Is a Traditional Drawing Exercise for Plant and Seed Identification Still Effective for Millennial Students?

Marshall Hay and Kevin Donnelly
Kansas State University
Background

• History of drawing in education

• Role of drawing in crops team training

• Set basis for current study
Plant and Seed Identification Class

• Semester long, two credit course

• Identify 225 species
  – Both plant and seed required for most species
  – Specific varieties for some crops
  – About 25 introduced each week

• Learning facilitated through multiple mediums
Lab with study resources available to students
Weekly quiz – new samples plus review
This is not easy stuff!!!!

- alfalfa
- sweetclover
- red clover
- black medic

From: USDA Plants Database, http://plants.usda.gov/java/imageGallery
Drawing Exercise Added in 2015
Objectives of Study

• Determine the influence of facilitated drawing on student understanding of identification

• Compare drawing medium to other methods currently implemented

• Assess student perceptions of how drawing enhanced their learning
Methods

• Facilitated drawing times during class
  – Focus placed on key characteristics for each weekly quiz
  – About 45 minutes of two hour lab

• Open environment
  – Group work
  – Teaching assistant circulation
AGRON 350 Spring 2015
Forage Legume Practice

8.1 Consider the seed of alsike clover, birdsfoot trefoil, alfalfa, sweetclover, red clover, and white clover. Diagram the seeds and make note of various characteristics such as general shape, thumb position, symmetry, and color transition.

alsike clover
birdsfoot trefoil

alfalfa
sweetclover

red clover
white clover

8.2 Consider black medic and large hop clover. Diagram the varying characteristics of the two species. Include details such as leaflet structure, flower senescence, and legume pod shape. Use color where necessary.
Drawing Assessment

• Participatory grades for credit
  – Part of in-class participation score
  – Maximum 20 points out of 900 total

• Quality of drawings rated on a scale of 1 to 5
  – Completion
  – Detail
  – Reference notes
1.5 Distinguish between field bindweed and hedge bindweed flowers and pedicels using mounts and online pictures. Diagrams should include the location of **bracts and size of flowers**.
goosegrass

1. multiple florets and spikelets
   Two rows on lower side of rachis
   * other side is open

2. Mostly 3 spikes

3. Straight rachis
green mungbean

large stipules

hairy
orchardgrass
crested wheatgrass

short, stubby, cupped rachilla projects outward
Consider the inflorescence of perennial ryegrass edgewise versus flat attachment of spikelets and glumes of quackgrass.

**Perennial ryegrass**

- Spike inflorescence will spikelets alternating sides edgewise attachment to the rachis.

**Quackgrass**

- Attached flat like a duckbill
- Cannot see the rachis all the way up.
Drawing Outcomes

• 21 students in the class

• Defined two groups for analysis
  – 14 regular participants
  – 7 limited engagement

• Quality of drawing was evaluated, but students only received a “yes/no” participation score
Performance on Quizzes

- Students that draw
- Students that do not draw
- Entire class

Department of Agronomy
## Correlation Between Drawing Rating and Quiz Score

<table>
<thead>
<tr>
<th>Quiz Type</th>
<th>Correlation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Botany Quiz</td>
<td>0.000</td>
</tr>
<tr>
<td>ID Qz 1</td>
<td>0.411</td>
</tr>
<tr>
<td>ID Qz 2</td>
<td>0.222</td>
</tr>
<tr>
<td>ID Qz 3</td>
<td>0.569</td>
</tr>
<tr>
<td>ID Qz 5</td>
<td>0.086</td>
</tr>
<tr>
<td>ID Qz 6</td>
<td>0.506</td>
</tr>
<tr>
<td>ID Qz 7</td>
<td>-0.005</td>
</tr>
<tr>
<td>ID Qz 8</td>
<td>0.057</td>
</tr>
<tr>
<td>ID Qz 9</td>
<td>0.601</td>
</tr>
<tr>
<td>ID Qz 10</td>
<td>-0.102</td>
</tr>
<tr>
<td>ID Qz 11</td>
<td>-0.001</td>
</tr>
<tr>
<td><strong>Average</strong></td>
<td><strong>0.213</strong></td>
</tr>
</tbody>
</table>
Student Perceptions

• Two surveys
  – Mid-term and end of class
  – Very consistent results
• 68% percent of students were “okay with” or “enjoyed” completing the drawing exercises
• 73% felt that reviewing their hand drawings were “somewhat effective” or “very effective” in preparing for weekly quizzes
• All students indicated that drawings enhanced their identification skills for the future
Perceived Importance of Different Learning Methods

<table>
<thead>
<tr>
<th>Rate the following items as to how effective you think they are in helping you learn to identify the plants and seeds:</th>
<th>Rating*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Personally studying the samples provided in the lab</td>
<td>3.84</td>
</tr>
<tr>
<td>Lecture presentations by Dr. Donnelly on Wednesdays</td>
<td>3.26</td>
</tr>
<tr>
<td>Comments, questions, or discussion with Teaching Assistants</td>
<td>3.10</td>
</tr>
<tr>
<td>Reviewing written hints printed in the lab manual</td>
<td>2.84</td>
</tr>
<tr>
<td>Reviewing my personal notes added to the lab manual</td>
<td>2.84</td>
</tr>
<tr>
<td>Reviewing PowerPoint slides and interactive quizzes</td>
<td>2.79</td>
</tr>
<tr>
<td>The drawing exercises completed in class on Mondays</td>
<td>2.63</td>
</tr>
</tbody>
</table>

* 4=most effective  3=somewhat effective  2=slightly effective  1=not effective
Conclusions

• 18% higher final grades for regular participants
• Participation appears to be more important than quality of drawing
• Will be continued with additional weight toward final grade in future
• Targeted at all students as means to influence long term understanding of the material