

Miscellaneous topics

Mine Çetinkaya-Rundel

April 19, 2016

Sta 771S - Teaching Statistics

Teaching online

Fully online courses

- Small scale: university students
- Large scale: massive open online course (MOOC)

Synchronous vs. asynchronous

- Synchronous: students "meet" with you online
- Asynchronous: relies fully on previously recorded material
- Hybrid: a bit of both

Example: STA 104

Hybrid course for a small university audience

- Online version of STA 101, offered in the summer, for credit, for Duke students
- Virtual daily meetings on WebEx Training Center (recorded)
- 90 mins / day, 5 days / week, lecture + lab
- Breakout sessions for teamwork
- Assignments and forums (Piazza) on Sakai
- Materials posted on public course website

Recreating the classroom experience online

Video

Mine Cetinkaya-Rundel (Internal)

Bootstrapping

Rent in Durham - bootstrap interval

The dot plot below shows the distribution of means of 100 bootstrap samples from the original sample. Estimate the 90% bootstrap confidence interval based on this bootstrap distribution.

5% 90% 5%

900 1000 1100 1200 1300 1400

Statistics 104 - Mine Cetinkaya-Rundel LW - LT: Bootstrapping paired and two sample June 3, 2013 7:28

Duke University

STA 104 – polling

Recreating the clicker experience online

The screenshot shows a 'Network Recording Player' window titled 'Sta 104 – S13 – June 24'. The main window displays a 'Review' slide titled 'Poll' with the question 'Which of the following is true?'. The slide includes a diagram of 'Inference' and a list of five options (a-e). A 'Polling' window is overlaid on the right, showing the poll results. A 'Participants' window is also visible, listing names and joining/leaving times. A video feed of a participant, Mine Cetinkaya-Rundel, is shown in the bottom right corner.

Meeting number: 312 013 435 Date: Monday, June 24, 2013 Time: 1:00 PM, America/New_York (GMT -4:00)

Review

Poll

Which of the following is true?

Inference

Population inference (CI & hypothesis testing)

Experimental design

Probability

Modeling (statistical inference)

1 explanatory

many explanatory

Response inference (CI & hypothesis testing)

Experimental design

Probability

Modeling (statistical inference)

1 explanatory

many explanatory

1. Your Question (Apply: 01:07:34 PM)

a.a 0/5 (0%)

b.b 3/5 (60%)

c.c 2/5 (40%)

d.d 0/5 (0%)

e.e 0/5 (0%)

Participants

Name	Joining Time / Leaving Time
a	01:00 PM / 02:34 PM
b	01:00 PM / 02:34 PM
c	01:00 PM / 02:34 PM
d	01:00 PM / 02:34 PM
e	01:00 PM / 02:34 PM

Video

Mine Cetinkaya-Rundel (internal)

Statistics 104 (Mine Cetinkaya-Rundel) Final Review June 24, 2013 9 / 24

00:08:30 / 01:08:37

- “I like the **convenience** of the online class but also the web chat structure makes it feel as if you are actually in a classroom. So it is the best of both worlds.
- “I really enjoy the **videos!** They are a very helpful learning tool. It is also nice to have them to go back to at any time to clear up a concept.
- “I like that the class is **discussion-based and interactive.** I enjoy working with my classmates on application exercises and we are able to explain concepts to each other in terms that we understand. I also like the various polls that we do during lectures because they **keep you engaged** and you can learn a lot from hearing other students explain the reasoning behind their answers.

Positive:

- Great experience
- Synchronous sessions worthwhile
- Assessment submission and grading on Sakai
- Teams on Sakai for application activity submission and reveal
- Performance assessments*

*Adopted in on-campus course

Questionable:

- Scalable
- Exams on Sakai
- One-on-one student support

Example: MOOC

- Data Analysis and Statistical Inference (DASI)
- Now redesigned as the Statistics with R Specialization on Coursera
 1. Introduction to Probability and Data
 2. Inferential Statistics
 3. Linear Regression and Modeling
 4. Bayesian Statistics
 5. Statistics Capstone Project

It takes a village!

- Course design
- Content and assessment generation
- Video production
- Backend support
- Student support – community TAs
- ...

- Formative
 - Suggested textbook exercises
 - In-video questions
- Summative
 - Data analysis labs (R/RStudio or DataCamp)
 - Unit quizzes (10-15 MC questions, 2 attempts)
 - Exams
 - Data analysis project (peer assessment)

- Making educational resources widely and freely* available
- Good way to get your name out there
- Resources can be re-used on campus as part of a hybrid course

Teaching with online resources

Hybrid courses using

- Videos – made by you vs. curated by you
- Online quizzes – immediate feedback
- Online discussion forums

Assessment

- Course level
- Program level

How to assess

- Set goals, e.g. at the end of this course/program students will be able to ...
 - Use Guidelines for Assessment and Instruction in Statistics Education (GAISE) as a starting point
- Collect data specifically addressing these goals, i.e. not just course grade information
- Use widely used assessment scales, e.g. CAOS - Comprehensive Assessment of Outcomes in a First Statistics course
- Do pre-post testing when possible
 - Make it a part of the course so it doesn't feel like additional work for students

Course evaluations

- Always do a mid-semester evaluation, and share summary of findings with students
 - Encourage them to be constructive and specific
 - Address concerns explicitly
 - See if anything can be changed about the course in a way that doesn't negatively impact your course plan but also satisfies the students
- Encourage students to provide feedback via the official course evaluation mechanism
 - Set aside class time
 - Send reminders
 - Encourage them to be constructive and specific
- Publicly available evaluations
 - Remind yourself that voluntary response bias exists
 - Do not say (or write in an email) anything that you don't want posted publicly
 - Grow a thick skin :)

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