LectureTools: A Powerful Web-Based Alternative to Clickers

Presented by
Perry Samson — samson@umich.edu
My Agenda

- Demonstrate what LectureTools does
- Show what’s been learned
- Guide you to set up your own course
- Where’s this going?

Answer Questions
• Demonstrate what LectureTools does
• Show you what’s been learned
• Guide you to set up your own course
• Offer opportunities to present a lecture
QuickTime™ and a MPEG-4 Video decompressor are needed to see this picture.
QuickTime™ and a MPEG-4 Video decompressor are needed to see this picture.
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### Student's View :: Social Networking

#### FRONT OF CLASS

<table>
<thead>
<tr>
<th>Paul Schmidt</th>
<th>Jennifer Gregory</th>
<th>Sahil Saluja</th>
<th>Leslie Shellito</th>
<th>Sarah Ward</th>
<th>Connor Field</th>
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<tr>
<td>Lauren Thams</td>
<td>Megan DeShong</td>
<td>Marsheda Ewulomi</td>
<td>Heather Lucier</td>
<td>Michaelene Dye</td>
<td>Sarah Bush</td>
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<td>Steven Anderson</td>
<td>Ryan Leach</td>
<td>Elaina Peterson</td>
<td>Adrienne Reed</td>
<td>Shane Malett</td>
<td>Jamie Ticknor</td>
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<td>Teya McCockran</td>
<td>Martha Stortz</td>
<td>Heather Dorer</td>
<td>Veronica Cetnar</td>
<td>Britney Kman</td>
<td>Mark Beaudry</td>
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<td>Brian Trurnstein</td>
<td>Meredith Rogan</td>
<td>Albert Ong</td>
<td>Elizabeth Peters</td>
<td>Michael Hultz</td>
<td>Rebecca Siegel</td>
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<td>Robert Stevenson</td>
<td>Dillon Mehrberg</td>
<td>Neesha Sarkunaseelan</td>
<td>Sylvia Moh Sze Tan</td>
<td>Adam Richards</td>
<td>Michelle Weatherdon</td>
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<td>Meredith Reynolds</td>
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<td>Elizabeth Labelle</td>
<td>Mark Wilhelm</td>
<td>Jeremy Tyler</td>
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<td>Laura Pople</td>
<td>Yolanda Cossio</td>
<td>Joseph Taverna</td>
<td>Kelsey Hagberg</td>
<td>Peter VanDenToorn</td>
<td>Michelle Wongs</td>
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<td>Not in Lecture: Ashley McNees</td>
<td>Not in Lecture: Scott Granger</td>
<td>Not in Lecture: Melanie Killips</td>
<td>Not in Lecture: James Larkin</td>
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<td>Not in Lecture: Sagar Patel</td>
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<td>Not in Lecture: LaToya Williams</td>
<td>Not in Lecture: Jessica Asbill</td>
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LectureTools

WELCOME TO LECTURETOOLS

Learning in large introductory classes is a challenge in today's college environments. Students in these classes often feel anonymous and disconnected from the class experience, which may affect their ability and/or motivation to learn. Instructors likewise grapple with the low degree of interaction and inability to reach students individually.

LectureTools is designed to provide a class experience by:

1. Enabling note-taking synchronized to lecture slides,
2. Providing opportunities to pose questions electronically during lecture,
3. Including a complete personal responder system to participate actively in class activities and

OUTCOMES: Current semester students report they feel more attentive, more engaged, and learn more with LectureTools and vastly prefer it to clicker systems! [refresh page to see additional plots]

Do you feel that the use of your laptop in this class has affected your learning?

<table>
<thead>
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<th>Effect</th>
<th>Count</th>
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</tr>
<tr>
<td>Somewhat negative effect</td>
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<tr>
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<tr>
<td>Somewhat positive effect</td>
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</tr>
<tr>
<td>Significant positive effect</td>
<td>40</td>
</tr>
</tbody>
</table>

LectureTools in the News

Current
Want LectureTools in YOUR classes this fall? Submit classes you think would benefit at the student-run LectureTools Facebook page.

4 May, 2009
University of Michigan offers workshop "LectureTools: A Web-Based Alternative to Clickers" as part of Enriching Scholarship '09

22 April, 2009
Instructors can now search and add Learning Objects from MERLOT and the National Science Digital Library from within LectureTools.

13 April, 2009
University of Michigan selects Prof. Perry Samson, lead designer of LectureTools, as recipient of "2009 Teaching Innovation Prize."

24 Feb, 2009
Software & Information Industry Association (SIIA) selects LectureTools as finalist for CODiE Award in categories of "Best Educational Use of a Technology Device" and "Best Postsecondary Instructional Solution."
My Agenda

- Demonstrate what LectureTools does
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Change in class

- Students voluntarily bring laptops to class
Change in class

- Students ask more questions

66% of students asked at least one question during lecture
An Alternative to Clickers

Have you used 'clickers' (like Qwizdom) in other classes?

- Yes: 54%
- No: 46%
Critiquing Clickers

**Design**
- The scope of questions are limited
- Students can’t ask questions
- Not integrated with other learning strategies

**Use**
- Students feel they’re used mostly to take attendance
- Question design is key.
An Alternative to Clickers

Given the option which would you prefer:

- No student response system
- Use clickers
- Use LectureTools
- Both clickers and LectureTools

Number of Responses
Student Feedback:

1. I really prefer the use of lecture tools compared to "the clicker".

2. I feel that lecture tools is very efficient and really helps me stay organized.

3. I feel that lecture tools is a much more interactive system than the clicker. It is very easy to access and use, and provides a multitude of note taking options.

