



Integrative Use of an Incubator Farm Class Project to Enhance Student Engagement

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UNIVERSITY
1896

Hands-on learning at university teaching gardens and farms

- Instructional garden at Univ. of Wisconsin-Madison (Stimart, 1999)
- Horticulture teaching garden at Oregon State Univ. (VanDerZanden and Cook, 1999)
- Year-round student organic farm at Michigan State Univ. (Biernbaum et al., 2006)
- A survey of 80 college and university student farms (Leis et al., 2011)
 - ✓ Diverse operating characteristics
 - ✓ Greatest impact on undergraduate students
 - ✓ Student recruitment tool

Horticultural Sciences Department vegetable teaching garden at University of Florida

- Group-based project-based hands-on learning in HOS3281C - Principles of organic and sustainable crop production
- Research and demonstration projects
- Students' feedback: integrating agribusiness management into class group projects





Fall 2018: Incubator farm class project

- Concepts of marketing, business planning, and budgeting integrated into lectures and a writing assignment
- Groups of 5-6 students assuming the role of a beginning farmer

- ✓ Select and grow fall vegetable crops to start and operate an incubator organic farm (30 ft × 22 ft)
- ✓ Identify and address S.M.A.R.T. holistic farming management goals
- ✓ Use an online blog to document farming progress
- ✓ Farm tours at the end of the semester
- ✓ Produce a 2-page pamphlet and a 5-minute video



Branding and team development

Forming

Storming

Performing

Norming

The
Friendly
Farm





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Students' perception of learning



- Post-then-pre assessment at the end of the course
- 44 students completed the assessment to report their perceived levels of knowledge, skill set, and interest **before** and **after** conducting the project
- 27 questions: 18 related to knowledge, understanding, and application; 9 related to skill and interest development
- 5-point scale: 1 = low, 5 = high



Questions related to knowledge / understanding / application

- 1. Overall knowledge of vegetable farming operations**
- 2. Growing vegetable crops**
- 3. Growing vegetable crops organically**
- 4. Setting S.M.A.R.T. goals to start a vegetable farming operation**
- 5. Holistic management planning of a vegetable farming operation**
- 6. Conducting holistic management of a vegetable farming operation**
- 7. Creating a business plan for a vegetable farming operation**
- 8. Developing marketing strategy for a vegetable farming operation**
- 9. Enterprise budgeting and record keeping for a vegetable farming operation**



Questions related to knowledge / understanding / application

10. Using intercropping systems for organic vegetable production

11. Using cover crops for organic vegetable production

12. Using composts for organic vegetable production

13. Fertilization and nutrient management for organic vegetable production

14. Using integrated management practices for organic vegetable production

15. Appreciation of environmental sustainability of farming operations

16. Appreciation of economic viability of farming operations

17. Appreciation of social community sustainability of farming operations

18. Appreciation of long-term sustainability of farming operations



Questions related to skill / interest development

1. Teamwork skill development
2. Leadership skill development
3. Oral communication skill development
4. Written communication skill development
5. Problem solving skill development
6. Interest and motivation in active learning
7. Interest and motivation in conducting organic farming research
8. Interest and motivation in pursuing a career directly related to farming operations in general
9. Interest and motivation in pursuing a career directly related to organic production



Data analysis



- Glimmix procedure in SAS 9.4
- Paired t-test to compare the pre and post scores for each question
- ANOM (analysis of means) to determine whether the pre and post score difference for each question differs from the overall mean of the pre and post score difference

Results: Questions related to knowledge / understanding / application

- Analysis of students' responses indicated significant knowledge gain in **ALL** assessed areas ($P < 0.001$)

Q	Pre	Post	Diff
1	2.66	4.16	1.50
2	2.48	4.14	1.66
3	1.82	4.07	2.25
4	1.88	4.02	2.14
5	1.98	4.09	2.11
6	2.00	4.12	2.12
7	1.86	3.88	2.02
8	1.93	3.77	1.84
9	1.84	3.67	1.83

