Clickers in the Classroom

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Agenda

• Philosophical/Pedagogical Background
• Prior Research
• Research @ Iowa
• Demonstrations
To get us started...

• Press and hold “menu” to turn it on
• Verify that screen says “Qwizdom”

• To select a response, use the keypad
• To submit final answer, press two arrow key to transmit
• Notice that all we have is clickers, USB-linked receiver, and software
To get us started…

What experience have you had with personal response systems (clickers)?
A. Never seen or used clickers before today
B. Seen them briefly in a demo or on TV
C. Seen them in use in a classroom
D. Used them as student or instructor

*Remember to push two arrow keys to submit*
Background

- Technology has no effects on learning simply by its presence in the classroom.

- How technology is used matters:
  - Stimulate critical thinking?
  - Motivate attendance, time on task?
  - Disrupt thought process?
  - Distract from material to be learned?
Background

In many large lectures:

No overt response = Little mental processing

A possible solution:

Technology that requires overt responses can be used to encourage and support mental processing and provide feedback
Background

“Learning gains reported in this study were not the result of technology alone. Rather these gains were the result of the application in class of teaching and learning principles centred on active engagement and dialogue which were supported by... technology.”

(Nicol & Boyle, 2003, p. 472, emphasis mine)
Prior Research

• Crouch & Mazur (2001) “Peer Instruction”
• Results from 1990 to 1997
• Basic process:
  – Concept question
  – Individual thinking and response (clicker)
  – Feedback
  – Peer discussion
  – Individual revised response (clicker)
  – Lecturer summarizes
Prior Research

• Nicol & Boyle (2003) Comparison Study
  – Compared clickers for “peer instruction” or “class-wide discussion”, N = 114
  – 92% agreed “discussing PRS questions with other students helps me to understand…”
  – 40% agreed “discussion with a microphone is an important aspect of a PRS class…”

  – Concluded preference is for peer instruction.
Prior Research

• Draper & Brown (2004) Larger Study
• Psychology, Philosophy, Statistics, etc.
• Question regarding “net value”
  – Ex: Statistics 58% “definitely benefited,” and 38% “benefits outweigh disadvantages”
• Concluded most promising approaches:
  – Contingent Teaching
  – Interactive Engagement
<table>
<thead>
<tr>
<th>Question</th>
<th>‘05</th>
<th>‘06</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clicker activities helped to keep my attention</td>
<td>68%</td>
<td>72%</td>
</tr>
<tr>
<td>Clicker activities were generally a distraction</td>
<td>12%</td>
<td>9%</td>
</tr>
<tr>
<td>Clicker activities helped me to feel involved</td>
<td>72%</td>
<td>75%</td>
</tr>
<tr>
<td>More likely to attend a lecture that uses clickers</td>
<td>54%</td>
<td>61%</td>
</tr>
<tr>
<td>Clicker activities and feedback helped me learn</td>
<td>57%</td>
<td>58%</td>
</tr>
<tr>
<td>Overall, the clickers are a worthwhile addition</td>
<td>70%</td>
<td>77%</td>
</tr>
</tbody>
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Introduction to Management, Spring 05 (N = 474)
Introduction to Management, Spring 06 (N = 350)
Contingent Teaching Demo

Which of the following questions would you most like to hear answered right now?

A. How much time would it take for me to develop questions and prepare the software?
B. How much time will it take in each class to pose questions and allow discussion?
C. How much will these cost the students?
D. What type of support can the Center and Academic Technologies offer to help me implement these in my classes?
Clicker Use in Physics

• Concept questions
  – Should be short, isolating a single concept
  – Ideally ~40% correct first time, ~70% correct after discussion
  – Use 3-4 per lecture
  – Very powerful when tied to a demonstration

• Reading Quizzes
  – Given randomly roughly every 2 weeks
  – Don’t require deep understanding – just awareness of the most basic content
  – Provide some bonus points for final exam
Which of these laws is not one of Newton’s laws?

1. For every action there is an equal and opposite reaction.
2. $F = ma$.
3. All objects fall with equal acceleration.
4. Objects at rest stay at rest, etc.
Two identical balls roll down two different tracks with the same starting and ending heights. The first track is straight and the second track curves up and down and is longer. At the end of each track each ball flies off the track horizontally. For which track does the ball fly farther?

1. The straight track.
2. The curvy track.
3. Both tracks are the same.
4. Insufficient information - the mass of the ball is needed.