Current events articles enhance student learning in undergraduate genetics

Jennifer Minick Bormann and Megan M. Rolf
Kansas State University
Introduction

• ASI 500 Genetics
• Required by all ASI majors
• Also serves College of Agriculture
  – Primarily agronomy and horticulture
• Only pre-req is general biology
Introduction

• ASI 500 Genetics
  – Unit 1 - Mendelian inheritance, sex linkage, epistasis, pedigree analysis
  – Unit 2 - Chromosome structure, DNA structure and replication
  – Unit 3 - Transcription, translation, gene expression, biotechnology
  – Unit 4 - Genomics, quantitative and population genetics
Introduction

- Current events have potential to reinforce student learning
- Genetics is rapidly evolving, often in news
  - Mainstream
  - Ag related
Objectives

• Does the incorporation of current events papers enhance student learning?
Materials and Methods

• Approved by KSU Institutional Review Board
• Fall semester 2013- 130 students
• Spring semester 2015- 139 students
Materials and Methods

• Current events assignment Fall 2013
  – 5 different popular press articles related to genetics (current year)
    • Livestock, crop/horticulture plant, companion animal, exotic animal, human
  – Write 1 page paper describing the article and explaining how it related to concepts covered in class
  – Due at the end of semester
Materials and Methods

• Current events assignment Spring 2015
  – 4 different popular press articles related to genetics (current year)
    • Livestock, crop/horticulture plant, companion animal, exotic animal, NOT human
  – Write 1 page paper describing the article and explaining how it related to concepts covered in class
  – Due dates evenly distributed through the semester
Materials and Methods

• Data collected
  – Pre-test and post-test for every unit (4)
    • Improvement from pre- to post-test
  – Cumulative GPA
  – Date paper submitted
  – Species of paper
  – Survey
Materials and Methods

• Data analysis
  – SAS (Cary, NC)
  – General linear model to analyze improvement included fixed effect of year and covariate of GPA
  – Chi-square test of survey results
Results and Discussion

<table>
<thead>
<tr>
<th>Variable</th>
<th>Fall 2013</th>
<th>Spring 2015</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Improvement Unit 1</td>
<td>17.07</td>
<td>27.13</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td>Improvement Unit 2</td>
<td>39.81</td>
<td>36.55</td>
<td>0.05</td>
</tr>
<tr>
<td>Improvement Unit 3</td>
<td>30.46</td>
<td>40.49</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td>Improvement Unit 4</td>
<td>21.54</td>
<td>28.13</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td>Average improvement</td>
<td>26.62</td>
<td>32.82</td>
<td>&lt;0.01</td>
</tr>
</tbody>
</table>
Results and Discussion

Number of current events assignments submitted by day of semester.
Results and Discussion

Number of current events assignments submitted by day of semester.
<table>
<thead>
<tr>
<th>Species</th>
<th>Percent of students F13</th>
<th>Percent of articles F13</th>
<th>Percent of students S15</th>
<th>Percent of articles S15</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beef</td>
<td>61.83</td>
<td>6.04</td>
<td>63.63</td>
<td>26.10</td>
</tr>
<tr>
<td>Cat</td>
<td>38.17</td>
<td>0.35</td>
<td>17.42</td>
<td>1.92</td>
</tr>
<tr>
<td>Crops agronomy</td>
<td>38.17</td>
<td>5.01</td>
<td>27.27</td>
<td>17.27</td>
</tr>
<tr>
<td>Crops horticulture</td>
<td>29.77</td>
<td>2.25</td>
<td>13.64</td>
<td>3.45</td>
</tr>
<tr>
<td>Dairy</td>
<td>38.17</td>
<td>1.21</td>
<td>13.64</td>
<td>4.22</td>
</tr>
<tr>
<td>Dog</td>
<td>54.96</td>
<td>3.11</td>
<td>31.82</td>
<td>5.37</td>
</tr>
<tr>
<td>Exotic</td>
<td>35.11</td>
<td>5.18</td>
<td>20.45</td>
<td>14.40</td>
</tr>
<tr>
<td>Goat</td>
<td>29.77</td>
<td>0.17</td>
<td>9.09</td>
<td>0.96</td>
</tr>
<tr>
<td>Horse</td>
<td>55.73</td>
<td>4.32</td>
<td>31.82</td>
<td>5.18</td>
</tr>
<tr>
<td>Human</td>
<td>34.35</td>
<td>55.44</td>
<td>11.36</td>
<td>1.34</td>
</tr>
<tr>
<td>Poultry</td>
<td>27.48</td>
<td>0.17</td>
<td>7.58</td>
<td>1.54</td>
</tr>
<tr>
<td>Sheep</td>
<td>29.77</td>
<td>0</td>
<td>11.36</td>
<td>1.34</td>
</tr>
<tr>
<td>Swine</td>
<td>30.53</td>
<td>0.35</td>
<td>20.45</td>
<td>3.65</td>
</tr>
</tbody>
</table>
Results and Discussion

Student responses to survey question: On a scale from 1-5 with 1 being not helpful at all and 5 being extremely helpful, how useful were the current events articles in learning and reinforcing the concepts discussed in class?

<table>
<thead>
<tr>
<th>Student response</th>
<th>Number F13</th>
<th>Percent F13</th>
<th>Number S15</th>
<th>Percent S15</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 not helpful</td>
<td>17</td>
<td>16.2</td>
<td>25</td>
<td>19.7</td>
</tr>
<tr>
<td>2</td>
<td>19</td>
<td>18.1</td>
<td>28</td>
<td>22.1</td>
</tr>
<tr>
<td>3</td>
<td>36</td>
<td>34.3</td>
<td>42</td>
<td>33.1</td>
</tr>
<tr>
<td>4</td>
<td>25</td>
<td>23.8</td>
<td>17</td>
<td>13.4</td>
</tr>
<tr>
<td>5 extremely helpful</td>
<td>8</td>
<td>7.6</td>
<td>15</td>
<td>11.8</td>
</tr>
</tbody>
</table>

NS
Results and Discussion

• Survey question: Did you find the majority of articles for class in your regular reading, OR specifically go looking for articles just to complete the assignment?
  – Fall 2013: 89.8% searching, 10.2% regular reading
  – Spring 2015: 84.9% searching, 15.1% regular reading (NS)
Results and Discussion

• Survey question: How many magazine/newsletter/periodicals (print or electronic) related to your specie(s) of interest do you read regularly?
  – Fall 2013: 1.8
  – Spring 2015: 1.5 (NS)
Implications

• Student learning seemed to be improved when assignments were distributed throughout the semester.

• Students don’t appear to be reading popular press related to their species of interest.

• Students believe reading articles and writing papers is only moderately helpful in learning genetics concepts.