, 92% agreed that the “Real World” project incorporated into their respective class was an example of something they would see or do in their future careers. The 2007 Hort 450: Greenhouse Management class generated the lowest mean of 3.86. However the 2006 Hort 450: Greenhouse Management class results were similar to the other courses included in the study (Figure 7). There was no change in the curriculum for the course between the two years. The Hort 269: Residential Landscape Planning course provided the highest mean of 4.86. There were no practical differences among gender or internship completion.

The total number of participants for the next eight survey questions is 92 as these topics were not addressed in the same manner on the initial survey administered to the 2006 Hort 450: Greenhouse Management class.

When the students were asked if they felt prepared to complete the “Real World” activity 68.5% agreed. All of the courses with the exception of Hort 269: Residential Landscape Planning yielded similar means between 3.35 and 3.8. The students in Hort 269: generated a substantially higher mean of 4.13 (Figure 8). There were no significant differences among gender or internship completion.
At the completion of the “Real World” activity, 86.9% of the students from the five courses felt confident with their decisions. Both Landscaping courses (Hort 269 and Hort 368) and the Retail Horticulture Business course (Hort 455) generated similar means (Figure 9). There was a slight practical difference of means between those who completed an internship and those who had not. Those who had completed an internship generated a mean of 4.30 and those who had not provided a mean of 4.08. Differences among gender were not significant enough to report.

At the completion of the “Real World” activity, 73.7% of the participants felt comfortable presenting their finished project to their clients. The 2007 Hort 450: Greenhouse Management course and Hort 457: Interior Plantscaping yielded the lowest mean of 3.57. Both landscaping courses generated the highest means of 4.27 and for Hort 398: Landscape Planting Design and 4.34 for Hort 296: Residential Landscape Planning. Hort 455: Retail Horticulture Business Management generated a mean of 4.00. There were no significant differences among gender or internship completion.

About 90% of the participants from the five courses would like to see more “Real World” activities incorporated into their horticulture courses. There was a significant difference between the means of those who had completed internships (4.20) and those who had not completed an internship (4.65). Hort 455: Retail Horticulture Business Management and Hort 368: Landscape Planting Design had the two lowest means in this area with 4.12 and 4.18 respectively (Figure 10). These two courses also have the two highest numbers of students who have completed internships.
About 95% of the participants agreed that “Real World” activities allow the student to apply their knowledge more effectively (Figure 11). There was a slightly significant difference between those who had completed an internship and those who had not. Those who had completed the required internship had a mean of 4.5 verses those who had not completed an internship had a mean of 4.78. Again, the two courses that had the lowest means, Hort 455 and Hort 368, also had the highest number of internship completion.

Of the 92 participants, 43.5% felt they had taken other horticulture courses in the department that incorporated “Real World” activities into the curriculum. 39.1% responded they had not taken a horticulture course that incorporated the activities and 17.4% of the participants were unsure. When asked about their courses outside the horticulture department only 35.2% of participants had experienced “Real World” activities in their classes. 44% responded that they had not taken a course outside the department that included the activities and 20.9% were unsure.

The last question of the new version of the survey asked the 92 participants to select the resources and activities they would most like to have incorporated into their horticulture classes. 77% of the participants reported that they wanted more guest speakers. 84.8% of participants would like to have field trips incorporated into their horticulture classes. Only 41.3% of the participants would like to have laboratory activities, and 59.8% wanted more special projects in their classes. 80% of the participants would like to have more “Real World” activities incorporated into their horticulture classes.

As previously mentioned in the Material and Methods portion of this work, the initial survey administered to the 2006 Hort 450: Greenhouse Management course contained three questions that were removed from the later survey. The analysis of those questions will be
provided below. There were 14 participants from this course, thus the following results can only be applied to those students.

