Building the Capacity of Graduate Students to Teach Statistics

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ICOTS
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• **WHAT?**
A class to help statistics PhD students improve their teaching and communication of statistics

• **WHERE?**
  • Harvard University (student, then TA)
  • Duke University (professor)

• **WHY?**
  - PhD students often teach (as TAs or later as professors), but usually receive little training
  - Effective communication is essential
Courses

• “The Art and Practice of Teaching Statistics” (Harvard)
  • Required of all 1st year statistics PhD students
  • 5 – 13 students
  • Co-taught with Center for Teaching and Learning
  • Started by then chair Xiao-Li Meng in 2005

• “Teaching Statistics” (Duke)
  • Not required
  • 12 students (11 stat PhDs, G1 – G5, 1 psych PhD)
  • Counts towards Certificate in College Teaching
  • [http://stat.duke.edu/courses/Fall12/sta790.04/](http://stat.duke.edu/courses/Fall12/sta790.04/)
Student Perspective

• Message that teaching is valued and important!
• Lots of thinking about what makes good teaching
  • preparing for practice teaching
  • discussions
  • watching peers teach
• Close interaction with faculty as a G1
• Bonding with peers
• (Note: none of this is anything “taught”)
• Motivated me to create a similar class at Duke...
<table>
<thead>
<tr>
<th>Date</th>
<th>Topic</th>
<th>Due</th>
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<tbody>
<tr>
<td>8/29</td>
<td>Practice Teaching 1 - General&lt;br&gt;Introductions, short spontaneous teaching of a non-statistical topic</td>
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<tr>
<td>9/5</td>
<td>Office Hours&lt;br&gt;Good practices for office hours, mock office hours</td>
<td>Responses to questions</td>
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<td>9/12</td>
<td>Being a TA&lt;br&gt;Running labs, grading, answering email, etc.</td>
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<td>9/19</td>
<td>Introductory Statistics - GAISE Guidelines (pptx)&lt;br&gt;Teaching intro stat - guidelines and recommendations</td>
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<td>9/26</td>
<td>Practice Teaching 2 - Lecture&lt;br&gt;Briefly teach a topic in intro stat (6 min)</td>
<td>Prepare to teach</td>
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<tr>
<td>10/3</td>
<td>Lecturing (pptx)&lt;br&gt;Giving a good lecture</td>
<td>Meet with Kari</td>
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<td>10/10</td>
<td>Practice Teaching 3 - Lecture, take 2&lt;br&gt;Repeat practice teaching 2, with suggested improvements</td>
<td>Prepare to teach</td>
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<tr>
<td>10/17</td>
<td>Keeping Students Engaged (pptx)&lt;br&gt;Tips for keeping students engaged in the classroom</td>
<td>Read article</td>
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<td>10/24</td>
<td>Making Change Happen (pptx)&lt;br&gt;Simulation methods to introduce inference, enabling change</td>
<td>Read Cobb article</td>
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<td>10/31</td>
<td>Practice Teaching 4 - Active Learning&lt;br&gt;Longer teaching on a topic of your choice</td>
<td>Prepare to teach</td>
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<td>11/7</td>
<td>Practice Teaching 4 - Active Learning&lt;br&gt;Longer teaching on a topic of your choice</td>
<td>Prepare to teach</td>
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<td>11/14</td>
<td>Teaching statements&lt;br&gt;Draft and discuss teaching statements</td>
<td>Write a teaching statement</td>
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<td>11/21</td>
<td>Thanksgiving - No Class</td>
<td>Questions about teaching?</td>
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<td>11/28</td>
<td>Open Discussion</td>
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Successful Course Aspects

- Practice teaching
- Feedback from self, peers, and professor
- Discussions of good teaching practices
- Role playing – answering questions
- Drafts of teaching statements
- Occasional readings
Practice Teaching

• Several mini-presentations throughout the semester
  • First day: teach anything for 2 min (not stats)
  • Intro stat topic in 5 min: take one
  • Same intro stat topic in 5 min: take two
  • Any stat topic in 10 min: active learning

• Students find the practice teaching very helpful!
• Build comfort speaking in front of others
• Practice planning a lesson
• Lots of opportunities for feedback...
Feedback

• Students do comment sheets on their classmates’ practice teachings

• Practice teachings are videotaped, students required to meet with me to watch and discuss videotape

• Before prof or peer comments, students answer:
  • What did you LIKE about your teaching?
  • How can you improve?

• Give concrete suggestions for improvement and hold them accountable
Topics

- Office hours (answering questions, one-on-one)
- Being a TA (running labs, grading, email, time management, etc...)
- GAISE guidelines (intro stat)
- Keeping students engaged (active learning)
- Making change happen (simulation methods, etc.)
- Teaching statements
- Being a professor (life in academia)
Role Playing

• Pass out slips of paper with
  1) relatively straightforward intro stat problems
  2) challenging (but common) questions

• Students pair up and play the roles of TA and undergrad asking for help

• Practice answering questions

• Gets students thinking from student perspective

• Email me (kari@stat.duke.edu) if you want the questions
Student Comments

• “The teaching assignments were great at giving me experience & helped me discover what teaching skills I had and what I lacked”

• “In class teaching 5 min sessions each was very useful; particularly to learn from other students”

• “Great feedback on teaching, through student comments & videos. This helped me gain new perspectives. It really helped me see where I can improve”

• “I think this class is great at encouraging serious and thoughtful discussions about teaching statistics”

• “This class fills an important space in the curriculum for many of us who are interested in teaching statistics, whether in an academic position or just as a statistician working with colleagues from other departments”
General Advice

• Utilize peer interaction
• There is no one best way to teach
• Get them thinking about what makes good teaching (rather than just telling them what you think)
• Give suggestions for improvement AND compliments
• Keep it fun!
Community

• For more information or to become part of an email group devoted to courses like this, contact me at klm47@psu.edu

• Thank you!