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

Charles Henderson
Western Michigan University
http://homepages.wmich.edu/~chenders/

Melissa H. Dancy
University of North Carolina - Charlotte
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.
### General Descriptions

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

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<th>Terry</th>
<th>Gary</th>
<th>Mary</th>
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<td>My way of teaching is that they [the students] are interacting with me and other students in the class.</td>
<td>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.</td>
<td>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.</td>
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“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.
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| **My way of teaching is that they [the students] are interacting with me and other students in the class.**  
I find students very reluctant to talk to each other during class, 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. | **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.**  
So what I’ve decided works better for me, is I ask lots of rhetorical questions… 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. | **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.**  
[Student groups solve problems on white boards and then] I choose three or four representative ones and we talk about them as a whole group. **What were they trying to do? Why isn’t this a valid approach?** |

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**Western Michigan University**
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

Incomplete understanding of educational principles

“Peer Interaction is not necessary in Peer Instruction”

Inaccurate perception

“I’m interacting, so they must be too”

Implementation Difficulties

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

leads to

Inappropriate Assimilation

“That’s exactly what I do”
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
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?
References

Belcher, J. W. (2003). Improving Student Understanding with TEAL. The MIT Faculty Newsletter, 16(2), 1,8-11.