Of the 14 participants from the 2006 Hort 450: Greenhouse Management class, 92.9% agreed they felt prepared to conduct and write the written portion of their “Real World” activity. 92.9% of the participants also felt confident with their decisions and could present their information to their client. The participants unanimously agreed they would like to have more “Real World” activities in their classes to allow them to apply their knowledge more effectively.
Table 1: Demographics for all six horticulture classes utilized in the study

<table>
<thead>
<tr>
<th>Class</th>
<th>Total Students</th>
<th>Male</th>
<th>Female</th>
<th>Internship Yes</th>
<th>Internship No</th>
<th>Undergrad</th>
<th>Graduate</th>
<th>Observer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hort 455</td>
<td>25</td>
<td>60%</td>
<td>40%</td>
<td>16</td>
<td>9</td>
<td>25</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Hort 457</td>
<td>8</td>
<td>25%</td>
<td>75%</td>
<td>2</td>
<td>6</td>
<td>7</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Hort 450 (07)</td>
<td>14</td>
<td>64%</td>
<td>36%</td>
<td>7</td>
<td>7</td>
<td>12</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>Hort 269</td>
<td>23</td>
<td>95.70%</td>
<td>4.30%</td>
<td>5</td>
<td>18</td>
<td>22</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Hort 368</td>
<td>22</td>
<td>68%</td>
<td>32%</td>
<td>16</td>
<td>6</td>
<td>21</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Hort 450 (06)</td>
<td>14</td>
<td>64%</td>
<td>36%</td>
<td>6</td>
<td>8</td>
<td>9</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td><strong>Totals</strong></td>
<td><strong>106</strong></td>
<td><strong>67.90%</strong></td>
<td><strong>32.10%</strong></td>
<td><strong>52</strong></td>
<td><strong>54</strong></td>
<td><strong>96</strong></td>
<td><strong>6</strong></td>
<td><strong>4</strong></td>
</tr>
</tbody>
</table>
Figure #1: The “Real World” Activity Corresponded to the Course Material
Figure #2: The “Real World” Activity Improved Understanding of the Course Material

Figure #3: The “Real World” Activity Required the Participant to Apply their Knowledge More then in a Classroom Setting
Figure #4: The Participant took “Real World” Activity Seriously as it Involved a Real Client/Company
Figure #5: The Participant felt it was Necessary to Meet the Client and Visit the Project Site

Figure #6: The Participant Wanted to Discover the Information Related to a Project Rather than Have it Provided to them
### Figure #7: The Project Reflects Something the Participant Would See in their Future Career

![Bar Chart](chart1.png)

### Figure #8: The Participant Felt Prepared to engage in the “Real World” Activity

![Bar Chart](chart2.png)
Figure #9: At the Completion of the Activity, the Participant Felt Confident with Their Decisions
Figure #10: Participants Want More “Real World” Activities Integrated into Their Classes

Figure #11: “Real World” Activities Allow the Participant to Apply Their Knowledge More Effectively
Figure #12: Number of Internship Completion by Class
Chapter 5

Discussion

The intended goal for this study was to obtain the students’ perceptions toward “Real World” activities in their horticulture classes and be able to provide a rational basis for their answers. In the first question of the survey, the participants were asked if they felt the activity corresponded to the course material. This question is of most importance because if the student could not draw a correlation between the activity and course material, then the participant’s remaining answers on the survey instrument would reflect their confusion and dissatisfaction. Since the majority of students agreed their respective “Real World” activity did correspond to the course material, it can be assumed that their remaining answers on the instrument are a valid measure of their experience with the activity.

Of all the participating courses, the students in the Hort 457: Interior Plantscaping class generated the lowest mean in reference to the activity corresponding with the course material. However, there were no questions on the survey instrument to determine the participants overall satisfaction with the activity, thus it can not be determined why the students felt the activity did not correspond to the course material. In speaking with the course instructor, Dr. E. Jay Holcomb (personal communication, February 8, 2007), it was established that this activity was a more challenging experience in comparison to past years. Also, this activity was not a direct match to the course objectives as the course focused on tropical plants and the activity utilized plants found in temperate regions. This information may help explain the lower class means in regards to improving understanding of the course material and the students feeling confident
with their decisions. More descriptive questions on the survey instrument would have allowed for further examination and explanation of these results.

