SticiGui, Onosophic, and Statistics W21

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JSM
Miami, FL
First online course taught at Berkeley, in any subject.
Primary audience: intended Business & Economics majors.
Enrollment 300–425, many timezones, including Asia.
Hybrid 1997–2006; online 2007–present
Mastery-based: \leq 5 submissions, \geq 80\% or no credit.
In-person final (\approx 50 students take proctored off-campus).
Typically 7 GSIs holding \approx 140 office hours per week.
“Learning preparedness assessment” by phone \approx 1 month before class.
Milestones

- Most of text online in 1997, including applets for key concepts, glossary.
- Online, machine-graded assignments from 1998.
- Dynamic examples, exercises, individualized homework from 2000.
- Added topics continually. Now have reasoning, set theory, logic, ...
- “Functional grading” from 2003.
- Online office hours with whiteboard, 2-way audio/video, etc. from 2007
- Online lectures from 2009.
- Deep anchors and thorough analytics from 2011.
SticiGui

- 222 XHTML files, 140,384 lines
- 63 Java classes, 15,385 lines
- 28 JavaScript libraries, 15,418 lines
- 4 CSS files, 2,201 lines
- 37 data files, 10,733 records

Close to 8000 hours of work.
Onsophic

- Platform for discovery of course materials, course assembly, course delivery, analytics.
- Built on Sakai.
- Customization for W21: SMS for office hours, heat map granularity, etc.
Analytics

- Viewing sections of book, lecture, or podcast
- Viewport events
- Viewing footnotes
- Attempting practice problems
- Submitting homework

Number of activities, time on task, scores.
### Screenshots: Daily Assignments

<table>
<thead>
<tr>
<th>Thursday, July 14, 2011</th>
<th>Friday, July 15, 2011</th>
<th>Monday, July 18, 2011</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Using the Binomial Distribution</strong></td>
<td><strong>Random Variables</strong></td>
<td><strong>Calculating Binomial, Geometric, Hypergeometric, and Negative Binomial Probabilities</strong></td>
</tr>
<tr>
<td>Continuation of the Let's Make a Deal Problem</td>
<td><strong>Sampling from 0-1 Boxes</strong></td>
<td><strong>Discrete Distributions</strong></td>
</tr>
<tr>
<td><img src="image" alt="Assignment: The sample sum and the Binomial distribution" /></td>
<td><strong>Geometric Distribution</strong></td>
<td><strong>Case Study: Trade Secret Litigation</strong></td>
</tr>
<tr>
<td><strong>CHAPTER 16 Summary: Probability Meets Data</strong></td>
<td><strong>The Negative Binomial Distribution</strong></td>
<td><strong>CHAPTER 17 Summary: Random Variables and Discrete Distributions</strong></td>
</tr>
<tr>
<td><strong>CHAPTER 17 Introduction: Random Variables and Discrete Distributions</strong></td>
<td><strong>The Hypergeometric Distribution</strong></td>
<td><img src="image" alt="Assignment: Random variables and discrete distributions" /></td>
</tr>
<tr>
<td><strong>Random Variables</strong></td>
<td><strong>Calculating Binomial, Geometric, Hypergeometric, and Negative Binomial Probabilities</strong></td>
<td><strong>CHAPTER 18 Introduction: The Long Run and the Expected Value</strong></td>
</tr>
<tr>
<td><strong>The Law of Large Numbers</strong></td>
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## Screenshots: Module Overview

<table>
<thead>
<tr>
<th>Sections</th>
<th>Open Date</th>
<th>Close Date</th>
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</thead>
<tbody>
<tr>
<td><strong>Intro thru Demo</strong></td>
<td></td>
<td></td>
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<tr>
<td>Read: Sample Data Sets</td>
<td></td>
<td>1</td>
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<tr>
<td>Read: Trade Secret Data</td>
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<td>1</td>
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<tr>
<td>Watch: Trade Secret Data</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Listen: Trade Secret Data</td>
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<td>1</td>
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<tr>
<td><strong>Practice</strong></td>
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<tr>
<td>Practice: Exercise 3.2</td>
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<td>1</td>
</tr>
<tr>
<td>Practice: Exercise 3.3</td>
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<td>1</td>
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<tr>
<td>Practice: Exercise 3-4</td>
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<td>1</td>
</tr>
<tr>
<td>Practice: Exercise 3-5</td>
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<tr>
<td><strong>Intro thru Demo</strong></td>
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</tr>
<tr>
<td>Read: Gravity Data</td>
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<tr>
<td>Watch: Gravity data</td>
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<td>1</td>
</tr>
<tr>
<td>Listen: Gravity data</td>
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</tr>
</tbody>
</table>
Screenshots: Online Lecture
The Law of Large Numbers

The Law of Large Numbers says that in repeated independent trials with probability $p$ of success in each trial, the chance that the fraction of successes is close to $p$ grows as the number of trials grows. More precisely, for any tolerance $e > 0$,

$$P(|(\text{fraction of successes in } n \text{ trials}) - p| < e)$$

approaches 100% as the number $n$ of trials grows. This expresses a long-term regularity of repeated independent trials with a shared probability of success.
Figure 8-2: Residual Plot of Heteroscedastic Data.
Screenshots: HeatMap of Modules
Screenshots: HeatMap for Student Activities
Screenshots: HeatMap for Student 1
You'll need to change this value

Figure 3-2 is the first applet in this book—there are many more to come. This applet is a program with content manipulation. For example, try moving the scroll bars near the bottom of the plot, or typing other numbers into the scroll bars and then pressing the Enter or Return key. If you set the area from text box lower than the top histogram will change color from blue to yellow, and the area of the yellow part will be displayed under the "Selected area."

Re: Help! Histogram tool isn't working
Instructor 1 (instructor1) (Jun 16, 2011 7:57 AM) - Read by: 11 [Reply]
Email

Are you using Firefox 4? There are various issues with the Java applets in other browsers and older versions

Help! Histogram tool isn't working
Student 1 (student1) (Jun 16, 2011 7:54 AM) - Read by: 10 [Reply] [HeatMap] [ThinkTank]
Email

I can't seem to get the Histogram tool to respond.

Are there any known issues with that tool?
Research Questions Analytics Can Answer

- Do students who read footnotes do better than those who don’t?
- Do students who do more self-test exercises do better than those who do fewer?
- Do students who spend the majority of their time watching online lectures do better than those who spend the majority of their time reading the book?
- What features of students’ use of the materials predict mastery of the material?
- Do interventions to promote such use increase mastery?
Example: Time Versus Assessment Score, Spearman test

- Histograms and data taxonomy: $p \approx 0.8$
- Counting (combinatorics): $p \approx 0.03$