Daniel L. Schwartz
2021 Klaus J. Jacobs Research Prize Recipient

Stanford University Professor Daniel L. Schwartz receives the 2021 Klaus J. Jacobs Research Prize for his studies addressing cognitive questions through innovative learning experiments, bringing new insight to areas of educational research such as lecturing, transfer—where learners can apply knowledge or skills mastered in one context to a different context—and assessment. Schwartz is a leader in the developing field bridging cognitive psychology and education; among his discoveries is a new theoretical concept linking the perception of symmetry to learning negative numbers.

His transformative work has been widely applied by educators, in part through his book *The ABCs of How We Learn: 26 Scientifically Proven Approaches, How They Work, and When to Use Them,* and other media.

Innovative Experiments

Schwartz is the I. James Quillen Dean and Nomellini & Olivier Professor of Educational Technology at Stanford. He leads Stanford's Transforming Learning Accelerator, a major interdisciplinary initiative advancing the science and design of learning to bring effective and equitable solutions to the world.

His studies have broken new theoretical ground in educational research, exemplified by his study of how children learn negative numbers, a unique, decade-long project that used functional magnetic resonance imaging (fMRI) brain research, mathematical modeling, classroom data, and innovative teaching technologies. More broadly, says Schwartz, he is interested in "how can we design environments that help students generate and learn new ideas, and even more foundational, how can we design lessons that enable students to learn on their own when there is not a teacher telling them what to do and learn?"

AI for Education

In working toward these goals, Schwartz has invented an artificial intelligence-based technology called a Teachable Agent (TA), a graphical computer character that students teach. His research demonstrates that students who work with a Teachable Agent learn more and spend more time in learning activities as a result.

In the next 5 years, Schwartz plans to extend his research on TAs that support learning to reason between data and claims. "The current work will create a highly useable and scalable TA with an underlying intelligence architecture that can be leveraged broadly," says Schwartz, adding that "if ultimately successful, the work will result in an engaging and effective way to increase scientific literacy, for example, for learning and reasoning about pandemics."