Although in both sections of the Hort 450: Greenhouse Management course students agreed that the “Real World” activity corresponded to the course material, there was a practical difference between the means of the two classes. There was also a difference between the means of the sections in regards to the activity being an example of something the participant would see in their future careers. Both sections were provided with the same information and taught in the same manner. The activity expectations and grading criteria were the same as well. However, each group within the two sections did have different clients, thus the circumstances of each situation differed. This may account for the variation in means between the two classes.

Two courses, Hort 368: Landscape Planting Design and Hort 455: Retail Horticulture Business Management, generated unexpected results for four questions within the survey. Hort 368: Landscape Planting Design is a senior level class that is considered to be the capstone course of the Landscape Contracting major. This class had the highest frequency of internship completion in comparison to the other courses. It most likely had the highest number of seniors out of the other courses. However, this can not be a definite statement as there was no question pertaining to specific year of class standing included on the survey. The Hort 455: Retail Horticulture Business Management course had the second highest number of completed internships. Again, there is no way of determining the specific class standing of the students, but this course is usually frequented by more seniors then juniors.

The means of these courses, Hort 368 and Hort 455, were very similar to each other, but lower than the means of the other four classes for the following questions:
I took the “Real World” activity more seriously because it involved a real client/company rather than a simulation
“Real World” activities allow me to apply my knowledge more effectively
It was necessary to meet the client and visit the project site
I would like to have more “Real World” activities in my classes

These unexpected results may be directly tied to the high rates of internship completion among the two courses’ respective students. It could also be inferred that both courses most likely had high rates of senior level students, thus older students do not value the “Real World” activity experiences as much as younger inexperienced students. However, the survey instrument was not sensitive enough to definitively generate these results, thus further research should be conducted to solidify the credibility of these statements.

There was an additional question in which the completion of an internship may have impacted the perceptions of the participants. Students who completed an internship generated a higher mean than those who had not in regards to feeling confident with their decisions at the conclusion of the “Real World” activity. The experiences attained via an internship may have been utilized in the completion of the activity, thus giving the participant an advantage in the situation. Hort 368 and Hort 455, having the highest rates of internship completion, generated the highest means in regards to the survey question, but Hort 269 an introductory level landscaping course, which had the lowest rate of internship completion, generated the same mean as the capstone landscaping course. The high mean of Hort 269 could be related to the concept that this particular “Real World” activity is one of the first opportunities for the student to tie what they were learning directly to their future careers. At the completion of the task, they may have had a new sense of accomplishment and pride. Again, there were no in-depth questions regarding the reasons behind their level of confidence with their decisions, thus future research will need to be conducted to investigate this opinion.
The survey question regarding “Real World” applications required the participant to apply their knowledge more than they would have in a classroom laboratory setting was the only question on the survey to show significant differences among gender. The mean of the female participants was significantly higher than that of the males. The only explanation for this difference can be attributed to the inequality of gender among the participants. The ratio of males to females is slightly greater than 2:1. Thus, there is greater potential for a male participant to provide a lower rating for the question. In this instance, the standard deviation is lower for the females than the males meaning that a few of the male participants gave very low scores on the scale which in turn lowered their overall mean.

There was an even split among participants concerning whether they could generate the same quality of work for a fictitious setting. Upon data analysis, it was discovered that the question was incorrectly worded and needed to be reverse coded when entered into the SPSS program. The wording of this question may have caused some confusion among the participants, thus it is felt that the results from this question are not very accurate and should not be considered relevant to the study.

The last question on the survey asked students to select the forms of experiential learning they would like to see in their classes. Guest speakers, field trips, and “Real World” activities were the highest rated. The majority of students did not want to have more laboratory exercises added to their courses. Field trips and “Real World” activities do create experiences for learning that the student will most likely remember because they are active in the learning process. According to Walter & Marks (1981) the underlying central tenet of experiential learning is that one learns best by doing.
Overall, the results illustrate that the “Real World” activity needs to correlate to the course material in order to be effective. If it does, the “Real World” activity will allow the student to draw connections to their future careers through experience which according to Cantor (1995) will increase their knowledge retention. The results also show younger inexperienced students prefer to have “Real World” activities incorporated into their horticulture classes. They feel that it improves their understanding of the course material and builds their confidence in their work. The findings of this study agree with those from Rhykerd et al. (2006) where students reported that they were provided with a deeper understanding of the topics than would have been possible in a classroom setting.

