Using a Web-based Classroom Interaction System to Enhance Student Learning

Joseph Beuckman
&
N. Sanjay Rebello
Kansas State University
PHYSICS DEPARTMENT
Physics Education Research Group

Supported in part by HP Technology for Teaching Grant

Classroom Interaction Systems (slide 1 of 2)

- PRS (Personal Response System)
  - Multiple-choice questions
  - Instructor feedback
  - No student feedback

2

Classroom Interaction Systems (slide 2 of 2)

- PDA (Personal Digital Assistant)
  - Various question types
    - Multiple choice
    - Short answer
    - Ranking tasks
    - Likert scale
  - Question sequences
    - Branched (answer-based)
    - Randomized set
  - Two-way interaction
    - Feedback to/from students

K-State InClass Web-based delivery system

3

Research Questions

- Did course performance (as measured by course grades) improve with PDAs relative to PRS?
- Did more frequent users of PDAs perform better than less frequent users?
- What were students' attitudes toward the impact of PDAs on their learning?

4

Research Context & Participants

- Elementary Education Majors
  - Very few have experience with technology
- Classroom Interaction System
  - Fall 2003 (N=63) PRS
  - Fall 2005 (N=87) PDA
- Pedagogy
  - Peer Instruction during lecture
  - Learning Cycle in Activities Center

5

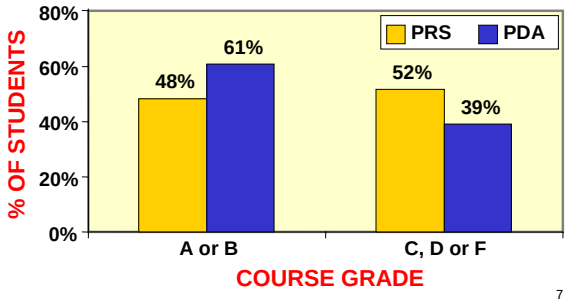
Data Sources

- Course grades with PRS: Fall 2003 (N = 64)
- Course grades with PDA: Fall 2005 (N= 87)
- Data logs of PDA use: Fall 2005 (N=87)
- Student Survey: Fall 2005 (N=87)

6

Course Performance: PRS vs. PDA

Course GPA with PDA greater than with PRS ($p<0.036$)

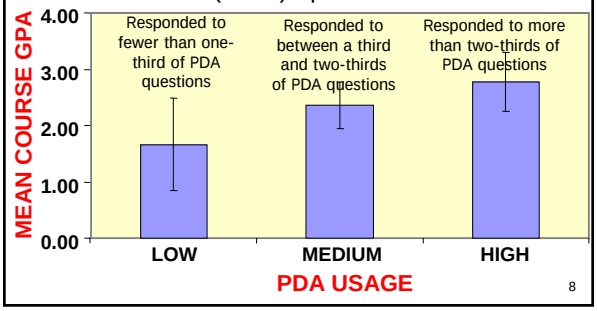


7

Course Performance vs. PDA Use

Students using PDAs more often scored higher grades

ANOVA (N=87) : p-value < 0.030



8

Student Survey Ratings

Percent who agreed or strongly agreed

- Responding to questions in class using the hand-held computers was useful to my learning (63%);
- Interacting with other students while discussing the questions in class was useful to my learning (61%);
- The hand-held computers help the instructor clarify what we do not understand (79%);
- This experience with hand-held computers has made it more likely that I will use this type of technology in my own teaching (65%).

9

Conclusions

- Did course performance improve with PDAs relative to PRS?
  - Yes. Statistically significant improvement in course grades with PDA vs. PRS for same course, similar students.
- Did more frequent users of PDAs perform better than less frequent users?
  - Yes. More frequent users of PDAs secured higher course grades than less frequent users.
- What were students' attitudes toward the impact of PDAs on their learning?
  - A majority of students strongly or very strongly agreed that PDAs positively impact their learning.

10

Limitations & Future Work

- Correlation is not causality
  - PDA use correlation with higher performance does not imply PDAs cause higher performance.
- Investigate how PDAs are used, not just how often they are used
  - Certain ways of using PDAs may be more beneficial to student learning than others.

11

THANK YOU

For information please contact

srebello@ksu.edu

12