Mar 13th, 2:00 PM - 2:45 PM

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Maria-Isabel Carnasciali
Georgia Institute of Technology, maria.carnasciali@cetl.gatech.edu

Chaohua Ou
Georgia Institute of Technology, chaohua.ou@cetl.gatech.edu

Tristan Utschig
Georgia Institute of Technology, tutschig@kennesaw.edu

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Recommended Citation
Carnasciali, Maria-Isabel; Ou, Chaohua; and Utschig, Tristan, "Investigation of Student Perceptions about Learning in Large Courses Utilizing PRS" (2009). SoTL Commons Conference. 110.
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Investigation of Student Perceptions About Learning in Large Courses Utilizing PRS

Maria-Isabel Carnasciali, Ph.D.
Chaohua Ou, Ed.D.
Tristan T. Utschig, Ph.D.

Center for the Enhancement of Teaching and Learning
Georgia Institute of Technology
Atlanta, GA

Session Plan

• Background PRS survey
• Survey Context
• Survey results
• PRS value poll
• Participant discussion
• Share results
• Closure and session assessment
Question 1

I have used clickers to teach (or in teaching)...

1. Never.
2. 1-2 times
3. 3-7 times
4. Regularly for 1-2 semesters.
5. Extensively.

Question 2

I have used clickers as a participant ...

1. Never.
2. 1-2 times.
3. 3-7 times.
4. Regularly for 1-2 semesters.
5. Extensively.
This study was conducted using core STEM courses at a large technical university

- GA Tech Students
- Primarily freshman
- Required core classes for STEM majors
  - Chem, Bio, Physics, Computing
- Approximately 100-200 students/class

Our survey measured student perceptions about 11 aspects of PRS use.

- 1st: Learning Style Q’s and gender demographics collected
- 2nd: Q’s regarding student perceptions
  - paying attention
  - active involvement
  - thinking deeply
  - thoughtful responses
  - time value
  - learn from peers
  - exam performance
  - remembering content
  - assignment performance
  - class enjoyment
  - widespread use
Demographics

• Collected 427 valid responses
• 239 males (56%)
• 188 females (44%)
• Average GPA
  – Males 3.2 (StdDev 0.62)
  – Females 3.3 (StdDev 0.57)

Kolb’s Learning Styles

• Type 1 (concrete, reflective)
  • n = 34 (19 males, 15 females)
• Type 2 (abstract, reflective)
  • n = 239 (132 males, 107 females)
• Type 3 (abstract, active)
  • n = 97 (56 males, 41 females)
• Type 4 (concrete, active)
  • n = 56 (31 males, 25 females)
Average student perceptions of PRS value were neutral to positive.

Q30: I do better in exams in classes that use PRS than in traditional lecture classes.

Q32: I do better in assignments in classes that use PRS than in traditional lecture classes.
Q28: I enjoy interacting and discussing questions with other students.

Q29: Discussing PRS questions with other students in the class helps me better understand the subject matter.

Q31: I remember [more] after a class that uses PRS than after other classes.

We performed an ANOVA statistical analysis to look for significant differences.

Based on …

1. learning styles
2. gender
3. interaction between learning styles AND gender

• learning enhancement
• learning satisfaction
• paying attention (3)
• active involvement (3)
• thoughtful responses
• time value
• enjoy peer discussion (2)
• learn from peers (1,3)
• exam performance
• remembering content
• assignment performance
• class enjoyment (3)
• Widespread use

Red $p < .05$
Blue $p < .1$
Using a PRS helps me pay attention in lectures.

Learning style and gender combinations w/ PRS appear to impact student attention.

Learning style and gender combinations w/ PRS also may impact student engagement.
Males report a higher enjoyment of the PRS format than females.

Learning style alone (or in combination with gender) affects student understanding of lecture content in PRS classes.
Our comment coding procedure involved several stages.

- Open coding by individual clauses
- 3 independent thematic analyses
- Synthesis of independent results into unified list
- Re-coded using combined list
- Performed frequency distribution analysis among final list of themes
Top student comments about the strengths of the PRS system addressed engagement, working on examples, and enhancing their learning.

- “PRS questions get students involved with the lecture, helping them to focus and pay attention.”

- “They give an opportunity to see what kind of questions can be asked over the material we are covering.”

- “It gives richer learning experience.”
Top student comments about improving the PRS system addressed grades and frequency of use.

- “I would not do tests or quizzes on the PRS but solely use them as class participation. I don’t like the idea that people who come and try the quiz and get it wrong get the same score as people who never come at all.”

- “One of my classes only use PRS system. I think using too much PRS system does not really help.”

- “More questions”. “Encourage more classes to do it”.

Other student insights about the PRS system included financial and technical issues.

- “It … costs too much money, I am broke”.

- “Frequent technical difficulties eat into class time. Professors will continue to mess with it up to a half hour into class before leaving it alone.”
Question 3

Which part of our study summary did you find most valuable?
1. Study context / descriptions.
2. Statistical analysis (qualitative results).
3. Thematic coding (qualitative coding).
4. All of the above.
5. None.

Discussion Questions

1. Through what mechanisms might PRS most effectively improve student learning?
2. What are likely shortcuts that might be used in creating PRS items that will reduce its value as a learning tool?
3. Why do you think these gender and learning style differences come up, and how can they best be addressed?
Can you please provide us some constructive feedback about this session on your notecard?

1. What did you find most valuable from our session?

2. What might we have done to provide you more value in this session?

Thank You!