As previously mentioned, Hort 368: Landscape Planting Design is a capstone course for the Landscape Contracting Major. Although the participants from this course did favor “Real World” activities in their course curriculum, they did not place as much value on the experience as the introductory and core courses did. This does not parallel the findings from Trede & Andreason (2000) where students of a capstone agriculture education course at Iowa State University rated their “Real World” activity the highest of all other forms of experiential learning in the class. It is not known if the participants of Iowa State course had engaged in forms of experiential learning, such as internships and “Real World” activities prior to the capstone course.

Based on the “Real World” project criteria utilized in this study, the “Real World” activities for all courses can be sited to the category of service learning. As defined by Furco (1996), “service-learning is a method of learning that enables school-based and community-based professionals to employ a variety of effective teaching strategies that emphasizes student centered, interactive, experiential education. Service learning places curricular concepts in the
context of real-life situations.” The results from this study reinforce those from Brooks & Schramm (2007) that experiential learning combined with “Real World” applications has proven to be a positive learning experience for students.

Although the survey instrument did generate valid results, it was not sensitive enough to determine reasons for the outcomes other than what was speculated. The instrument was designed to be completed in a 5 minute period of time as to not compete with valuable class time with the instructor. If the study were to be conducted again it is recommended that the instrument be expanded to contain several questions to acquire a stronger understanding of the following:

- How the activity corresponded to the course material
- Did the student find the activity challenging and why
- How did the activity improve their understanding of the course material
- What were the reasons for feeling uncomfortable at the beginning of the activity
- What were the reasons for feeling confident at the completion of the activity
- How did the participant benefit from the group experience
- What was the most beneficial part of the activity
- What employee traits were developed other than content knowledge
- What was their specific major and semester standing

If the survey instrument was to be expanded additional time and open-ended questions would be needed to ensure more valid results. Participants may need to be surveyed outside of class as to not compete for valuable class time.
Literature Cited


Chapter 6

Conclusion

“Real World” applications in the horticulture curricula can be utilized as an effective form of instruction. The experiences gained from these activities allow the student to connect the information acquired in the classroom to the outside world and possibly to their future careers. These applications encourage experiential learning by requiring the student to make real decisions that will in turn affect the results of the activity. “Real World” applications can also fall under the category of service learning as it involves providing a service for a client outside of the classroom free of charge.

The purposes of this study were to determine horticulture student perceptions toward “Real World” applications in the horticulture curricula, determine the need for “Real World” applications in the horticulture curricula, and assess horticulture student perception differences toward the activities among the horticulture classes.

Overall, the participants felt the “Real World” activities improved their understanding of the class material as long as it corresponded with goals of the curriculum. About 90% of the students felt the activities required them to apply their knowledge more then they would have in an ordinary classroom setting. Based on the results, the activities proved to be most beneficial to students who had not completed an internship. This was a serendipitous finding in the study. All in all, 90% of the participants would like to have more “Real World” activities incorporated into their courses. The results of this study generated numerous questions that could be answered with a future research investigation. If this study were to be conducted again, it is
recommended that the survey instrument be expanded to include questions pertaining to the activities correlation to the course material, the participant’s feelings associated with the activity, and the participant’s major and class standing.
Appendix A

Hort 269: Residential Landscape Planning

Assessment of Special Project Usefulness
Assessment of Landscape Special Project Usefulness

Listed below are statements relative to the client based special projects you completed in class. Your client based special project is an example of a “real world” activity. Please indicate your level of agreement for each statement using the following scale:

