



# Improved Academic Achievement and Student Perceptions of Learning through use of a Cell Phone-based Personal Response System

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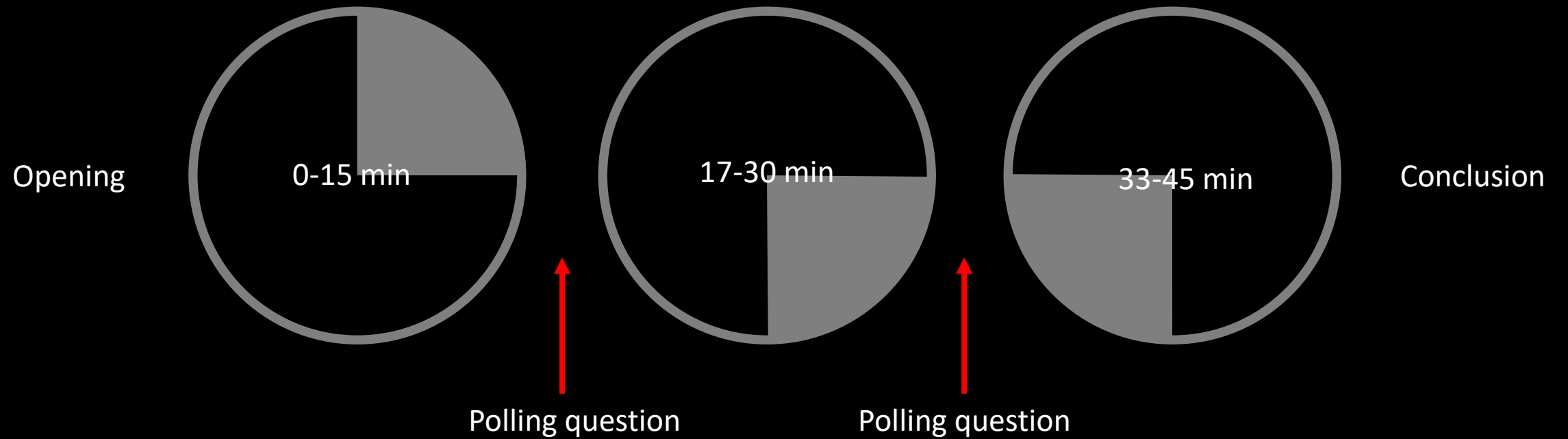
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2017 NACTA Conference, June 28 - July 1, Purdue University

# Blended classroom



(Watson, 2017)

