

Impacts of Teaching Garden Hands-on Activities on Student Learning



Xin Zhao (zxin@ufl.edu)¹, Bala Rathinasabapathi¹,
Marilyn E. Swisher², and Zhifeng Gao³

¹Horticultural Sciences Dept., ²Family, Youth and Community
Sciences Dept., ³Food and Resource Economics Dept.

Hands-on Learning in Horticulture

- ✓ Hands-on learning as one of the key components of the Horticultural Science curriculum
- ✓ **At UF**: An increase of student engagement in active hands-on learning along with the rising enrollment in the courses and major and minor programs in Horticultural Sciences Dept.



UF Horticultural Sciences Dept. Teaching Garden

Teaching Garden as an Important Resource

- HOS 1014 - Vegetable Gardening
- VEC 2100 - World Herbs and Vegetables
- VEC 3221C - Commercial Vegetable Production
- HOS 3020 - Principles of Horticultural Crop Production
- HOS 3281C - Principles of Organic and sustainable Crop Production
- HOS 4283C - Advanced Organic and Sustainable Crop Production



Teaching Garden as Field Laboratories

- Cultivate integrative hands-on learning
- The multifaceted function of institutional teaching gardens and farms in promoting student learning is increasingly recognized

“interdisciplinary learning, place-based learning, active and engaged learning, relationship-building, multiple perspectives, and systems thinking and interconnectedness.” (Burns and Miller, 2012)



Objectives

- Identify student perceptions of hands-on learning activities in different courses taking place at the vegetable teaching garden on campus and their impacts on student learning.

Fall 2015

- VEC 2100 - World Herbs and Vegetables
- VEC 3221C - Commercial Vegetable Production
- HOS 3020 - Principles of Horticultural Crop Production
- HOS 3281C - Principles of Organic and sustainable
Crop Production

Survey Instrument

- Online survey via Qualtrics
- 210 students enrolled in the four courses were contacted via email
- Demographics: gender, age, major, ethnicity, prior gardening or farming experience
- Aspect of learning influenced by hands-on activities
- 1-5 rating scale: 1 = highly negative, 2 = slightly negative, 3 = no influence, 4 = slightly positive, and 5 = highly positive

Aspect of learning and experience assessed

- **New technical skill(s) in horticulture**
- **Acquisition of knowledge**
- **Skills related to team work**
- **Leadership skills**
- **Writing and presentation skills**
- **Time to be outdoors and connecting with nature**
- **Gaining physical exercise**
- **Inspiration in the discipline**
- **Active learning in the discipline**
- **Interest in horticultural science research**
- **Interest in courses in future semesters that take place directly in the teaching garden**
- **Overall motivation in horticulture**

What Did Students Tell Us?

- ✓ 126 responses (n =126) used in the analysis
- ✓ Linear models used, SAS 9.4

- > 90% of the respondents indicated positive impacts of different hands-on activities on:
 - ✓ acquisition of knowledge in the area relating to the activity
 - ✓ new technical skills in horticulture
 - ✓ devoting their time to be outdoors connecting with nature
 - ✓ overall motivation in horticulture

What Did Students Tell Us?

- ✓ 126 responses (n =126) used in the analysis
- ✓ Linear models used, SAS 9.4

- > 75% (< 90%) of the participants perceived positive effects of class activities on:
 - ✓ skills related to team work
 - ✓ interest in guided-research in the horticultural sciences
 - ✓ interest in courses in future semesters that take place directly in the teaching garden focusing primarily on hands-on activities
 - ✓ gaining physical exercise

What Did Students Tell Us?

- ✓ 126 responses (n =126) used in the analysis
- ✓ Linear models used, SAS 9.4

- ~ 89%: positive influence on student interest and active learning in the discipline
- ~ 73%: positive impacts on inspiration to invent or develop something new or original
- ~ 71%: responded positively regarding leadership skills
- ~ 66%: positive impacts on positive impacts on writing and presentation skills

Comparing the Impacts

- ✓ Linear models used, SAS 9.4
- ✓ Fisher's LSD test for multiple comparisons, $P \leq 0.05$

Impact	Score
Connecting with nature, outdoors	4.62 a
New skills in horticulture	4.54 ab
Motivation in horticulture	4.47 abc
Acquisition of knowledge	4.44 bcd
Interest in the discipline	4.35 cde
Interest in courses in future semesters with a hands-on focus	4.31 de

- 1 = highly negative, 2 = slightly negative, 3 = no influence, 4 = slightly positive, and 5 = highly positive

Comparing the Impacts

- ✓ Linear models used, SAS 9.4
- ✓ Fisher's LSD test for multiple comparisons, $P \leq 0.05$

Impact	Score
Teamwork skills	4.24 ef
Inspiration to invent or develop something new or original	4.10 fg
Gaining physical exercise	4.09 fg
Interest in guided-research	4.06 g
Leadership skills	4.05 g
Writing and presentation skills	3.88 h

- 1 = highly negative, 2 = slightly negative, 3 = no influence, 4 = slightly positive, and 5 = highly positive

Demographics

- ✓ Linear models used, SAS 9.4
- ✓ Fisher's LSD test for multiple comparisons, $P \leq 0.05$

- **Gender** effect regarding the impact of hands-on activities on learning new skills in horticulture

Gender of students	Score
Female (n = 66)	4.67 a
Male (n = 60)	4.40 b
P value	0.035

- 1 = highly negative, 2 = slightly negative, 3 = no influence, 4 = slightly positive, and 5 = highly positive

Demographics

- ✓ Linear models used, SAS 9.4
- ✓ Fisher's LSD test for multiple comparisons, $P \leq 0.05$

● **Gender** effect regarding the impact of hands-on activities on interest in taking courses in future semesters with a hands-on focus

Gender of students	Score
Female (n = 66)	4.45 a
Male (n = 60)	4.15 b
P value	0.047

- 1 = highly negative, 2 = slightly negative, 3 = no influence, 4 = slightly positive, and 5 = highly positive

Demographics

- **Gender** did not influence the impact of hands-on activities on:
 - acquisition of knowledge ($P = 0.819$)
 - motivation in horticulture ($P = 0.454$)
 - teamwork skills ($P = 0.195$)
 - inspiration to invent or develop something new or original ($P = 0.777$)
 - interest in guided-research ($P = 0.627$)

Demographics

- **Ethnicity** effect regarding the impact of hands-on activities on motivation in horticulture

Ethnicity of students	Score
Other (n = 5)	4.80 a
Hispanic (n = 15)	4.67 a
Caucasian/White (n = 88)	4.51 a
African American/Black (n =4)	4.50 ab
Not wish to disclose (n =1)	4.00 ab
Asian/Pacific Islander (n =13)	3.85 b
P value	0.029

- 1 = highly negative, 2 = slightly negative, 3 = no influence, 4 = slightly positive, and 5 = highly positive

Demographics

- **Ethnicity** did not influence the impact of hands-on activities on:
 - learning new skills in horticulture ($P = 0.538$)
 - acquisition of knowledge ($P = 0.062$)
 - teamwork skills ($P = 0.277$)
 - interest in taking courses in future semesters with a hands-on focus ($P = 0.180$)
 - inspiration to invent or develop something new or original ($P = 0.956$)
 - interest in guided-research ($P = 0.394$)

What Did We Learn?

- Integrate hands-on activities into course design to enhance student learning and skill development
- Teaching garden as an invaluable resource for integration and innovation: **How can we optimize its function?**
 - ✓ Targeting higher cognitive skills
 - ✓ Interdisciplinary collaborations
 - ✓ Curriculum design and innovation for promoting student engagement and recruitment



