Lecture Tools:
A Powerful Web-Based Alternative to Clickers

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

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

- FULFILLMENT

Answer Questions
Tornadoes, Lightning and Hail

Oh my...

Ordered List:
Tornado bearing down
1. Go to the southwest corner of basement
2. Go to northeast corner of basement
3. Open windows
4. Close windows
5. Jump into bathtub
6. Hide under bed
7. Run like banshee
8. Drive like banshee

Fujita Scale: F0

<table>
<thead>
<tr>
<th>Maximum Wind Speeds</th>
<th>Typical Effects</th>
</tr>
</thead>
<tbody>
<tr>
<td>40-72 mph</td>
<td>Gale Tornado: Light Damage: Some damage to chimneys; breaks twigs and branches off trees; pushes over shallow-rooted trees; damages signboards; some windows broken; hurricane wind speed begins at 73 mph.</td>
</tr>
</tbody>
</table>

Q: can you please redefine global warming potential?
- It's the rate at which it can be a greenhouse gas much more strongly than carbon dioxide

Q: Why would CO2 have the same global warming potential for 20, 100 and 500 years? Wouldn't it decrease?
- CO2 is sort of the standard that all other gases are compared to. So CO2 will have a 1, and the other ones are less. So regardless of time, it will always be the standard. Of course, in 30 years scientists realize CH4 should be the standard. It will have a GWP of 1. It's an index so speak, not a comparison.

Q: why does potential of N2O increase from 20 to 100 yrs
- Over time N2O accumulates more and more because it has such a long lifetime compared to carbon dioxide

Q: how can a number get bigger as you go from 20 years to 100 years? for example HFC 23 ???
- Perhaps because the HCF23 has a long lifetime, so say you release 3 units in the atmosphere today (just making up a number), that will be in the atmosphere for about 260 years. If we release 3 more units tomorrow, that will overlap with the one from today. In other words, its effects are cumulative. It's so long lasting in the atmosphere. There are other factors involved.

Q: Why is methane worse if it has a shorter life span?
- Methane has a much faster reaction time with certain molecules in the atmosphere compared to other compounds

Q: Sorry, but I don't understand what those numbers refers under lifetime and GWP.
- Under lifetime, it's the number of years that the gas will be in the atmosphere, and it was explained by Prof. Samson in class. See a previous slide. GWP gives an idea of the potential of the other greenhouse gases have relative to CO2 (which is 1)
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>Name</th>
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</thead>
<tbody>
<tr>
<td>Lauren Thams</td>
<td>Jennifer Gregory</td>
<td>Paul Schmidt</td>
<td>Sahil Soluja</td>
<td>Leslie Shelite</td>
<td>Sarah Werd</td>
<td>Connor Field</td>
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<tr>
<td>Steven Anderson</td>
<td>Ryan Leach</td>
<td>Marsheda Ewuomi</td>
<td>Heather Lucier</td>
<td>Heather Mikonja</td>
<td>Michelle Rye</td>
<td>Sarah Bush</td>
</tr>
<tr>
<td>Teya McCockran</td>
<td>Elaina Peterson</td>
<td>Emma Stevens</td>
<td>Adrienne Reed</td>
<td>Shane Malett</td>
<td>Anna Mickols</td>
<td>Erika Mayer</td>
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<tr>
<td>Martha Stortz</td>
<td>Veronica Cetnar</td>
<td>Jirtney Kalmann</td>
<td>John Birney</td>
<td>Oliver Nakad</td>
<td>Christina Barkel</td>
<td>Rebecca Siegel</td>
</tr>
<tr>
<td>Brian Bernstein</td>
<td>Meredith Rogan</td>
<td>Casey Herman</td>
<td>Jael Hatz</td>
<td>Shannon Eagen</td>
<td>Michelle Weatherdon</td>
<td>Jeremy Tyler</td>
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<tr>
<td>Robert Dawson</td>
<td>Veronica Snody</td>
<td>Elizabeth Peters</td>
<td>Michael Shultz</td>
<td>Oliver Nakad</td>
<td>Christina Barkel</td>
<td>Rebecca Siegel</td>
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<tr>
<td>Meredith Reynolds</td>
<td>Noah Jacob</td>
<td>Albert Ong</td>
<td>Elizabeth Labelic</td>
<td>Mark Wilhelm</td>
<td>Mark Leemon</td>
<td>wenmian shao</td>
</tr>
<tr>
<td>Yelanda Cossio</td>
<td>Yolanda Meehan</td>
<td>Neesha Sarkunaseelan</td>
<td>Sylvia Moh Sze Tan</td>
<td>Adam Richards</td>
<td>Rebecca Segel</td>
<td>Carolyn Somes</td>
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<tr>
<td>Chase Masters</td>
<td>Brandon Breslow</td>
<td>Joseph Taverna</td>
<td>Kelsey Hagberg</td>
<td>Paige Bennett</td>
<td>Peter VandenToorn</td>
<td>Christopher Johnson</td>
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</tbody>
</table>

### Year: Freshmen
**Major: Undecided**
**Living: Oxford**

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### Change Seat
- Refresh

### Not in Lecture:
- Katie McKeiver
- Anesha McDole
- tristin Llewellyn
- Angela Wang
- Ashley McNeese
- Scott Granger
- Melanie Killips
- James Larkin
- Sagar Patel
- Joseph Kretkiewicz
- LaToya Williams
- Jessica Asbell
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?

- Significant negative effect
- Somewhat negative effect
- No effect
- Somewhat positive effect
- Significant positive effect

LectureTools in the News

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."

http://www.lecturetools.org
### Answers to Anticipated Questions

<table>
<thead>
<tr>
<th>Zip Code</th>
<th>803xx</th>
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<tbody>
<tr>
<td>Term</td>
<td>Spring</td>
</tr>
<tr>
<td>Year</td>
<td>2009</td>
</tr>
<tr>
<td>Course</td>
<td>LectureTools 101</td>
</tr>
</tbody>
</table>
My Agenda

- Demonstrate what LectureTools does
- Show what’s been learned
- Guide you to set up your own course
- Where’s this going?
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 email
- Do work for this class (other than homework)
- Read materials unrelated to class
- Play games
- Do work for other classes
- Sleep
- Daydream
- Converse
- Text

Graph shows comparison with and without laptop.
What’s Changed?

- Check e-mail: 69
- Do work for this class (other than homework): 5
- Read materials unrelated to class: 3
- Play games: -2
- Do work for other classes: -6
- Sleep: -13
- Daydream: -13
- Converse: -15
- Text: -26

Difference
“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?”

- Significant positive effect
- Somewhat positive effect
- No effect
- Somewhat negative effect
- Significant negative effect

% of Respondents
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.
My Agenda

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- Guide you to set up your own course
- Where’s this going?
My Agenda

• Demonstrate what LectureTools does
• Show what’s been learned
• Guide you to set up your own course
• Where’s this going?
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." zcczxc dfgdg Zxx
Lightening 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