Bridging Neuroscience and Interaction Design: How Online Game Design Experiments Can Accelerate Scientific Experimentation and Social Impact at Scale

Guest Lecture by Derek Lomas, Design Fellow
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Abstract: Large-scale randomized experiments are widely used to optimize the design of online services. Hundreds of thousands of A/B tests are run each year at companies like Google and Amazon to maximize usage and revenue. Online educational software can also benefit from these software experiments to optimize user motivation and learning. Going beyond optimization, large-scale online experiments have great potential for testing and developing basic scientific theories. In this talk, I will share how I designed and evaluated a popular online learning game for fraction number sense. By randomly assigning design variations to hundreds of thousands of users, I was able to test multiple hypotheses about the relationship between challenge and intrinsic motivation, leading to some surprising conclusions. For instance, we produced evidence indicating that the motivational benefits of challenge are derived from the factors of novelty and suspense rather than difficulty. Then, to illustrate the "big science" opportunities and challenges in large-scale online research, I will share recently published work demonstrating how artificial intelligence might assist future scientific inquiry. I'll conclude by sharing a new adaptive media system designed to support well-being and cognitive development in young children.

Bio: Derek Lomas is a Design Fellow at the UC San Diego Design Lab, which aims to bridge the science and practice of design. His work blends design, entrepreneurship, cognitive science, and machine learning. Lomas received his PhD at Carnegie Mellon's HCI Institute, where he helped design over 35 different learning game titles, which have been played by over 3 million people, in addition to sinning awards from the New York Department of Education, Sesame Street, and the White House. His work was funded by a 5-year training fellowship from the Institute of Education Sciences, DARPA, and the Grable Foundation. He received a BA in Cognitive Science from Yale and an MFA in Visual Arts from UCSD. He has neuroscience lab training from CWRU, Appropriate Design training from MIT, and he received a MacArthur Foundation grant based on his ethnographic design research for low-cost computing systems in India. As an entrepreneur and Techstars alum, he has licensed learning software and design services to large education companies, including Houghton Mifflin Harcourt, Pearson, and Scientific Learning. His current design projects focus on "beneficial AI" systems for nurturing human potential and well-being.