1= Strongly Disagree; 2=Disagree; 3=Neutral; 4=Agree; 5=Strongly Agree

1. The client-based projects corresponded with the material covered in class. 1 2 3 4 5
2. The client-based projects improved my understanding of the course materials. 1 2 3 4 5
3. The client-based projects required me to apply my knowledge more than I would have for a project in a fictitious setting. 1 2 3 4 5
4. I took the client-based projects more seriously because it involved an actual person rather than a simulation. 1 2 3 4 5
5. It was necessary to meet the clients and visit the site in person to successfully complete my project. 1 2 3 4 5
6. I would have preferred to have the information pertaining to the project provided to me rather than visit discover it for myself. 1 2 3 4 5
7. I felt well prepared to create a design plan for the client-based Project. 1 2 3 4 5
8. After completing all the components of the client-based project, I felt confident with my decisions. 1 2 3 4 5
9. After completing all the components of the client-based project, I felt comfortable presenting my design to my clients. 1 2 3 4 5
10. The client-based project is an example of something I would do or see in the real world. 1 2 3 4 5
11. I would like to have more “real world” activities incorporated into my classes. 1 2 3 4 5
12. “Real world” activities allow me to apply my knowledge more effectively. 1 2 3 4 5
Please circle the answer that best describes you.

1. Gender
   a. Female
   b. Male

2. I am taking this course as a(n)
   a. Undergraduate student
   b. Graduate student
   c. Observer

3. I have completed an internship for a company or business outside of the university
   a. Yes
   b. No

4. I have completed other horticulture courses that incorporate “real world” activities into their curricula.
   a. Yes, if yes please specify
   b. No
   c. Not Sure

5. I have completed other courses outside the horticulture department that incorporate “real world” activities into their curricula.
   a. Yes, if yes please specify
   b. No
   c. Not Sure

Please place an “x” by the activities/resources you would like to have incorporated into your horticulture courses.

_____ Guest Speakers
_____ Field Trips
_____ Lab Exercises
_____ Special Projects
_____ Real World Activities
Appendix B

Hort 368: Landscape Planting Design

Assessment of Landscape Project Usefulness
# Assessment of Landscape Special Project Usefulness

Listed below are statements relative to the client based special projects you completed in class. Your client based projects are examples of “real world” activities. Please indicate your level of agreement for each statement using the following scale:

1 = Strongly Disagree; 2 = Disagree; 3 = Neutral; 4 = Agree; 5 = Strongly Agree

1. The client-based projects corresponded with the material covered in class.  
2. The client-based projects improved my understanding of the course materials.  
3. The client-based projects required me to apply my knowledge more than I would have for a project in a fictitious setting.  
4. I took the client-based projects more seriously because it involved an actual person rather than a simulation.  
5. It was necessary to meet the clients and visit the site in person to successfully complete my project.  
6. I would have preferred to have the information pertaining to the project provided to me rather than discover it for myself.  
7. I felt well prepared to create a design plan for the client-based Project.  
8. After completing all the components of the client-based project, I felt confident with my decisions.  
9. After completing all the components of the client-based project, I felt comfortable presenting my design to my clients.  
10. The client-based project is an example of something I would do or see in the real world.  
11. I would like to have more “real world” activities integrated into my classes.  
12. “Real world” activities allow me to apply my knowledge more effectively.
Please circle the answer that best describes you.

1. Gender
   a. Female
   b. Male

2. I am taking this course as a(n)
   a. Undergraduate student
   b. Graduate student
   c. Observer

3. I have completed an internship for a company or business outside of the university
   a. Yes
   b. No

4. I have completed other horticulture courses that incorporate “real world” activities into their curricula.
   a. Yes, if yes please specify
      b. No
      c. Not Sure

5. I have completed other courses outside the horticulture department that incorporate “real world” activities into their curricula.
   a. Yes, if yes please specify
      b. No
      c. Not Sure

Please place an “x” by the activities/resources you would like to have incorporated into your horticulture courses. Check all that apply

