ACS Summer 2023 Workshops Summary
Applying Adaptive and Interactive Learning Practices in Undergraduate Statistics Courses

Facilitators

Prof. Denny Garvis
Williams School, WLU
garvisd@wlu.edu

Prof. Zoila Ponce de León
Williams School, WLU
zponcedeleon@wlu.edu

Prof. Lilla Orr
Dept. of Mathematics & Statistics
University of Richmond
lorr2@richmond.edu

Topics

Adoption and Implementation of Adaptive Learning Courses

- Regardless of teaching style, all learning situations are inherently adaptive and interactive
- Adaptive learning courseware can be seen as a system of course materials that takes into account learner variables as well as feedback for appropriate suggestions and interventions
- Differences in timing, sequence, and sources of interactions and feedback
- Application of adaptive learning research findings in OLI statistics courses
    - Core perspectives – i) question, ii) data, iii) analysis, iv) conclusions w/ interpretation
    - Learning statistics by doing statistics
    - Feedback to student as well as instructor

Implementation of Adaptive Learning Projects

- Timing, format, content, and grading
- Students have lab access on Monday and work together in class on Tuesday
- They can ask instructor, as well as peers, about prompts, concepts, and software, but cannot ask for the answers to the graded lab questions
- Students continue with work and questions on Thursday, which many finish and submit by the end of class
- Reinforce concepts from prior projects and extend applications to new concepts
- Specific implementation of Hypothesis Testing lab project

Implementation of Interactive Learning Exercises

- Using class time to reinforce key concepts, clarify common misunderstandings, quickly identify and check in with students who are struggling, challenge students who are excelling, and convince students that class material is worth learning
- Facilitate synthesis after class and throughout the term
- Structure of a 75 min lesson with review, lecture, introductory example exercise followed by worksheet exercises
- Implementation of Conditional Probability & Bayes Rule exercise
- Adapting to student needs

Resources

Syllabi and Course Schedules available from Facilitators or through ACS repository

Probability and Statistics courseware, https://oli.cmu.edu/courses/probability-and-statistics/

Statistical Reasoning courseware, https://oli.cmu.edu/courses/statistical-reasoning/

Consortium for the Advancement of Undergraduate Statistics Education, https://causeweb.org/cause/

Cavanagh, Chen, Lahcen and Paradiso. 2020. Constructing a Design Framework and Pedagogical Approach for Adaptive Learning in Higher Education: A Practitioner's Perspective, International Review of Research in Open and Distributed Learning, 21:1, 173–197.

Bowen, Chingos, Lack, & Nygren. 2012. Interactive Learning Online at Public Universities: Evidence from Randomized Trials. ITHAKA.

Joo and Spies. 2019. Aligning Many Campuses and Instructors around a Common Adaptive Learning Courseware in Introductory Statistics; Lessons from a Multi-Year Pilot in Maryland. ITHAKA S+R, New York, NY.

Lovett, Meyer, and Thille. 2008. The Open Learning Initiative: Measuring the Effectiveness of the OLI Statistics Course in Accelerating Student Learning. 2008 Journal of Interactive Media in Education, pp. 1-16 http://jime.open.ac.uk/2008/14

Natriello, ed. 2013. Adaptive Educational Technologies. National Academy of Education, Washington, DC.

Plass and Pawar. 2020. Toward a taxonomy of adaptivity for learning. Journal of Research on Technology in Education, 52:3, 275-300.