Rebecca C. Bott-Knutson, Erin L. Cortus, Todd P. Trooien
DON'T YOU HATE IT WHEN WORK STARTS PILING UP?

TELL ME ABOUT IT!
Previous Work

(Bott and Cortus, 2014)

- Students need to be confident in their ability to apply their knowledge in a production setting
- Instill confidence in ability to apply knowledge and practical skills
- Need for experiential learning
- Manure management as the study topic
<table>
<thead>
<tr>
<th></th>
<th>Stable Management</th>
<th>Agricultural Waste Management</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Program</strong></td>
<td>Animal Science</td>
<td>Agricultural Systems Technology (AST) Program</td>
</tr>
<tr>
<td><strong>Opt/Mandatory</strong></td>
<td>One of three technical elective options for an equine minor.</td>
<td>Required course for the AST major. Optional for graduate students.</td>
</tr>
<tr>
<td><strong>Class ID</strong></td>
<td>SM</td>
<td>AWM1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>AWM2</td>
</tr>
<tr>
<td><strong>Number of Students</strong></td>
<td>26</td>
<td>25</td>
</tr>
<tr>
<td></td>
<td></td>
<td>29</td>
</tr>
<tr>
<td><strong>Undergraduate/Graduate</strong></td>
<td>26/0</td>
<td>23/2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>26/3</td>
</tr>
<tr>
<td><strong>Males/Females</strong></td>
<td>2/24</td>
<td>24/1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>28/1</td>
</tr>
<tr>
<td><strong>Activity Period</strong></td>
<td>October – December 2012</td>
<td>February – April 2013</td>
</tr>
<tr>
<td></td>
<td></td>
<td>March – April 2014</td>
</tr>
</tbody>
</table>
Previous Work:

- Pre and Post Survey
  - Knowledge and beliefs
    - Current knowledge
    - Confidence in ability to manage compost pile
    - Impact of horses on environment
    - Manure management as challenge or opportunity
    - Are you a steward of the environment?
  - Technical knowledge
    - Health risks
    - Pathogens
    - Recommended moisture content

- Student assessment of experience
  - Learned useful information
  - Enjoyed the activity
  - Learned more than from lecture only
  - Open response topics

- Response scale 1-5
  - 1=minimal/challenge
  - 5=maximal/opportunity
  - Open response topics
Change in Self-Assessment of Knowledge and Confidence (p<0.01)

Change in Student Performance on Technical Knowledge (p<0.01)

Optimum Temperature

Optimum Moisture

Manure Produced

Pre-Test

Post-Test

Current Knowledge

Confidence to Manage Compost

Previous Work
<table>
<thead>
<tr>
<th></th>
<th>Pre-test</th>
<th>Post-Test</th>
</tr>
</thead>
<tbody>
<tr>
<td>Optimum temperature</td>
<td>7%</td>
<td>88%*</td>
</tr>
<tr>
<td>Optimum moisture</td>
<td>27%</td>
<td>100%*</td>
</tr>
<tr>
<td>Manure produced</td>
<td>56%</td>
<td>100%*</td>
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</tbody>
</table>

*(P<0.01)*

Student performance on technical knowledge is significantly improved post-test compared to pre-test. Optimum temperature and moisture, as well as manure produced, show marked increases.
Course:
Prerequisites:
Objective:
Frequency:
Current Project:

1. To gain experience with project management and design
2. To critically evaluate the compost process and make appropriate design decisions
3. To work in teams to develop and manage a design project
Objectives

• Demonstrate the change in knowledge related to composting and project design
• Identify impact on students’ ability to work as productive members of a team and to manage tasks
Defining the Problem

Teams developed evaluation criteria for the compost design which would meet the needs and limitations of their client while effectively composting manure.

- Design must effectively compost manure from two horses
- Must be operable by one person, by hand

"I know that's what your father calls it, sweetheart...but a nicer word for it is fertilizer!"
Process

• “Client” and faculty met with students regularly throughout semester.

• Students worked in teams to:
  – Develop project objectives
  – Create a plan of work
  – Develop a project timeline in the form of a Gantt chart
  – Design a solution (compost process)
  – Produce final written and oral reports

• Students individually completed a retrospective self-evaluation related to:
  – Compost- and project development-based knowledge
  – Ability to work in teams
  – Learning process
Students improved numerically in their perceived knowledge of design (2.462 vs 3.846)
Topical-based knowledge

Knowledge of the composting process

Before

After

Scale of 1 (very little/very weak) to 5 (very much/very strong)

Students improved numerically in their perceived knowledge of composting (2.231 vs. 4.154)
Students improved numerically in their perceived knowledge of maintenance tasks (2.462 vs. 4.077) compared to topical-based knowledge.
Students improved numerically in their perceived ability to execute maintenance tasks.

<table>
<thead>
<tr>
<th>Process-based knowledge</th>
<th>Before</th>
<th>After</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ability to execute maintenance tasks</td>
<td>15%</td>
<td>38%</td>
</tr>
<tr>
<td>15%</td>
<td>23%</td>
<td>0%</td>
</tr>
<tr>
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<td>50%</td>
</tr>
<tr>
<td>50%</td>
<td>60%</td>
<td>70%</td>
</tr>
</tbody>
</table>
Students improved numerically in their perceived ability to compromise (3.615 vs. 4.154)
Student ability to organize as a cooperative or high-performing team improved from 54% to 100%.

What is the highest level of team productivity you achieved?

- 1st Group
- 2nd Group

Process-based knowledge
Summary

- Increase in working topical- and process-based knowledge as indicated by self-reported:
  - Knowledge of the design and composting processes
  - Knowledge of and ability to execute maintenance tasks improved
  - Ability to compromise
  - Ability to organize as a cooperative or high performing team

- Further work should examine a flipped scenario where basic project management skills are introduced in any team processes