# iClicker works But not always



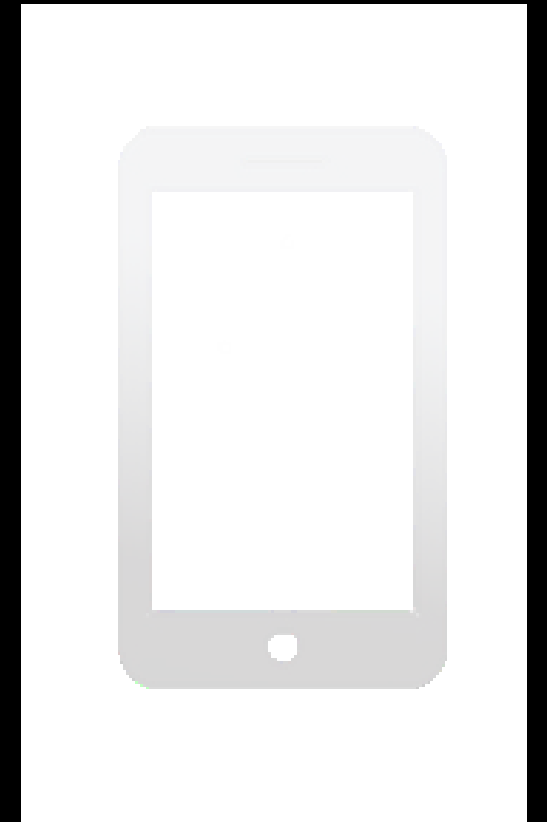
Sevian and Robinson, 2011

Gauci, Dantas, Williams, & Kemm, 2009

Hunsu, Adesope, & Bayly, 2016

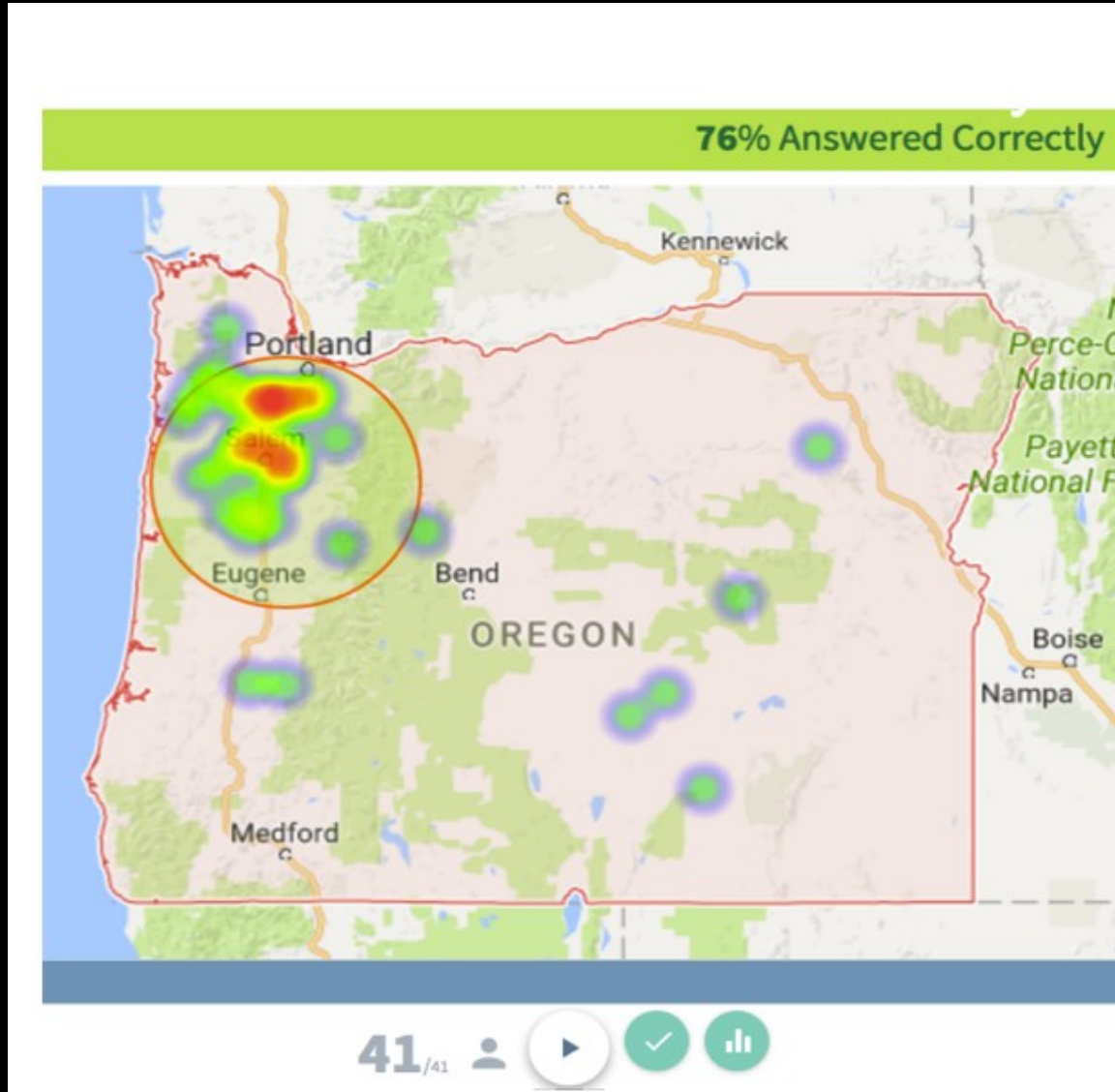
Everyone has a phone

Distraction



# Cell phone-based personal response system

to evaluate the impact of using CPPRS  
in an upper-level undergraduate Food  
Science course on *academic  
achievement* and *student perceptions  
of learning*

