

# Responding with a Click: Lectures Remixed

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## Abstract

Instructors teaching large-enrollment courses can use classroom response systems to vary the traditional 50- to 75-minute lecture format by posing strategically-placed questions to students. Students submit their responses in real-time, with software or, more typically, with clickers—dedicated handheld devices. Questioning methods that can be easily implemented with clickers can increase participation, engagement, and, beyond these instructional desiderata, the quality of student learning. This session demonstrated some of these strategies, with audience participation.

## Outline/ Presentation Notes

- 1. Educators I've sampled.** In keeping with the remixing theme of the conference, I'd like to recognize the educators (artists) I've sampled, whose work is listed in the Bibliography printout you each have:
  - Derek Bruff, Vanderbilt University
  - Jane E. Caldwell, West Virginia University
  - Clyde Freeman Herreid, SUNY-Buffalo
  - Will Thalheimer, independent researcher
  - University of North Carolina–Chapel Hill (UNC–CH) faculty, instructors, and students
- 2. Importance of questions.**
  - Posing a question gives emphasis.
  - *Emphasis* attracts *attention*.
  - Attention lays groundwork for learning.
  - Questions frame inquiry.
- 3. Paying attention to a lecture.** Our first clicker question draws on your personal experience, a common questioning strategy that helps students find material relevant:
  - When listening to a lecture or presentation, about how many minutes does it take before you have difficulty paying attention?
  - Results: 5 min – 2; 7 min – 1; 15 min – 1; 20 min - 1; 25 min – 1.
  - In Middendorf and Kalish's (1996) review, times range from 5 to 20 minutes.
- 4. The appeal of clickers.**
  - Equalizes participation
    - All students can answer at the same time.
  - Encourages candid response
    - Answers can be anonymous.
  - Transforms a large class into a small one
    - Many-to-one feedback.
- 5. Prompt feedback.**

- One of Chickering and Gamson's (1987) Seven Principles for Good Practice in Undergraduate Education
  - Aids effective formative assessment
    - Especially for challenged learners
  - Otherwise difficult to achieve, regardless of course size
- 6. Procedural questions.** Screenshot from Derek Bruff's Webcast. Calculus question that asks students to identify the incorrect step in solving a specified equation.
- 7. Conceptual questions.** Our second clicker question addresses conceptual knowledge in the domain of probability and is taken from Derek Bruff's Webcast:
- A friend calls to say that she's having twins. Assume that she's not having identical twins. Which of the following is more likely?
    - Twin boys (0)
    - Twin girls (1)
    - One girl and one boy (2)
    - All are equally likely (4)
  - If this were an actual class, we might proceed as Bruff does in his class, and, after the first round of polling, have students pair up and defend their answer choices.
  - This is an example of counter-intuitive conceptual knowledge, and this question activity sets up what Schwartz and Bransford (1998) refer to as "A Time for Telling."
- 8. Case studies.**
- Traditional method in law, medicine, and business
  - Clyde Freeman Herreid, SUNY-Buffalo: science education
    - Interrupted cases, directed cases
  - UNC-CH Student Government
    - Event on racism. Students watch video vignettes and are asked questions about racial stereotyping.
- 9. State of research.**
- No meta-analysis of response system research.
  - Caldwell (2007) summarizes research and best practices.
- 10. Caldwell's conclusions.**
- Use has neutral or positive effects when incorporated into traditional lecture courses.
  - Use has stronger positive effects in courses in which active learning plays a large role.
  - Effective questions are tied to learning objectives.
- 11. First steps in lecture redesign.**
- Using questions to check students' comprehension of lecture materials
  - Using questions to encourage students to read assigned materials in advance of class
    - Both approaches tend to emphasize recognition/recall of factual information.
- 12. Pretests and posttests.** Useful for class and for possible contribution to scholarship of teaching and learning
- Baseline reading of students' knowledge or understanding
  - Instructional intervention
    - Delivered lecture, video case study
    - Learning activity
  - Assessment of intervention
    - Benefit of reinforcement

### 13. Designing effective questions.

- Match questions with learning objectives.
- Work with colleagues inside and outside of your discipline.
- Use teaching and learning centers' resources for designing effective multiple choice questions.
- Consult teaching journals in your discipline.

14. [Final question that illustrates the benefits of learning more about question design: looking for grammatical cues that give away the correct response.]

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