



# **When One Instructor's Interactive Classroom Activity is Another's Lecture: Communication Difficulties Between Faculty and Education Researchers**

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# Introduction

## Previous Work (Reported PERC '04)

- **Instructors often have PER-compatible beliefs, but traditional practices.**

## Current Focus – “interactivity”

- **Instructor views and self-described practices**
- **Comparison with PER**



# Current Study

## Data: Open-Ended Interviews

- Three instructors at three institutions
  - Teaching lecture-based introductory physics
  - Tenured
  - No formal connections with PER
  - Thoughtful, reflective, well-respected
- ➔ This type of instructor is most likely to be influenced by PER

## Analysis:

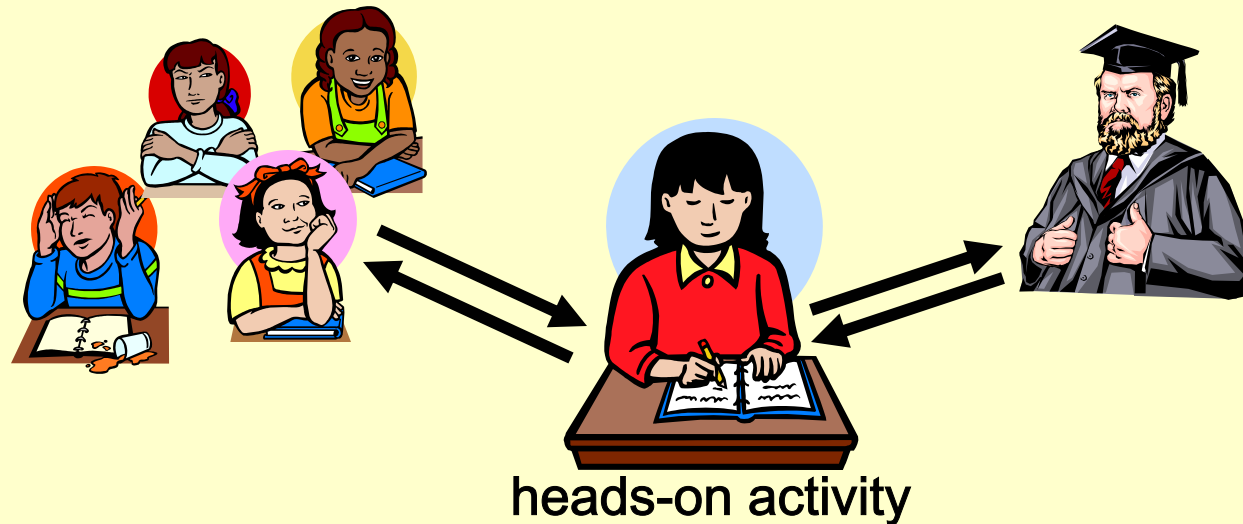
1. General descriptions of “interactive” instructional practices.
2. Detailed descriptions of “interactive” instructional practices.



# PER View of Interactivity

## “*Interactive Engagement*”

Instructional methods “designed at least in part to promote conceptual understanding through interactive engagement of students in heads-on (always) and hands-on (usually) activities which yield immediate feedback through discussion with peers and/or instructors.” (Hake, 1998)



