Is Classroom Polling an Effective Method for Facilitating Student Interaction?

Garrison J. Gundy, Marshall M. Hay, Kevin J. Donnelly
Why Polling?

• 85% of college students own a smartphone and 52% of college students own a tablet (Pearson 2015)
### Background

#### Objectives

- **Polling Software**
  - Laptop
  - Smartphone
  - Tablet*
  - Hybrid or “2 in 1” computer
  - None of these

#### Results

- Smartphone: 85% (2015), 84% (2014), 72% (2013)
- Tablet*: 52% (2015), 45% (2014), 38% (2013)
- Hybrid or “2 in 1” computer: 8% (2013)
- None of these: 1% (2013)

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**Pearson Student Mobile Device Survey: College Students, 2015**
85% of college students own a smartphone and 52% of college students own a tablet (Pearson 2015)

40% of students would like to use mobile devices more often in class (Pearson 2015)

99% of 209 Introductory Crop Science students at Kansas State own a smartphone (Fall 2015/Spring 2016) (Hay et al. 2016)

Many different applications allow for instant feedback
  - Smartphones decrease the cumbersome problems of clickers

Creates the opportunity for peer discussion, enhancing student understanding (Smith et al. 2009)

Incorporates technology into classroom providing additional strategy to allow for fundamental interaction by all students
Objectives

• Compare the functionality, cost, and effectiveness of three polling tools used by the Department of Agronomy at Kansas State University
Polling Software used in KSU Agronomy Department

1. Top Hat
   - Soil Science (121 students)
   - Integrated Weed Management (36 students)
   - Crop Growth and Development (40 students)

2. Kahoot!
   - Integrated Weed Management (36 students)
   - Crop Science (71 students)

3. Poll Everywhere
   - Crop Science (71 students)
   - Weed Science (80 students)
Receive unique join code for a given class
Submission via Web Browser, Top Hat App, SMS/Text message

Student Pricing
- One Term: $26
- Annual: $38
- Four Year: $75

Built in Gradebook/Export to Excel
- Can sync with Canvas

Question types: Multiple choice, Word answer, Numeric answer, Matching, Click on target, Sorting

Ability to upload all types of files
Attendance function
Requires WiFi and/or cellular reception
User Interface
Implementation

• Of these Best Management Practice's, which one are you least likely to implement on your farm or recommend to your clients?
Implementation

March 30 Question 1

Which of the following best describes the chemical properties of atrazine on high pH soils?

A. neutral                                15
B. positively charged                     17
C. negative charge                        0
D. ionic form                             0
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Kahoot!

- Free learning platform
- Users must download Kahoot! App on device
- Up to 4,000 players can join same PIN
- Requires excellent bandwidth, WiFi, and/or cellular reception (1 Mbps/10 players)
- Game types include: Quiz, Jumble, Discussion, Survey
- Questions are limited to 95 characters
- 120 seconds for maximum time to answer
- Results come in Excel file format with tabs for detailed breakdown for each question
User Interface

A fertilizer rec. calls for 80 lbs nitrogen/acre. How much UAN (32% N) should he apply?

- 26 lbs UAN
- 250 lbs UAN/acre
- 40 lbs UAN/acre
- 2560 lbs UAN/acre
User Interface

A fertilizer rec. calls for 80 lbs nitrogen/acre. How much UAN (32% N) should he apply?

- 26 lbs UAN
- 250 lbs UAN/acre
- 40 lbs UAN/acre
- 2560 lbs UAN/acre

Correct
Answer Streak 1

PIN: 218105
1 of 3

You're in 1st place
Garrison 983
Implementation
Polling Software used in KSU Agronomy Department

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Poll Everywhere

- Free version limited to 40 responses per poll (400 for paid version)
- Pricing (paid version only)
  - $14/student or $349 Instructor payment
- Easily integrated into PowerPoint, Keynote, and Google Slides
- Submission via text message or through website
- Question types: Multiple choice, Word cloud, Q&A, Clickable image, Survey, Open-ended
- Results can be exported to Excel or printed as PDF (paid version only)
- Requires WiFi and/or cellular reception
User Interface

What are your thoughts of NACTA 2017 so far?

Respond at PollEv.com/garrison Gund277

Text GARRISONGUND277 to 37607 once to join, then text your message

NACTA is a blast

/enjoying being here
Implementation

Why do we need to know the developmental/growth stages of crops? Using your smartphone come up with two applications why development stage is important and include the growth stage.

