

# Does the Use of a Smartphone-based Technology in Teaching Influence Learning Outcomes?

Vikram Koundinya\*, Feiran Chen\*\*, Peter Livingston\*\*\*  
Kevin Erb\*\* & Janice Kepka\*\*

\*University of California-Davis, \*\*University of Wisconsin-Madison,  
\*\*\*California Polytechnic State University-San Luis Obispo

NACTA Conference, June 13, 2018

Iowa State University, Ames, IA



# Presentation Outline

- **Project background**
- **Teaching intervention**
- **Research objective**
- **Research methods**
- **Results**
- **Implications**

# **Project Background**

# Project Purpose

- **To train USDA Farm Service Agency (FSA) staff on determining and documenting the existence of potential wetlands**

# Course Format

## **Blended Course:**

- **Online component on USDA's AgLearn training platform**
- **Field day with classroom and field components**

# Teaching Intervention

## Activity Methods

- **Rapid-fire Q & A to review learning outcomes**
- **Method 1: Teams using Whiteboard ( $n=19$ )**
- **Method 2: Kahoot! ( $n=8$ )**

# Anecdotal Observations

- **Whiteboard groups**
  - **Size matters!**
  - **Team dynamics**
- **Kahoot!**
  - **Personal responsibility**
  - **Fun method for review**
  - **Authorized phone time**

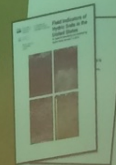








How would you describe hydric soils to a middle school student?



# Research Objective

- **To test the influence of a smartphone-based technology on student learning outcomes**

# Research Methods



- **Mixed-methods research design was used**
- **Quantitative data were collected from the end-of-field day surveys**
- **Qualitative data were collected from the reflections/debriefs about the field day from instructors from all the field days and from the open-ended questions in the surveys**

- **The choice of teaching intervention was based on instructor preferences**
- **Kahoot! was used at 8 locations with 203 participants. Whiteboard was used at 19 locations with 413 participants.**
- **An independent samples  $t$  test was used to test for significant differences on the outcome variables**

# Results





**Table 1. *t*test results of knowledge level on aspects taught at the field day**

<b>Item</b>	<b>Groups</b>	<b><i>M</i></b>	<b><i>SD</i></b>	<b><i>t</i> score</b>	<b><i>p.</i></b>
<b>Using Wetlands Mapper for pre-screening</b>	<b>Kahoot!</b>	<b>4.00</b>	<b>.811</b>	<b>.447</b>	<b>.655</b>
	<b>Whiteboard</b>	<b>3.97</b>	<b>.828</b>		
<b>Using Web Soil Survey to identify hydric soils</b>	<b>Kahoot!</b>	<b>4.06</b>	<b>.768</b>	<b>.230</b>	<b>.818</b>
	<b>Whiteboard</b>	<b>4.04</b>	<b>.812</b>		
<b>The different federal laws and regulations related to wetlands</b>	<b>Kahoot!</b>	<b>3.60</b>	<b>.774</b>	<b>1.875</b>	<b>.061</b>
	<b>Whiteboard</b>	<b>3.47</b>	<b>.792</b>		
<b>Identifying key potential wetland hydrology indicators</b>	<b>Kahoot!</b>	<b>3.87</b>	<b>.753</b>	<b>-1.553</b>	<b>.121</b>
	<b>Whiteboard</b>	<b>3.97</b>	<b>.742</b>		
<b>Identifying key potential wetland vegetation indicators</b>	<b>Kahoot!</b>	<b>3.79</b>	<b>.762</b>	<b>-1.902</b>	<b>.058</b>
	<b>Whiteboard</b>	<b>3.92</b>	<b>.767</b>		
<b>Using the Field Guide to identify wetland plants</b>	<b>Kahoot!</b>	<b>3.88</b>	<b>.826</b>	<b>-.272</b>	<b>.786</b>
	<b>Whiteboard</b>	<b>3.90</b>	<b>.830</b>		

**Table 2. *t*test results of comfort level on aspects taught at the field day**

<b>Item</b>	<b>Groups</b>	<b><i>M</i></b>	<b><i>SD</i></b>	<b><i>t</i> score</b>	<b><i>p.</i></b>
<b>Using Wetlands Mapper for pre-screening</b>	<b>Kahoot!</b>	<b>4.18</b>	<b>.666</b>	<b>.219</b>	<b>.827</b>
	<b>Whiteboard</b>	<b>4.16</b>	<b>.744</b>		
<b>Using Web Soil Survey to identify hydric soils</b>	<b>Kahoot!</b>	<b>4.22</b>	<b>.677</b>	<b>.614</b>	<b>.540</b>
	<b>Whiteboard</b>	<b>4.18</b>	<b>.744</b>		
<b>The different federal laws and regulations related to wetlands</b>	<b>Kahoot!</b>	<b>3.77</b>	<b>.695</b>	<b>.897</b>	<b>.370</b>
	<b>Whiteboard</b>	<b>3.72</b>	<b>.778</b>		
<b>Identifying key potential wetland hydrology indicators</b>	<b>Kahoot!</b>	<b>4.07</b>	<b>.637</b>	<b>-1.003</b>	<b>.316</b>
	<b>Whiteboard</b>	<b>4.13</b>	<b>.709</b>		
<b>Identifying key potential wetland vegetation indicators</b>	<b>Kahoot!</b>	<b>4.02</b>	<b>.648</b>	<b>-.033</b>	<b>.974</b>
	<b>Whiteboard</b>	<b>4.03</b>	<b>.745</b>		
<b>Using the Field Guide to identify wetland plants</b>	<b>Kahoot!</b>	<b>4.14</b>	<b>.668</b>	<b>1.379</b>	<b>.168</b>
	<b>Whiteboard</b>	<b>4.05</b>	<b>.763</b>		

# Qualitative Results

- **Kahoot! was learner-friendly and engaging**

- **Positive quotes:**

**“The use of both Whiteboard ... and Kahoot ... seemed like a good mix”**

**”First time Kahoot was used and it was fairly successful”**

**“I was hesitant at first to use Kahoot ..... , but it was easy to learn and we had very few glitches”**

- **Negative quotes:**

**“Older attendees in this group seemed less likely to participate in Kahoot”**

**“..... a couple of attendees did not have smart phones”**

**“Wi-fi issues...”**

# Implications



- **We will test if Kahoot! yields statistically significant differences in our future studies**
- **Kahoot! was used in a non-formal educational setting (Extension) with adult learners. We recommend testing this in formal classroom settings with traditional students**
- **Qualitative data indicates Kahoot! could be fun and engaging experience for students**
- **Kahoot! is a free App available to pilot test in classes**



**Questions?**

**Thank you for your time!**