

MICHIGAN STATE UNIVERSITY

9/26/2017

Dr. Michael Gardner, Professor
University of Utah
3230 Sorenson Arts & Education Complex
1721 Campus Center Drive
Salt Lake City, UT 84112-8914

Dear Dr. Michael Gardner and Search Committee Members,

I am writing to apply for the Assistant Professor of Learning Sciences (focus on Statistics and Measurement) position at the University of Utah. I am a doctoral candidate in Educational Psychology and Educational Technology at Michigan State University and will defend my dissertation in April 2018.

My research focuses on students' development of habits of mind and capabilities central to engaging in STEM, namely, data practices. This work involves designing and documenting student engagement in the context of classrooms (face-to-face and online) and other settings, such as out-of-school programs. My research informs, and is informed by, theories of engagement and learning from educational psychology and the learning sciences and accounts of learning as engaging in disciplinary practices from mathematics and statistics education scholars. Leveraging the roles of computation and digital tools across STEM domains, my work also draws from research on educational technology.



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As an example of my work informing both psychological and STEM-related research, my dissertation, *Examining Data Modeling Through the Lens of Engagement Theory: A Person-Oriented Approach Using an Experience Sampling Method* examines students' engagement in the "data practices" of measuring and modeling that integrate across STEM domains. Specifically, this study examines how more than 200 learners in out-of-school STEM programs engage in data practices through constructing measures of real-world phenomena and developing models that account for variability or uncertainty. In recognition of newer conceptions of engagement as a dynamic and multifaceted construct, I use measures through an Experience Sampling Method that are responsive to changes in the context and activity. While many scholars have argued that data practices can be understood in terms of learners' capabilities developed through modeling data, my research shows that these practices can be understood in terms of contemporary engagement theory. This work illustrates the importance of affective and motivational constructs for making informed recommendations about teaching and learning STEM.

My research has been published in peer-reviewed journals, including, for example, the *Journal of Research in Science Teaching* and the *Journal of Technology and Teacher Education*. In total, I have published or have in-press eight peer-reviewed journal articles (including four first-author publications) and two articles in the revise and resubmit stage. In addition to publishing in journals, edited books, and conference proceedings, I have experience applying and receiving extramural support for research. Most recently, using an approach developed in my dissertation, I contributed to the grant application for

Jennifer Schmidt's National Science Foundation-funded project *Profiles of Science Engagement* and plan to stay involved as a senior personnel over the next three years. Finally, a unique part of my work is my development of software, such as a tool designed for researchers for carrying out person-oriented analysis in the statistical software *R*. Other tools, such as *konfound*, an *R* package (and associated interactive web application) for carrying out sensitivity analysis to support causal inference. I also develop tools for learners, such as simulations that output complex datasets for students to use to generate explanations.

In addition to research experience, I have substantial and diverse (i.e., face-to-face, hybrid, and online) teaching experience. I have taught or assisted more than 20 course offerings during my time as a graduate student. These courses were broadly, in educational psychology, educational technology, and research methods. As an experience instructor at the university level—and as a teacher at a public high school in a past career—I know that learning about powerful ideas and developing ambitious capabilities takes time, application, and a network of support. Accordingly, in my teaching, I focus courses on semester-long tasks that are supported through the structure of assignments and an emphasis on student-directed discussion. For example, in a research methods course, students identified a problem related to teaching with technology, constructed measures, and analyzed the data they collected and shared their work through a class social media page. This approach has been well received with student ratings consistently rating my teaching between “Superior” and “Above Average.” I am prepared to teach classes in educational psychology and the learning sciences, including both theory classes as well as classes on design-based and design-based implementation research, and introductory statistics (i.e., ANOVA, regression, and their extensions, i.e. MANOVA and multiple regression) and measurement (i.e., reliability, validity, classical test theory) courses as well as advanced courses, particularly mixed effects or multi-level models and their Bayesian implementations and latent variable models, including measurement and mixture models. I am interested in proposing and teaching a class on the creation of data products augment existing offerings. This course could be useful not only to MA in Statistics for presenting their work in new ways but also doctoral students in the learning sciences interested in improving how they prepare and manage larger datasets.

I have been involved in service in large education research associations (Division C of the American Educational Research Association and Division 15 of the American Psychological Association). I also have also been involved in a leadership position for the Technological Pedagogical Content Knowledge (TPACK) special interest group (SIG) in the Society for Information Technology and Teacher Education (SITE), having served as co-chair. Finally, I am active in my program and department, having mentored junior Ph.D. students on multiple practicum committees, coordinated the social media platforms associated with my program, and served on a search committee for an academic specialist.

With respect to the required and preferred qualifications for the position, I am in the position to augment the strengths of the department through research and teaching focused on how students come to engage in data practices, both a research agenda grounded in psychological (and developmental) theory. I have extensive preparation and experience in advanced statistical methods, having applied them in work both with Educational Testing Service and as core parts of funded research. My demonstrated capability to closely collaborate with both research methodologists and educational psychology and learning sciences scholars, including experience applying for extramural support, prepare me to contribute immediately.

I look forward to hearing from you soon. Thank you.

Sincerely,
Joshua M. Rosenberg
Joshua Rosenberg