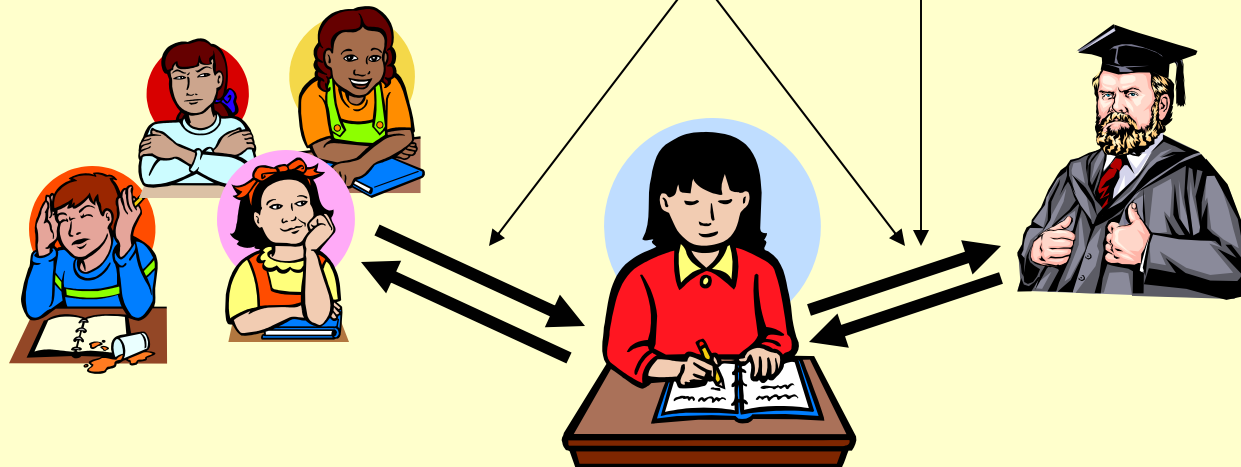


# Instructors' view of Interactivity

All three instructors value interactivity and think of their classes as interactive.

Three ways instructors talked about interactivity:

- My class is more like a discussion than a lecture.
- I ask a lot of questions.
- I serve as a coach or guide more than a source of information.



heads-on activity



# General Descriptions

Instructors' general descriptions were remarkably similar to one-another. These are examples for each aspect of interactivity.

Terry	Gary	Mary
<b>My way of teaching is that they [the students] are interacting with me and other students in the class.</b>	<b>So basically, in my lecturing style what I'm trying to do is, I'm continually trying to pose questions and problems and making them think about it.</b>	<b>I work through problems with them instead of show them how to do it I have them tell me how to do it, so I would say that it tends to be more interactive.</b>

**“Class is a discussion.”**

**“I ask a lot of questions.”**

**“I'm a guide.”**



# Based on General Descriptions...

**we might conclude that these instructors:**

- 1. Basically agree with PER on what it means to have an “Interactive” class**
- 2. Have incorporated these PER ideas of interactivity into their instructional practices**