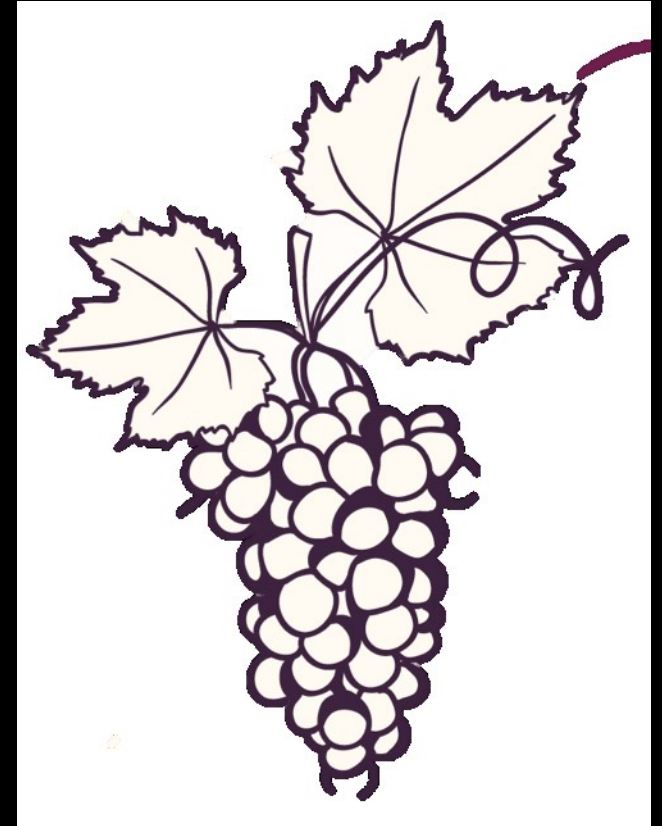


- Students in FST/HORT 3114 Wines and Vines in Fall 2016 at a southeastern land-grant university
- Students must be at least 21 years old
- The data from students who primarily used TopHat on their laptops was not included.





- an undergraduate level course
- 3 credit
- covers world wine styles, wine appreciation, and sensory evaluation of wine
- over a 16-week period