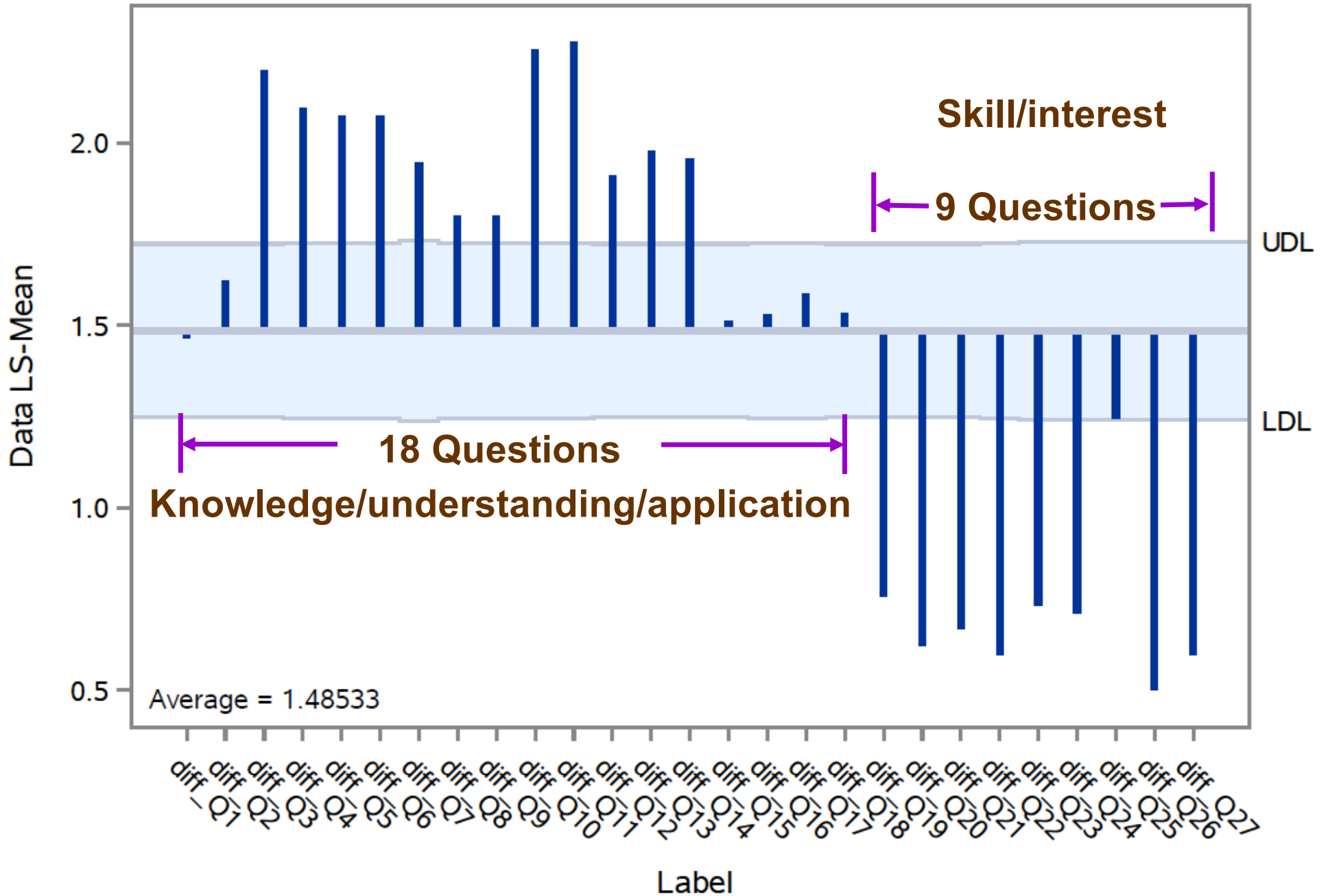
Q	Pre	Post	Diff
10	2.14	4.44	2.30
11	2.12	4.44	2.32
12	2.32	4.27	1.95
13	2.00	4.02	2.02
14	2.20	4.20	2.00
15	3.11	4.66	1.55
16	2.75	4.28	1.53
17	2.77	4.40	1.63
18	3.02	4.59	1.57

Results: Questions related to skill / interest development

- Analysis of students' responses indicated significant increases in **ALL** assessed areas ($P < 0.001$)

Q	Pre	Post	Diff
1	3.68	4.45	0.77
2	3.70	4.34	0.64
3	3.66	4.34	0.68
4	3.80	4.42	0.62
5	3.76	4.51	0.75
6	3.86	4.60	0.74
7	2.86	4.12	1.26
8	3.37	3.88	0.51
9	2.93	3.52	0.59

Analysis of Means With 95% Decision Limits





(Post – Pre) scores greater than overall mean of difference

- **Growing vegetable crops organically**
- **Setting S.M.A.R.T. goals to start a vegetable farming operation**
- **Holistic management planning of a vegetable farming operation**
- **Conducting holistic management of a vegetable farming operation**
- **Creating a business plan for a vegetable farming operation**
- **Developing marketing strategy for a vegetable farming operation**
- **Enterprise budgeting and record keeping for a vegetable farming operation**



(Post – Pre) scores greater than overall mean of difference

- **Using intercropping systems for organic vegetable production**
- **Using cover crops for organic vegetable production**
- **Using composts for organic vegetable production**
- **Fertilization and nutrient management for organic vegetable production**
- **Using integrated management practices for organic vegetable production**



(Post – Pre) scores similar to overall mean of difference

- **Overall knowledge of vegetable farming operations**
- **Growing vegetable crops**
- **Appreciation of environmental sustainability of farming operations**
- **Appreciation of economic viability of farming operations**
- **Appreciation of social community sustainability of farming operations**
- **Appreciation of long-term sustainability of farming operations**
- **Interest and motivation in conducting organic farming research**



(Post – Pre) scores lower than overall mean of difference

- Teamwork skill development**
- Leadership skill development**
- Oral communication skill development**
- Written communication skill development**
- Problem solving skill development**
- Interest and motivation in active learning**
- Interest and motivation in pursuing a career directly related to farming operations in general**
- Interest and motivation in pursuing a career directly related to organic production**



Take-home messages



- The Incubator Farm class project had significantly positive impacts on student learning and engagement
- Overall, greater influence on knowledge gain and application vs. skill and interest development
- Positive impact on teamwork and problem-solving skills, interest and motivation in active learning, and motivation in conducting organic farming research stood out regarding skill and interest development
- The Dream Farm class project with more focus on skill development in the advanced organic and sustainable crop production course in the following spring semester
- Improving the class project design and assessment tools

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THANK YOU!