4. Printing out 10 pages of slides for every class is a horrible waste of paper. This system is extremely efficient and very well put together.
Student Feedback:

5. I only wish that I had more classes using this system as it would save me a lot of money and a lot of headaches.

- I find the fact that I can ask questions directly to a GSI and get an immediate answer (or read others' questions and see those responses) to be really helpful.

- My favorite feature, however, is the fact that this is all available online, and for free, which is $35 less than "the clicker."

- I think it's far superior to Quizdom. I've found that most people seem to use Quizdom only as a way to check attendance.
Faculty Concerns:

1. To what degree will the introduction of laptops into class introduce distractions?

2. To what degree will the introduction of laptops into class change attentiveness?

3. To what degree will the introduction of laptops into class change engagement?

4. To what degree will the introduction of laptops into class change student learning?
“How do you feel that your use of laptops in this class has changed the time you spend on tasks unrelated to the lecture?”
“In classes where you do not use a laptop, what percentage of time do you estimate you are engaged in tasks not pertaining to that course?”
“How do you feel that your use of laptops in this class has changed the time you spend on tasks unrelated to the lecture?” {Fall, 2008}
“How do you feel that your use of laptops in this class has changed the time you spend on tasks unrelated to the lecture?” {Winter, 2009}
What’s Changed?

Check e-mail
Do work for this class (other than homework)
Read materials unrelated to class
Play games
Do work for other classes
Sleep
Daydream
Converse
Text

w/Laptop
wo/Laptop

0 25 50 75 100
What's Changed?

Check e-mail: 69
Do work for this class (other than homework): 5
Read materials unrelated to class: 3
Play games: 0
Do work for other classes: -6
Sleep: -13
Daydream: -13
Converse: -15
Text: -26
“My **attentiveness** in this class has increased due to laptop use”
“In this class laptops help me to be engaged during lecture”
“Do you feel that the use of your laptop in class has affected your learning?”
Summary

Laptops are a source of distraction:

1. Students admit that the presence of laptops in class adds distraction.
2. Distraction appears to affect women more than men.

Regardless, laptops are viewed as positive:

1. Students feel laptops help them be more engaged.
2. Students feel laptops help them be more attentive.
3. Students feel laptops have a positive affect on their learning.
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Welcome to Stats 350 Winter 2009
Brenda Gunderson bkg@umich.edu

- Please Pick up a Syllabus Handout
- Also up front: a few copies of lecture notes for today (if you have your lecture notes coursepack – you don’t need this!)
- We will turn on clickers LATER in class.
- Today:
  - Go through syllabus & course basics
  - Intro to Chapter 2: Turning Data into Information
  - Try some Clicker Questions along the way!
- For next class: Read Chapters 1 and 2

“Statistical thinking will one day be as necessary for efficient citizenship as the ability to read and write.”
– H. G. Wells

...the most important science in the whole world: for upon it depends the practical application of every other science and of every art: the one science essential to all political and social administration, all education, all organization based on experience, for it only gives results of our experience.”

My Family...
Confounding variables are less likely to be a problem in the interpretation of randomized experiments. Because the treatments are randomly assigned to the units, the values of confounding variables should approximately even out across treatment groups. For example, the group of physicians that was randomly assigned to take aspirin and the group of physicians randomly assigned to take placebo in Case Study 1.6 should have had similar compositions in terms of other health-related variables. Therefore, health-related variables such as diet and exercise would not be confounded with the explanatory variable, which was whether a physician took aspirin or placebo.

**Example 4.1 What Confounding Variables Lurk Behind Lower Blood Pressure?**

**Thought Question 4.2**

Choose a possible confounding variable for the situation in Example 4.1, other than the ones mentioned in the example, and explain how it meets the two conditions necessary to qualify as a confounding variable.

Hint: Think of something that would probably be different for people who attended church compared to those who didn't and that might affect blood pressure.

**Example 4.2 The Fewer the Pages, the More Valuable the Book?**

As these examples illustrate, it is unlikely that any explanatory variable is the direct and sole explanation for the values of the response variable. There are almost always confounding variables. These confounding variables might be measured and accounted for in the analysis of the data, or they could be unmeasured lurking variables. In either case, always think about the possible effect of confounding variables when you consider the results of statistical studies. Confounding variables can be especially problematic in interpreting the results of observational studies. Randomized experiments are designed to help control the influence of confounding variables.
Lightning Detection and Suppression

For many years, lightning strokes were detected primarily by visual observation. Today, cloud-to-ground lightning is located by means of an instrument called a lightning direction-finder, which works by detecting the radio waves produced by lightning. A web of these magnetic devices is a valuable tool in pinpointing lightning strokes throughout the United States, Canada, and Alaska. Lightning detection devices allow scientists to examine in detail the lightning activity inside a storm as it intensifies and moves (see Fig. 10.24). This gives forecasters a better idea where intense lightning strokes might be expected. In addition, when this information is correlated with satellite images, a more complete and precise structure of a thunderstorm is obtained.

Each year, approximately 10,000 fires are started by lightning in the United States alone and around $50 million worth of timber is destroyed. For this reason, tests have been conducted to see whether the number of cloud-to-ground lightning discharges can be reduced. One technique that has shown some success in suppressing lightning involves seeding a cumulonimbus cloud with hair-thin pieces of aluminum about 10 cm long. The idea is that these pieces of metal will produce many tiny sparks, or corona discharges, and prevent the electrical potential in the cloud from building to a point where lightning occurs. While the results of this experiment are inconclusive, many forestry specialists point out that nature itself may use a similar mechanism to prevent excessive lightning damage. The long, pointed needles of pine trees may
Next Steps

Try it!
http://www.lecturetools.org

Write me...
samson@umich.edu

Enjoy a BOTL...
Mahony & Sons: TODAY, 4:30 pm