_____ Guest Speakers
_____ Field Trips
_____ Lab Exercises
_____ Special Projects
_____ Real World Activities
Appendix C

2006 Hort 450: Greenhouse Management

Energy Audit Usefulness
Assessment of Energy Audit Usefulness

Listed below are statements relative to the “Energy Audit Project” you completed in class. The energy audit is an example of a “real world” activity. Please indicate your level of agreement for each statement using the following scale:

1= Strongly Disagree; 2=Disagree; 3=Neutral; 4=Agree; 5=Strongly Agree

1. The energy audit project corresponded with the material covered in class. 1 2 3 4 5

2. The energy audit project improved my understanding of the course material. 1 2 3 4 5

3. The energy audit required me to apply my knowledge more than I would have in a classroom laboratory setting. 1 2 3 4 5

4. I took the energy audit project more seriously because it involved an actual company rather than a simulation. 1 2 3 4 5

5. It was necessary to meet the energy audit project client or visit the site in person. 1 2 3 4 5

6. I could have generated the same quality work from looking at pictures of the greenhouse rather than visiting the site. 1 2 3 4 5

7. I felt well prepared to conduct and write the energy audit. 1 2 3 4 5

8. After completing the written portion of the project, I felt confident with my decisions and could present the information to the greenhouse owner. 1 2 3 4 5

9. The energy audit project reflects something I would do or see in the real world. 1 2 3 4 5

10. I would like to have more “real world” activities in my classes allowing me to apply my knowledge more effectively. 1 2 3 4 5
Please circle the answer that best describes you.

1. Gender
   a. Female
   b. Male

2. I am taking this course as a(n)
   a. Undergraduate student
   b. Graduate student
   c. Observer

3. I have completed an internship for a company or business outside of the university
   a. Yes
   b. No
Appendix D

2007 Hort 450: Greenhouse Management

Energy Audit Usefulness
2007 Assessment of Energy Audit Usefulness

Listed below are statements relative to the “Energy Audit Project” you completed in class. The energy audit is an example of a “real world” activity. Please indicate your level of agreement for each statement using the following scale:

1= Strongly Disagree; 2=Disagree; 3=Neutral; 4=Agree; 5=Strongly Agree

1. The energy audit project corresponded with the material covered in class. 1 2 3 4 5
2. The energy audit project improved my understanding of the course material. 1 2 3 4 5
3. The energy audit required me to apply my knowledge more than I would have in a classroom laboratory setting. 1 2 3 4 5
4. I took the energy audit project more seriously because it involved an actual company rather than a simulation. 1 2 3 4 5
5. It was necessary to meet the energy audit project client or visit the site in person. 1 2 3 4 5
6. I could have generated the same quality work from looking at pictures of the greenhouse rather than visiting the site. 1 2 3 4 5
7. I felt well prepared to conduct the energy audit at the greenhouse. 1 2 3 4 5
8. After completing the written portion of the project, I felt confident with my decisions. 1 2 3 4 5
9. After completing the written portion of the project, I felt confident with presenting the results to the greenhouse owner. 1 2 3 4 5
10. The energy audit project reflects something I would do or see in the real world. 1 2 3 4 5
11. I would like to have more “real world” activities integrated into my classes. 1 2 3 4 5
12. “Real world” activities allow me to apply my knowledge more effectively. 1 2 3 4 5
Please circle the answer that best describes you.

1. Gender
   a. Female
   b. Male

2. I am taking this course as a(n)
   a. Undergraduate student
   b. Graduate student
   c. Observer

3. I have completed an internship for a company or business outside of the university
   a. Yes
   b. No

4. I have completed other horticulture courses that incorporate “real world” activities into their curricula.
   a. Yes, if yes please specify
      b. No
      c. Not Sure

5. I have completed other courses outside the horticulture department that incorporate “real world” activities into their curricula.
   a. Yes, if yes please specify
      b. No
      c. Not Sure

Please place an “x” by the activities/resources you would like to have incorporated into your horticulture courses. Check all that apply.