**We can congratulate ourselves on a job well done.**



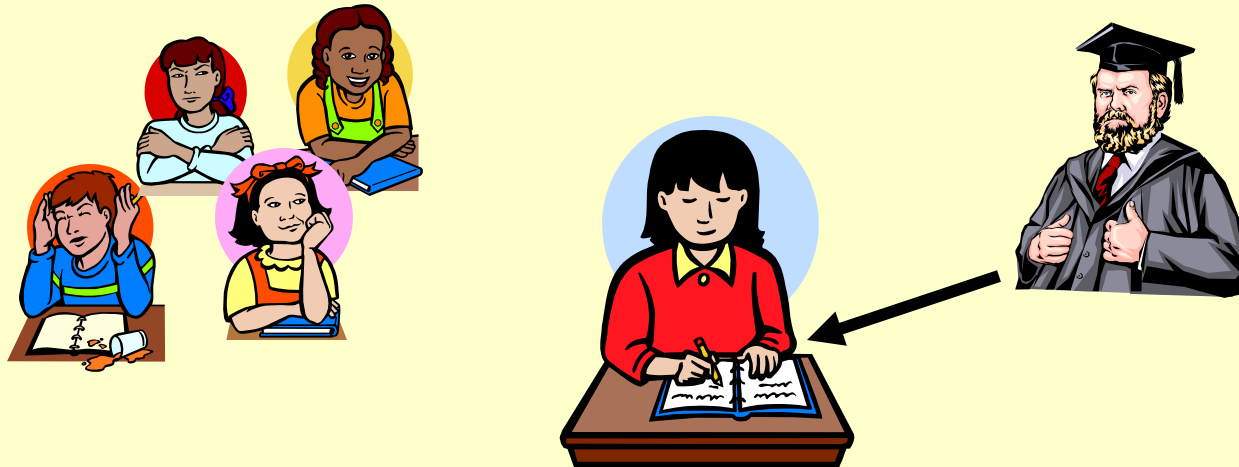
# Detailed Descriptions

Terry	Gary	Mary
<p>My way of teaching is that they [the students] are interacting with me and <b>other students in the class.</b></p> <p><b>I find students very reluctant to talk to each other during class,</b> they much prefer to talk ... with me and I stay out in front of the bench and not behind the bench and I wave my hands at them all the time, I mean you know it's a very interactive class.</p>	<p>So basically, in my lecturing style what I'm trying to do is, I'm continually trying to pose questions and problems and <b>making them think about it.</b></p> <p>So what I've decided works better for me, is <b>I ask lots of rhetorical questions...</b> So, I'm also asking lots of rhetorical questions where I may say, well don't answer this but what's thus and so, I just want them to think about it a little bit.</p>	<p>I work through problems with them instead of show them how to do it <b>I have them tell me how to do it,</b> so I would say that it tends to be more interactive.</p> <p><b>[Student groups solve problems on white boards and then]</b> I choose three or four representative ones and we talk about them as a whole group. <b>What were they trying to do? Why isn't this a valid approach?</b></p>



# Common Differences in the Details

- **My class is more like a discussion than a lecture.**
  - No student-student interaction. Few students participate. (Terry, Gary)
- **I ask a lot of questions.**
  - Rhetorical questions or questions that all students answer correctly (Terry, Gary, sometimes Mary)
- **I serve as a coach or guide more than a source of information.**
  - Non-individualized “Coaching”. Instructor does thinking for student(s). (Gary, Terry unclear)





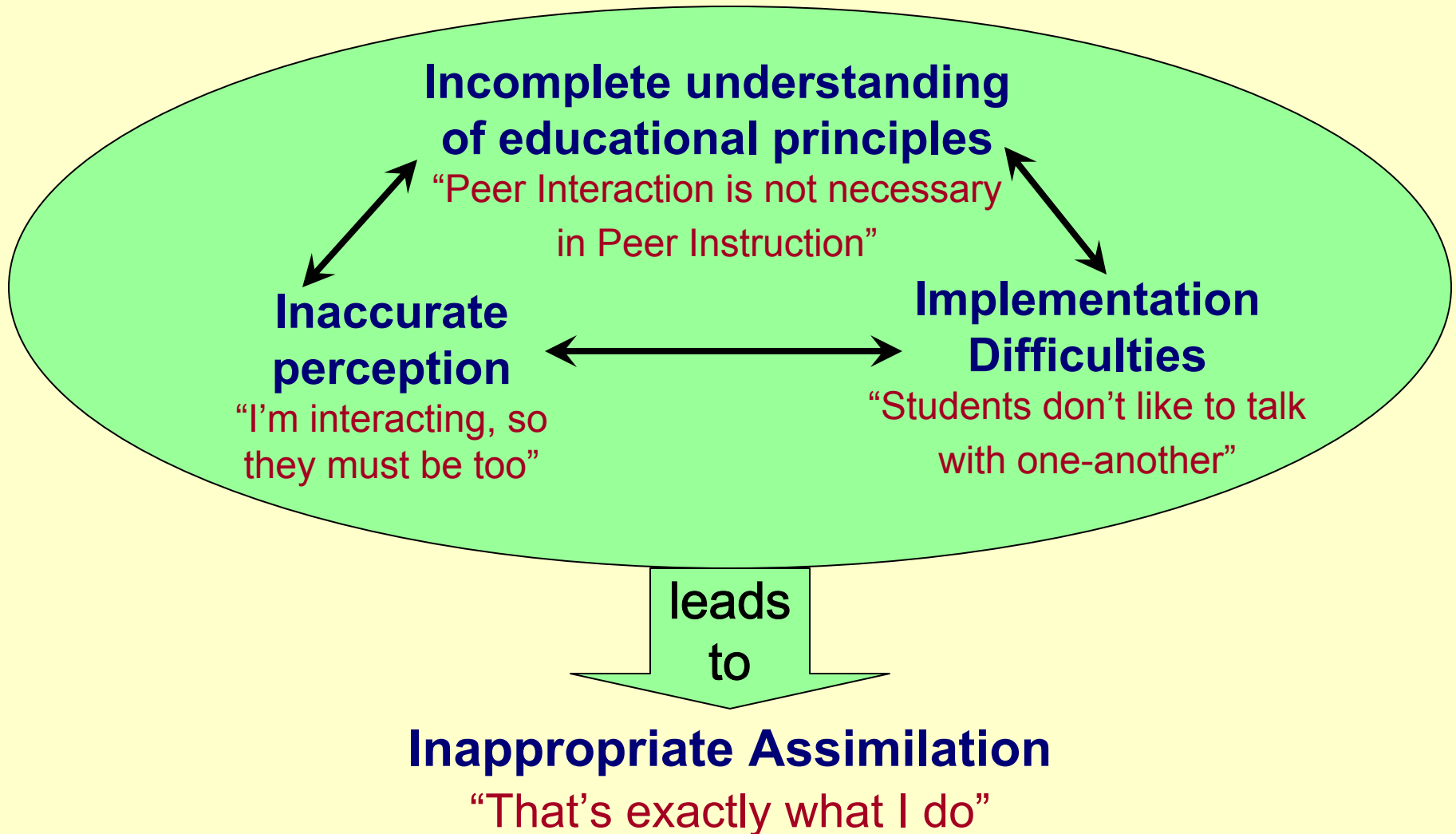
# **Inappropriate Assimilation: A Common Phenomena**