Introduction

Objective & hypothesis

# Materials & methods (Implementation)

Results & discussion

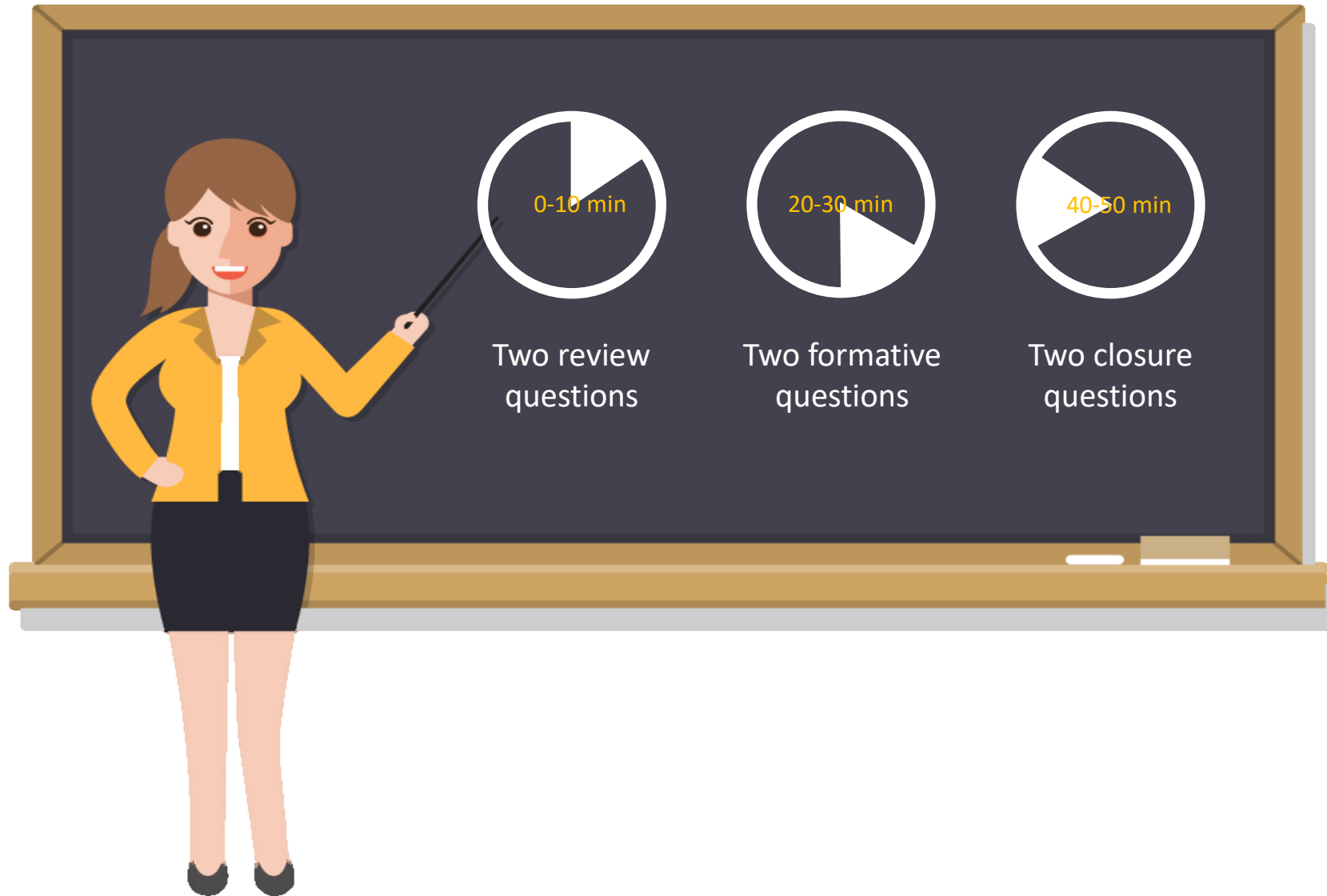
Conclusion

W 1		W 2		W 3		W 4		W 5		W 6		W 7
L 1	L 2	L 3	L 4	L 5	L 6	L 7	L 8	L 9	L 10	Exam 1	Cancelled	L 11

No TopHat™

With TopHat™

W 7	W 8		W 9		W 10		W 11		W 12		W 13		W 14		W 15	W 16
L 12	L 13	L 14 & L 15	L 16	L 17	L 18	L 19	Exam 2	L 20	No class	L 21	L 22	L 23	Sensory application	Review	Final exam (early)	Final exam



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W 1		W 2		W 3		W 4		W 5		W 6		W 7	
L 1	L 2	L 3	L 4	L 5	L 6	L 7	L 8	L 9	L 10	Exam 1	Cancelled	L 11	

No TopHat

Quiz 1

Quiz 2

Quiz 3

Quiz 4

With TopHat

W 7	W 8		W 9		W 10		W 11		W 12		W 13		W 14		W 15		W 16	
L 12	L 13	L 14 & L 15	L 16	L 17	L 18	L 19	Exam 2	L 20	No class	L 21	L 22	L 23	Sensory application	Review	Final exam (early)		Final exam	