_____ Guest Speakers
_____ Field Trips
_____ Lab Exercises
_____ Special Projects
_____ Real World Activities
Appendix E

Hort 455: Retail Horticulture Business Management

Marketing Plan Semester Project Usefulness
Marketing Plan Semester Project Usefulness

Listed below are statements relative to the “Marketing Plan Semester Project” you completed in class. The marketing plan is an example of a “real world” activity. Please indicate your level of agreement for each statement using the following scale:

1= Strongly Disagree; 2=Disagree; 3=Neutral; 4=Agree; 5=Strongly Agree

1. The marketing plan project corresponded with the material covered in class.  
2. The marketing plan project improved my understanding of the course material.  
3. The marketing plan required me to apply my knowledge more than I would have in a classroom laboratory setting.  
4. I took the marketing plan project more seriously because it involved an actual company rather than a simulation.  
5. It was necessary to meet Scott Burk to learn his goals and objectives for his Company  
6. I could have generated the same quality work for a fictitious client and setting  
7. I felt well prepared to develop a marketing plan for Scott Burk.  
8. After completing the written portion of the project, I felt confident with my decisions.  
9. After completing the written portion of the project, I felt confident with presenting the results to Scott Burk and the class.  
10. The marketing plan project reflects something I would do or see in the real world.  
11. I would like to have more “real world” activities integrated into my classes.  
12. “Real world” activities allow me to apply my knowledge more effectively.
Please circle the answer that best describes you.

1. Gender
   a. Female
   b. Male

2. I am taking this course as a(n)
   a. Undergraduate student
   b. Graduate student
   c. Observer

3. I have completed an internship for a company or business outside of the university
   a. Yes
   b. No

4. I have completed other horticulture courses that incorporate “real world” activities into their curricula.
   a. Yes, if yes please specify
   b. No
   c. Not Sure

5. I have completed other courses outside the horticulture department that incorporate “real world” activities into their curricula.
   a. Yes, if yes please specify
   b. No
   c. Not Sure

Please place an “x” by the activities/resources you would like to have incorporated into your horticulture courses. Check all that apply.

_____ Guest Speakers
_____ Field Trips
_____ Lab Exercises
_____ Special Projects
_____ Real World Activities
Appendix F

Hort 457: Interior Plantscapping

Assessment of Riverport Project Usefulness
Assessment of Riverport Project Usefulness

Listed below are statements relative to the Riverport Project you completed in class. The Riverport project is an example of a “real world” project. Please indicate your level of agreement for each statement using the following scale:

1= Strongly Disagree; 2=Disagree; 3=Neutral; 4=Agree; 5=Strongly Agree

1. The Riverport project reflects the material covered in class.  
2. The Riverport project improved my understanding of the course material.  
3. The Riverport project required me to apply my knowledge more than I would have in a classroom laboratory setting.  
4. I took the Riverport project more seriously because it involved an actual company rather than a simulation.  
5. It was necessary to meet the Riverport clients and visit the site in person.  
6. I could have generated the same quality work from looking at pictures of the area rather than visiting the site. 
7. I felt well prepared to create a design for the Riverport project. 
8. After completing all the components of the Riverport project, I felt confident with the decisions I made. 
9. After completing all the components of the Riverport project, I felt confident in presenting my design to the class. 
10. The Riverport project is an example of something I would do or see in the real world. 
11. I would like to have more “real world” activities in my classes. 
12. “Real world” activities allow me to apply my knowledge more effectively.
Please circle the answer that best describes you.

1. Gender
   a. Female
   b. Male

2. I am taking this course as a(n)
   a. Undergraduate student
   b. Graduate student
   c. Observer

3. I have completed an internship for a company or business outside of the university
   a. Yes
   b. No

4. I have completed other horticulture courses that incorporate “real world” activities into their curricula.
   a. Yes, if yes please specify
      b. No
      c. Not Sure

5. I have completed other courses outside the horticulture department that incorporate “real world” activities into their curricula.
   a. Yes, if yes please specify
      b. No
      c. Not Sure

Please place an “x” by the activities/resources you would like to have incorporated into your horticulture courses. Check all that apply.

_____ Guest Speakers
_____ Field Trips
_____ Lab Exercises
_____ Special Projects
_____ Real World Activities