**“Classroom teachers may incorporate new reform strategies into their discourse about teaching practice and other activities without necessarily integrating those strategies into their actual practice.” (Honig & Hatch, 2004, p. 24)**

**Teachers and district policymakers implementing standards-based math and science curricula often overinterpret reform ideas as similar to some of their existing ideas. (Spillane, 2004 p. 79)**



# Our Hypothesis





# Inaccurate perception – “I’m interacting, so they must be too”

**When teachers believe that they are teaching interactive science lessons:**

- the teacher is doing most (~90%) of the talking. (Brown and Atkins, 1988; Black, 1989)
- when students are talking, only a small minority (~10%) of the students participate. (Davis, 1993)

**Compared to Observations, Faculty tend to: (O'Connor, 2004)**

- underestimate the pace of instruction
- overestimate number of students who participated
- overestimate diversity of participation (women, minorities, etc.)



# Incomplete Understanding of Educational Principles

## **“Peer Interaction is not necessary in Peer Instruction”**

(Otero & Nathan, 2004)

**Education students with “blank slate” model of cognition elicited student prior knowledge but “few connected this information to their instructional plans”**

(Henderson, 2004)

**College instructor who valued group work attempted to implement but did not attend to the 5 principles of cooperative grouping (Johnson et. al., 1991). Many of the groups did not function well.**



# Implementation Difficulties

**“Students don’t like to talk with one-another”**

## **Students often resist group work**

- RPI (Cummings & Marx, 1999)
- MIT (Belcher, 2003)
- “I find students very reluctant to talk to each other during class, they much prefer to talk with me.” (Terry)



# The good and the bad

## Faculty use of the language of interactivity

### → we can infer they

- have some exposure to education research related to interactive engagement
- value interactivity
- want to think of their classes as interactive

## But their practice is often not particularly interactive

### → we can infer they

- have difficulty implementing PER-compatible interactivity
- do not entirely understand basic principles of PER-compatible interactivity



# Big Picture

**Similar discrepancies were found in other areas.**

## **For example: problem solving**

- General descriptions of practice focused on developing students' thinking and problem-solving skills.
- In detailed descriptions of practice, “problem solving” emphasized getting correct answers to familiar problems.



# Implications

## Improve communication

- We need to be more specific in the words we use – instructors may not understand and use them in the same way we do.
- We need to report underlying reasons/goals/ideology for reformed practices
  - Empower instructors to personalize PER-compatible instruction for their unique situations.

## Develop tools to improve instructor self-perception

- e.g., “Wait time” studies
- Similar tools are needed in other areas.



# Implications

## **An opportunity to promote real change**

- **Create cognitive conflict**
  - **Help faculty to acknowledge/understand/confront contradictions between their beliefs and practice.**
- **Acknowledge barriers to change**
  - **How to overcome student resistance to group interaction? PER has some ideas.**
  - **What other barriers are there? How can we overcome them?**



more information: <http://homepages.wmich.edu/~chenders>

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