What's New with CAUSEweb and MERLOT?

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Many new things are happening with CAUSEweb and MERLOT, and the purpose of this short article is to share some important updates with the greater statistics education community.

eCOTS 2014

eCOTS 2014 has come and gone! There were 397 registrants for the biennial Electronic Conference on Teaching Statistics, held entirely online from May 19-23, 2014.

The two keynote speakers were: Christine Franklin (University of Georgia) who spoke about *Preparing K-12 Teachers to Navigate the Data Stream: Great Opportunities and Challenges* and Conrad Wolfram (The Wolfram Group) who spoke about *Fundamentally Changing Maths Education for the New Era of Data Science*. We present a brief synopsis of these talks:

Christine Franklin spoke about the exciting opportunities that are now waiting to be embraced by Statistics educators as a result of the Common Core state standards – all the way from elementary through undergraduate statistics courses. One of the most groundbreaking accomplishments of the Common Core is that for the first time ever, it brings statistical literacy

to *all* K-12 students – not just those who take AP Statistics, or just those who go on to college and potentially take a Statistics courses – but *all* K-12 students will now receive an education featuring statistics, and assuming these courses are indeed taught as intended, will achieve a certain level of statistical literacy.

Christine Franklin noted that together with big opportunities come big challenges, and that the statistical education community now faces a critical challenge in properly educating elementary, middle and high school teachers, as well as redesigning both the typical undergraduate college Introductory and second Statistics courses so as to include more advanced topics. She gave specific guidelines for the education of elementary, middle and high school statistics teachers to enable them to be fully prepared to teach the new statistical components of the Common Core. Statistical departments at the university level also need to re-think course offerings for K-12 statistics teachers and specifically, how to educate such teachers along the lines of a more concept-based, less formula-driven emphasis that focuses on the "big picture" of Statistics in general and how it gets used in a practical setting by people from all walks of life.

In conclusion, Christine Franklin reminded everybody that our subject is in heavy demand across all disciplines, but the key to capitalizing on this great opportunity lies in developing a teaching force that is capable of preparing future generations for the challenges of modern data. Outstanding statistics teachers are critical to the success of our field as a whole, and are often the only people who can motivate and guide students to be adequately equipped for a data-intensive future.

Conrad Wolfram spoke about how advances in computing technology have not only enabled – but mandated – a completely new way of teaching Statistics using computer-*based* analysis (not merely computer-*assisted* analysis). Mr. Wolfram remarked on the apparent contradiction between Math being indispensable to life and work in the modern world – with governments worldwide panicking about the lack of a mathematically trained workforce; yet at the same time, Math as a subject seems almost universally despised by students in schools, and usually only taken because it is required rather than by choice. One of the reasons for this chasm between education vs. the real world seems to arise from a disconnect in how Math gets used in real life vs. how it gets taught. Math is ubiquitous in the real world, but is mainly centered around modeling and data analysis – formulating difficult problems, then letting the computer solve it; whereas in schools – the majority of our time is spent on how to do various computations – the type of computations the computer would normally do for us. There are an abundance of incredibly complex – and fascinating – mathematical problems in the real world, but instead of stimulating student interest and getting them involved in solving real world problems, we drive them away by spending the majority of time on outdated computational techniques that are not nearly sufficient to solve modern day problems.

Mr. Wolfram argues that mathematical and statistical modeling is a very complex procedure that requires lots of practice to formulate suitable questions or hypotheses capable of being tested, to translate real world problems to a mathematical format, and to re-translate the computational output back to the real world. Rather than simplify the material or make it easier for students, making full use of modern computational resources allows us to present much more difficult problems to our students and excite them with complicated, real world issues that cannot simply be solved by going through a predetermined list of steps.

Putting these ideas into practice, Mr. Wolfram's organization has worked with the government of Estonia to redesign their mathematics and statistics curriculum. He helped create a series of online modules where students spend a lot of time formulating suitable hypotheses, using computationally intensive techniques to generate answers, and then interpreting these answers. Sample investigations include *Should I insure my laptop, How tall is the tallest woman in Estonia, How many Estonian words do I understand,* and *Will it rain tomorrow*. The latter investigation, for instance, is based on the past 35 years of weather data from Tallinn, and utilizes far more complex computational techniques than could be done by hand.

Mr. Wolfram reiterated that in order for our subject to remain relevant for the coming generation and remain at the forefront of the modern world, we need to fully embrace the power of automation and stand on its shoulders to go far beyond where we currently are, focusing on problems that are more difficult and also more relevant than at present. As educators, we should embrace this opportunity to transform our curriculum and become one of the most desirable subjects by both students and employers. More details can be found at his website, http://computerbasedmath.org/.

There were three main themes at eCOTS 2014: *Teaching from Big Data*, *The Impact of the Common Core*, and *Bridging the Disciplines.* To help summarize the content and facilitate broader discussion, some of the presenters from each theme participated in a panel discussion where they reiterated the most important points of their talks, followed by a dialogue based on audience questions.

