

BREAKTHROUGH RESEARCH &amp; DEVELOPMENT

# CAPTURING STUDENT GESTURES WITH MOTION-TRACKING TECHNOLOGY TO ENHANCE SCIENCE LEARNING AND INSTRUCTION

Researchers are discovering how body movements can impact technological interfaces, curriculum design, and learning in the classroom.

## A "HANDS-IN" APPROACH TO LEARNING

Science can be fascinating, but many middle school and high school students don't connect with the subject matter. Two College of Education professors at the University of Illinois at Urbana-Champaign are helping to pave the way to a more engaging way of learning that enables students to develop foundational explanatory models of natural phenomena, and that promises to have a great impact on curriculum design and classroom teaching.

Assistant Professor and Principal Investigator Robb Lindgren and Associate Professor and Co-Principal Investigator David Brown are using a \$1.45 million grant from the National Science Foundation to study how body movements, such as hand gestures, promote learning and understanding. "The relationship between gestures and learning specific ideas in areas such as science has not been fully explored," Lindgren says. "In particular, the idea of applying what we know

about learning and physical action has not been put to use in how we design science education resources such as computer simulations and small group activities."

**“We believe it's important to understand the learning process we want to support first, and then bring in the technology that best complements that process.”**

Lindgren and Brown are working with a number of schools in the Urbana-Champaign area, interacting with teachers and students as they press forward to understand the role that gestures play in constructing explanations for three science phenomena: the seasons, air pressure, and thermal conduction. They are working with the Concord Consortium to enhance their existing Web simulations. "We believe it's important to understand the learning process we want to support first, and then bring in the technology that best complements that process," Lindgren says. The professors are



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identifying what kinds of gestures best support understanding, and they are developing interfaces that are capable of recognizing those gestures.

## IMPACTING CURRICULUM DESIGN AND LEARNING IN THE CLASSROOM

The project demonstrates how research and design can work together to impact student learning. When students interact with elements in immersive ways, they are intuitively engaged in ways that have not been possible before. "With new technology, students have ways of interacting with dynamic simulations that have not been possible before, and that can provide a deeper, more immersive understanding of the explanatory elements, such as molecules in dynamic interaction," Brown says.

### LEARN MORE

To learn more about this study, email Dr. Lindgren at [robblind@illinois.edu](mailto:robblind@illinois.edu) or Dr. Brown at [debrown@illinois.edu](mailto:debrown@illinois.edu).



EDUCATION AT ILLINOIS

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**BUREAU OF EDUCATIONAL RESEARCH**

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