Respond at PollEv.com/garrisonund277

Text GARRISONUND277 to 37607 once to join, then text your message

“Roundup v8”
less than a minute ago

“Nitrogon V7”
about a minute ago

“Glyphosate-V8”
6 minutes ago

“2,4-d-V6 in corn”
2 minutes ago

“Halex GF only applicable to corn before 6 leaf stage”
about a minute ago

“ALS inhibitors not after V6 in corn”
2 minutes ago

“Accent Q herbicide V6-V10 corn”
less than a minute ago

“Fungicide R2.5”
2 minutes ago
Implementation

List one Precision Ag tool or other technology tool that is used in your field of study. Be able to provide to the class what it is used for and how it benefits producers.

When poll is active, respond at PollEv.com/garrisongund277 Text GARRISONGUND277 to 37607 once to join

<table>
<thead>
<tr>
<th>Option</th>
<th>Views</th>
<th>Votes</th>
</tr>
</thead>
<tbody>
<tr>
<td>“Row sense”</td>
<td>2 months ago</td>
<td></td>
</tr>
<tr>
<td>“Gps”</td>
<td>2 months ago</td>
<td></td>
</tr>
<tr>
<td>“GPS”</td>
<td>2 months ago</td>
<td></td>
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<tr>
<td>“GPS”</td>
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<td>“Gps”</td>
<td>2 months ago</td>
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<tr>
<td>“Sensor technology”</td>
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<tr>
<td>“Drones”</td>
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<tr>
<td>“Norac Sprayer System and automatic boom shut off”</td>
<td>2 months ago</td>
<td></td>
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<tr>
<td>“Variable Rate”</td>
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<td>“Precision applicators”</td>
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<tr>
<td>“GPS”</td>
<td>2 months ago</td>
<td></td>
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</table>

Total Results: 14
### Overview

<table>
<thead>
<tr>
<th>Category</th>
<th>Top Hat</th>
<th>Kahoot!</th>
<th>Poll Everywhere</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Cost</strong></td>
<td>Worst</td>
<td>Best</td>
<td>Best</td>
</tr>
<tr>
<td><strong>Functionality</strong></td>
<td>Best</td>
<td>Worst</td>
<td>Best</td>
</tr>
<tr>
<td><strong>Ease of Implementation</strong></td>
<td>Best</td>
<td>Worst</td>
<td>Best</td>
</tr>
<tr>
<td><strong>Grading Ability</strong></td>
<td>Best</td>
<td>Worst</td>
<td>Best</td>
</tr>
<tr>
<td><strong>Attendance</strong></td>
<td>Best</td>
<td>Worst</td>
<td>Best</td>
</tr>
<tr>
<td><strong>User Interface</strong></td>
<td>Best</td>
<td>Worst</td>
<td>Best</td>
</tr>
</tbody>
</table>

*Color scale: Worst (Red) to Best (Green)*
Student Survey

<table>
<thead>
<tr>
<th>Survey Question</th>
<th>Student Response (n = 23)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Did the polling software increase your desire to interact in the classroom?</td>
<td>3.74 (0.68)</td>
</tr>
<tr>
<td>Is polling an effective way to create discussion/interaction?</td>
<td>4.45 (0.71)</td>
</tr>
<tr>
<td>Did polling create a more inclusive classroom environment for all students?</td>
<td>4.00 (0.85)</td>
</tr>
<tr>
<td>Polling was effective at facilitating critical thinking and promoting deeper understanding.</td>
<td>4.04 (0.82)</td>
</tr>
<tr>
<td>The question/activities incorporated with the polling activity increased desire to learn.</td>
<td>3.83 (0.98)</td>
</tr>
</tbody>
</table>

Ratings based on 5-point scale from 1 (No Value) to 5 (Exceptional Value)

Comments: What changes are needed to be more effective?

- I thought it was very effective and allowed for group interaction and discussion.
- Enjoyed writing in own answers and then explaining to the class. Easier then risking raising hand and being wrong.
- I enjoyed the polling and seeing where other kids could apply what we were learning to real life.
- I feel like the polling exercises got us involved more than just listening to a lecture.
- Needs to be used more often.
- It’s not something that gets me excited.
Take-Home

• Positive feedback from students
  • Polling is an effective way to create interaction
  • Enjoyable activity
  • “Apply to real life”

• Top Hat provides an overall complete polling package

• Kahoot! and free version of Poll Everywhere can be situationally effective with easier implementation

• All three applications can be utilized to create more inclusive learning environments

• Instructor must develop effective questions to meet learning outcomes

• Peer and instructor discussion must follow polling activities to maximize student’s conceptual understanding and desire to learn
References

Hay, M. M., Donnelly, K. J., Kerschen, K. J., (June 2016). Should smartphones be used to facilitate a new approach to agronomy education. NACTA conference conducted from Honolulu, Hawaii.


https://www.polleverywhere.com/
https://kahoot.it/#
https://tophat.com/
Questions?

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