The following workshops were also held during eCOTS 2014:

1) *Teaching Randomization-based Methods in an Introductory Statistics Course: The CATALST Curriculum* by Bob delMas, University of Minnesota
2) *Using Fun and Games to Engage Real-World Learning* by Shonda Kuiper, Grinnell College; and Rod Sturdivant, The Ohio State University
3) *Empowering Introductory Statistics Students with a Passion-Driven, Project-Based Curriculum* by Lisa Dierker, Wesleyan University
4) *Web Resources for Interactive Probability Instruction* by Dennis Pearl, The Ohio State University; Ivo Dinov, University of Michigan; and Kyle Siegrist, University of Alabama
5) *Teaching the Statistical Investigation Process with Randomization-based Inference* by Nathan Tintle, Dordt College; and Beth Chance, Cal Poly San Luis Obispo

6) *Effective Teaching using R, RStudio, and the MOSAIC Package* by Nicholas Horton, Amherst College; Randall Pruim, Calvin College; and Daniel Kaplan, Macalester College

Future Conference

In 2015, USCOTS will be held Thursday May 28 - Saturday May 30 with workshops on Tuesday and Wednesday, May 26 - 27. It will be at the Penn Stater Hotel and Conference Center in State College, Pennsylvania.

CAUSEweb Resource Highlight

Explorable (https://explorable.com) is the CAUSEweb resource highlight for this edition of our Teaching Bits column. The educational website is "centered around the scientific method, psychology, research, and academia." The home page contains links to current science, technology, and research news that are accessible and of interest for both instructors and students. The site also contains a brief but fairly thorough statistics tutorial that could provide supplemental instruction for introductory students. Other portions of the site contain articles on a wide range of topics, from ethics, experiments, and philosophy to the history of science, mathematics, and psychology. There are even instructions for performing some ancient experiments, such as Archimedes' water displacement experiment and Heron's fountain.

MERLOT News

MERLOT recently announced a partnership with Learningpod, an online question bank. It currently includes 190 statistics questions that align with the OpenStax College Statistics book. Upcoming events include the Sloan-C International ALN Conference, to be held October 29-31, 2014, in Lake Buena Vista, Florida, and the Quality Matters Conference, coming up September 29-October 1, 2014 in Baltimore, Maryland.

Additional information about these topics and others related to the MERLOT community can be found in the MERLOT Grapevine Newsletter, http://grapevine.merlot.org.

The Journal of Online Learning and Teaching (JOLT)

Two recent papers in the current volume of the *Journal of Online Learning and Teaching* (http://jolt.merlot.org) may be of general interest to Statistics instructors. From Volume 10, Number 2, "The Influence of Instructor-Generated Video Content on Student Satisfaction with and Engagement in Asynchronous Online Classes," by Peter J. Draus, Michael J. Curran, and Melinda S. Trempus, describes a controlled experiment in an asynchronous online class where several "treatment" sections of the course included new, instructor-generated video content, and the "control" sections did not (http://jolt.merlot.org/vol10no2/draus_0614.pdf). The experiment provides both insights on the use of video in online classrooms and enough information for students to recreate some of the statistical tests as an exercise.

Volume 10, Number 1, continues the theme from last year with a section of papers and case studies about Massive Open Online Courses (MOOCs), in addition to a set of regular papers. Of particular interest to instructors who use online discussions as part of their course is the paper, "Strategies for Creating a Community of Inquiry through Online Asynchronous Discussions" by Aimee deNoyelles, Janet Zydney, and Baiyun Chen. The paper includes concrete suggestions for designing and implementing online discussion activities in any course that uses them (http://jolt.merlot.org/vol10no1/denoyelles_0314.pdf).

Recent CAUSEweb Webinars

CAUSEweb offers three webinar series: Activity Series, Teaching and Learning Series and Journal of Statistics Education Series. Below is a list of the most recent webinars from these three series. The slides of the presentations as well as the recorded webinars are currently available for viewing at the websites listed below.

Teaching and Learning Webinar Series

- "Sampling Variability: A Hot Topic in the Common Core" by Anna Bargagliotti (for the Project-SET team), Loyola Marymount University (https://www.causeweb.org/webinar/teaching/2014-06/)

Activity Webinar Series

No Activity Webinars have recently been presented; the most recent webinar was in February:

- "Five Years on the Island" by Michael Bulmer, University of Queensland (https://www.causeweb.org/webinar/activity/2014-02/)

Journal of Statistics Education Series

- "Engaging Students in a Large Lecture: An Experiment using Sudoku Puzzles" by Caroline Brophy, National University of Ireland Maynooth (https://www.causeweb.org/webinar/jse/2014-06/)
- "Does eye color depend on Gender? It Might Depend on Who or How you Ask" by Amy G. Froelich, Iowa State University (https://www.causeweb.org/webinar/jse/2014-04/)

If you have ideas for a webinars, please contact Ellen Gundlach at gundlach@purdue.edu for Teaching and Learning webinar ideas and Leigh Weiss at lweiss@capital.edu for Activity webinar ideas.