Quiz 5

Quiz 6

Quiz 7

Quiz 8

Survey open

## QUIZ

Ten multiple-choice questions in each quiz

- 6 questions--lower level of thinking

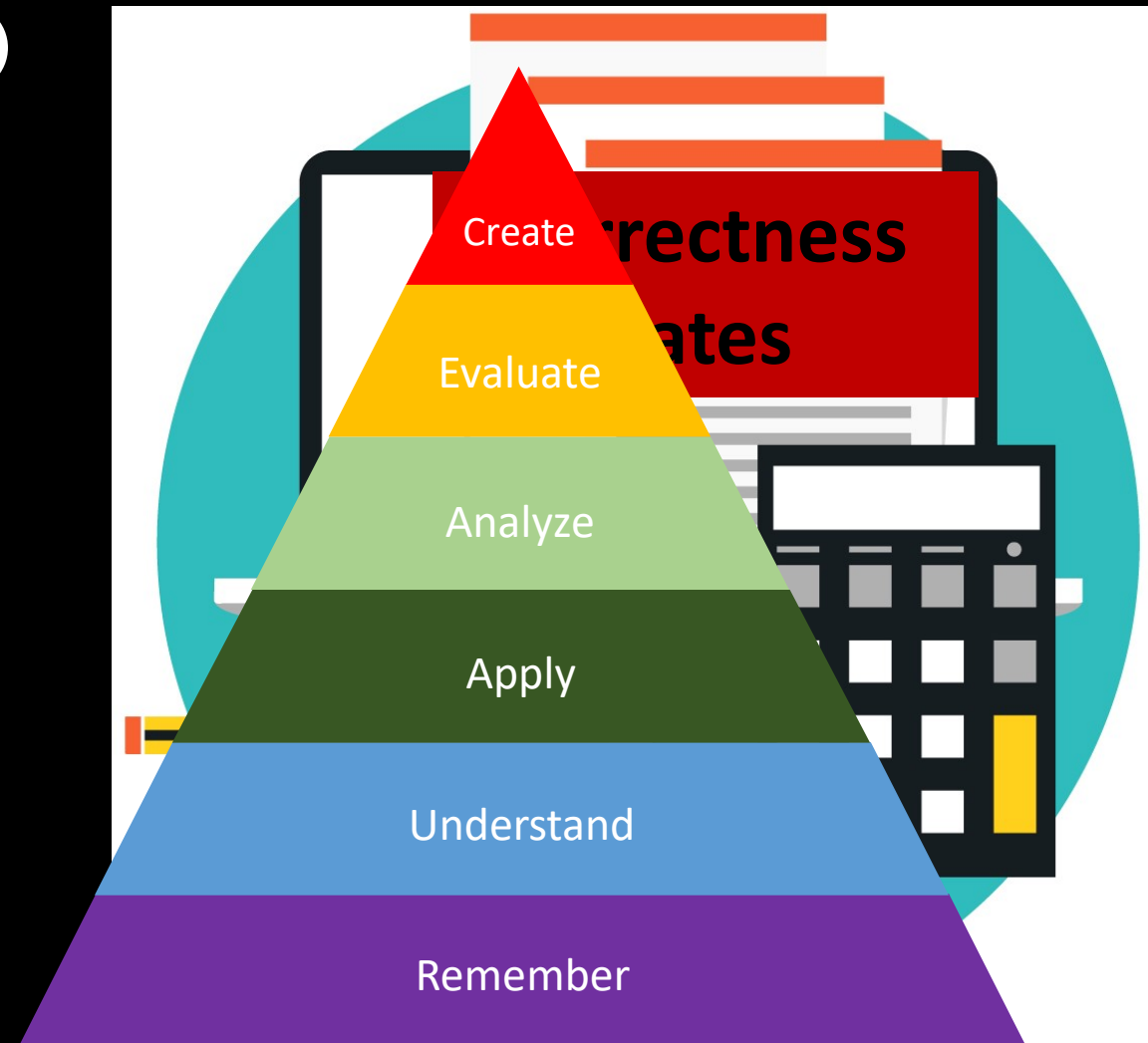
Example: The world's major cork stopper producing country is: B

- A. Chile
- B. France
- C. Portugal ✓ **0pt**
- D. South Africa

- 4 questions--higher level of thinking

Example: As a producer of Port wines in the city of Oporto, Portugal you would be likely to contract with vineyards located in: B

- A. Bordeaux
- B. Duoro ✓ **2pt**
- C. Stellenbosch
- D. Vinho Verde



- IBM SPSS Statistics (IBM Corporation)
  - 2 x 2 factorial design
  - Repeated measures analysis of variance with a Greenhouse-Geisser adjustment
- Significance level was defined as  $p > 0.05$
- Effect size (Cohen's  $d$ )
  - Large: Cohen's  $d$  value is 0.8
  - Medium: Cohen's  $d$  value is 0.5
  - Small: Cohen's  $d$  value is 0.2.



