

AA10: 3:50-4 p.m. Behavioral Analysis Techniques for Mobile Phone Collected Data

Contributed – Yong J. Kwon, Randolph College, Lynchburg, VA 24503; psheldon@randolphcollege.edu

Evan Goulding, Northwestern University

Bipolar disorder (BPD) is a severe and chronic mental illness that increases mortality nearly three-fold. Despite the use of mood stabilizers for many decades, BPD still disables many, and is listed as the ninth leading cause of disability worldwide. The ongoing suffering produced by this disease drives a clear need for improved treatment. This project aims to develop a smartphone intervention that will capture and feed back behavioral data to improve patient self-management and increase the effectiveness of psychological interventions to reduce symptoms and prevent relapse in BPD patients. The study is currently testing various techniques to capture the behavioral data in a useful form. Among them are, Eigenbehavior – identifying principle components of the daily behavior, Non-Parametric measure – discovering intradaily and inter-daily activity pattern, and Detrended Fluctuation Analysis – determining scale-invarianceness of the activity. We will discuss the effectiveness of above techniques for capturing the behavioral data.

Session AB: PER: Investigating Classroom Strategies

Location: Salon 4
Sponsor: AAPT
Date: Sunday, January 5
Time: 2–3:50 p.m.

Presider: Chris Whittaker

AB01: 2-2:10 p.m. Implementing, Documenting, and Assessing Evidence-based Physics Instruction*

Contributed – David E. Meltzer, Arizona State University, Mesa, AZ 85212; david.meltzer@asu.edu

For at least 90 years, physics educators have attempted to improve instructional practices through systematic analysis of student-learning data. I will review some of the highlights of these investigations in order to focus on key issues and problems that have surfaced. For example, although some analysis of students' physics ideas had occurred in the 1930s and 1940s, implementation of instructional materials based closely on such research did not take place until the 1970s. I will also address the evolution in diagnostic instruments and offer perspective on issues related to statistical analysis of assessment data, the validity of observational protocols, and trade-offs between practicality and reliability.

*Supported in part by NSF DUE #1256333

AB02: 2:10-2:20 p.m. Challenges Faced by Learning Assistants in a Studio Physics Course

Contributed – Joshua S. Von Korff, Georgia State University, Atlanta, GA 30303; jvonkorff@gsu.edu

Anna-Marie Smith, Megan Smith, Georgia State University

Georgia State University's Learning Assistant program recruits undergraduates to assist with instruction in our introductory algebra-based physics courses. Although the Learning Assistant model has been shown to be effective at enhancing student learning, little is known about the obstacles that Learning Assistants face. How do these obstacles evolve over the semester, and how do Learning Assistants deal with them? In order to investigate these questions, we interviewed four learning assistants who were assigned to SCALE-UP studio physics courses. We arranged four interviews with each Learning Assistant and examined all of their weekly essays written for the required science pedagogy course. We analyzed this data using constant comparative analysis, a technique associated with the grounded theory approach to qualitative research. The Learning Assistants described

many barriers that they encountered including student disengagement, difficulty finding the right question to ask, and others.

AB03: 2:20-2:30 p.m. Facilitating Discourse in Physics Whiteboard Meetings

Contributed – Scot A. Hovan, University of Minnesota, Minneapolis, MN 55417; scothovan@gmail.com

The Next Generation Science Standards (NGSS)¹ identify eight practices as essential to science and engineering, and several of these emphasize the role of students' constructing explanations, engaging in argumentation, and communicating scientific information. However, few teacher-training programs instruct teachers on how to facilitate discourse in the classroom. Developed at Arizona State University, Modeling Instruction² emphasizes the role of student discourse in the construction of scientific knowledge by having students participate in large group conversations called whiteboard meetings. However, the novelty of this conversation format can inhibit student participation and make the facilitation of this discourse mode quite challenging. This research is a portion of one high school teacher's self study analyzing his experiences facilitating discourse in his attempt to move students closer to those practices espoused by the NGSS.

1. National Research Council (2012). *A Framework for K-12 science education: Practices, crosscutting concepts, and core ideas*. Committee on a Conceptual Framework for New K-12 Science Education Standards. Board on Science Education, Division of Behavioral and Social Sciences and Education. Washington, DC: National Academy Press.
2. <http://modelinginstruction.org/>

AB04: 2:30-2:40 p.m. Video Resource for Professional Development of University Physics Educators

Contributed – Rachel E. Scherr, Seattle Pacific University, Seattle, WA 98119; rescherr@gmail.com

Renee Michelle Goertzen, American Physical Society

The Video Resource for Professional Development of University Physics Educators is being developed to support a wide range of university physics educators (four-year university faculty, two-year-college faculty, graduate teaching assistants, and undergraduate learning assistants) in engaging with key issues in teaching and learning. Based on compelling classroom video of best-practices university physics instruction, the resource is organized into "video workshops" that each introduce a significant topic in the teaching and learning of physics, such as formative assessment or cooperative learning. The topic is introduced through a captioned video episode of introductory physics students in the classroom, chosen to prompt collaborative discussion. Discussion questions prompt participants who view the episode to reflect on their pedagogical beliefs and on their own practice. The Video Resource will provide materials to be incorporated into a variety of professional development situations, including self-organized groups of professors, graduate TA training, LA pedagogy courses, and online professional development communities.

AB05: 2:40-2:50 p.m. A Taxonomy for Identifying Visual Elements of Textbooks

Contributed – Juan R. Burciaga, Mount Holyoke College, Department of Physics, Hadley, MA 01075-1424; jburciag@mtholyoke.edu

Alexandra Lau, Mount Holyoke College

Visual elements are integral components of today's textbooks. The applications for these elements vary from simply breaking up the textual narrative ... to establishing a supplemental or an alternative narrative ... to summarizing or communicating key concepts. To better understand the impact of visual elements in the pedagogical framework of textbooks we have created a taxonomy to identify their roles. The taxonomy is being used to analyze the number and placement of visual elements in both a traditional text and a non-traditional one. The resulting analysis is being used as a basis for designing additional visual elements.