

**2006 Teaching
and Learning
Symposium**

Interactive Classroom:

Why Use a Classroom Response System

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The Passive Classroom

- Students listen to traditional lecture and take notes (lots of variations on this theme).
 - Low attendance
 - Little knowledge gained – no long term gain
 - No long term effect on students' misconceptions
 - No conceptual understanding
 - Student's inclination to memorize algorithms is reinforced.
 - Disinterested students disappear in the crowd.

Active Classrooms

- Overview - Case Studies (L,S)
- Cooperative Groups (S)
- Socratic Dialogue Inducing Labs (Lab)
- Interactive Demonstrations (L,S)
- Peer Instruction / Think-Pair-Share (L,S)
- Tutorials / Workshops (S)
- Etc.

The Interactive Classroom

Things you can do...

- Class Participation
- Give Reading Quizzes
- Check understanding (feedback)
- Pre- and Post-Testing
- Peer Instruction / Think-Pair-Share
- Interactive Demonstrations
- etc.

The Interactive Classroom

Evidence That It Works

- Richard Hake (Indiana U.- Bloomington)
 - 6542 student study comparing traditional versus interactive lectures
 - 62 introductory physics courses
 - Pre- and Post-Instruction Testing
 - Measured Normalized Gain

$$\langle g \rangle = \frac{S_{Post} - S_{Pre}}{100 - S_{Pre}}$$

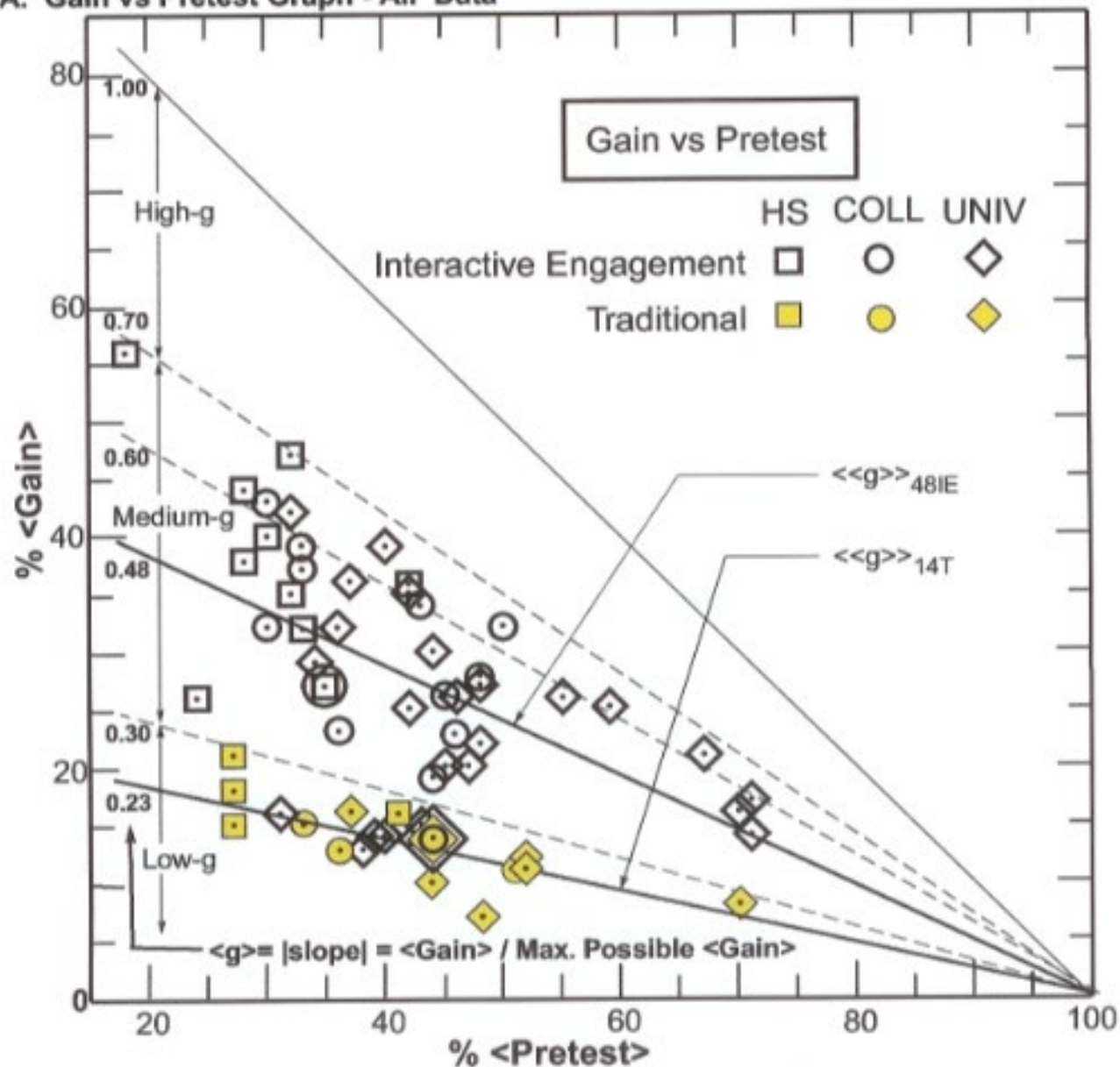
Richard Hake
American Journal
of Physics v66
p64-74 (1998)

Traditional
 $\langle \text{gain} \rangle = 0.23 \pm 0.04$

Interactive
 $\langle \text{gain} \rangle = 0.48 \pm 0.14$

III. CONCEPTUAL TEST RESULTS

A. Gain vs Pretest Graph - All Data



Benefits Others have Seen

- Interactive engagement shows a 2σ improvement in students learning mechanics over traditional lectures.
- Substantial impact on pre- versus post-test results in physics, astronomy, economics, biology, chemistry, computer science, and engineering
- Even more effective in conjunction with methods that induce thinking before lecture – Just in Time Teaching (JITT).

Benefits I have Seen

- Students read the textbook in detail.
- Class Overall Averages up
 - (75-78 % versus 67-70%)
- Attendance typically 85+%
- Student's interest level in science increases...many students decide to take more courses in physics as a result.
- Four other colleagues in physics observe the same benefits.

What do students think?

What is	What is your overall impression of using the classroom response system?			in when we
A	A	14%	Love it.	
	B	60%	Like it.	
B	C	19%	It's OK.	
C	D	3%	Do not think it's useful.	
	E	3%	Hate it.	