Table 1 The average and standard deviation of 39 students' correctness rates on the upper and lower level questions in eight quiz on the content which was delivered with/without TopHat™

Correctness rates	Content delivered without TopHat™	Content delivered with TopHat™	All content
Upper level questions	0.84±0.10	0.88±0.08	0.86±0.08
Lower level questions	0.77±0.13	0.79±0.12	0.78±0.12
All questions	0.82±0.10	0.84±0.09	N/A

$p=0.207$   
 Cohen's  $d=0.206$   
 $p=0.016$   
 Cohen's  $d=0.408$   
 $p=0.432$   $p=0.016$   $p<0.001$   $p<0.01$   
 Cohen's  $d=0.600$   $d=0.436$   $d=0.919$   $d=0.971$

## Students' perception

- impact of CPPRS on learning
- ease of use of CPPRS

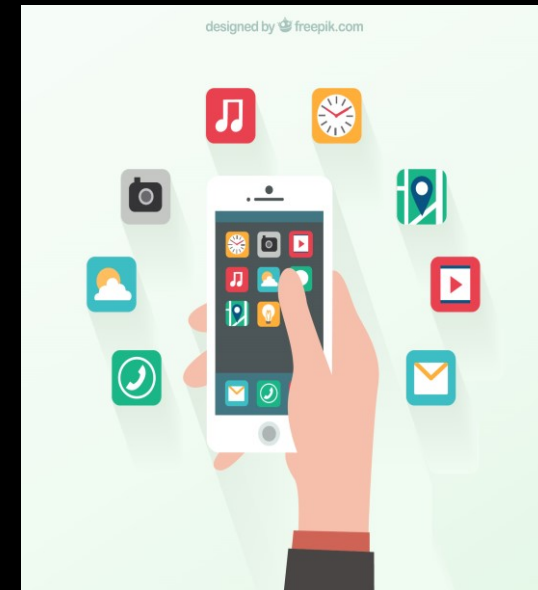


Options	Strongly agree	Agree	Somewhat agree	Somewhat disagree	disagree	disagree
Points	6	5	4	3	2	1



## Responses from 28 students

- ALL students have a smart phone
- 21 out of 28 students used their cell phone primarily
- Gender: 6 female and 22 male students
- Age: 21 to 26 years ( $21.8 \pm 1.25$ )
- Ethnicity: white (1 being Hispanic or Latino)
- Majors:
  - 8 from Food Science and Technology
  - 3 from Horticulture major
  - 2 from viticulture minor
  - 15 from various majors



**Table 1. Students' perception on using TopHat™ from the survey (28 responses)**

Survey questions	Average score± standard deviation
<b>Theme 1: the impact of using TopHat™ on learning</b>	<b>4.52±0.99</b>
Question 1: Using TopHat™ improved my learning.	4.46±1.20
Question 5: Using TopHat™ made me think more during class.	4.82±1.02
Question 9: Using TopHat™ increased my focus on the class.	4.29±1.15
<b>Theme 2: easy of use</b>	<b>5.04±0.58</b>
Question 2: Using TopHat™ was easy.	5.18±0.82
Question 6: Using TopHat™ was common sense.	4.93±0.60
Question 10: Using TopHat™ was straightforward.	5.00±0.77

Cell phone-based personal response system, such as TopHat, offers a strategy for turning ubiquitous phones into useful tools that can facilitate a collaborative teaching and learning environment.

- Dr. Amanda Stewart
- Dr. Peter Doolittle
- Dan Steger
- Graduate Teaching Scholar program in College of Agriculture and Life Sciences at Virginia Tech
- NACTA-CHS Foundation Travel Grants

**Thank you !**

