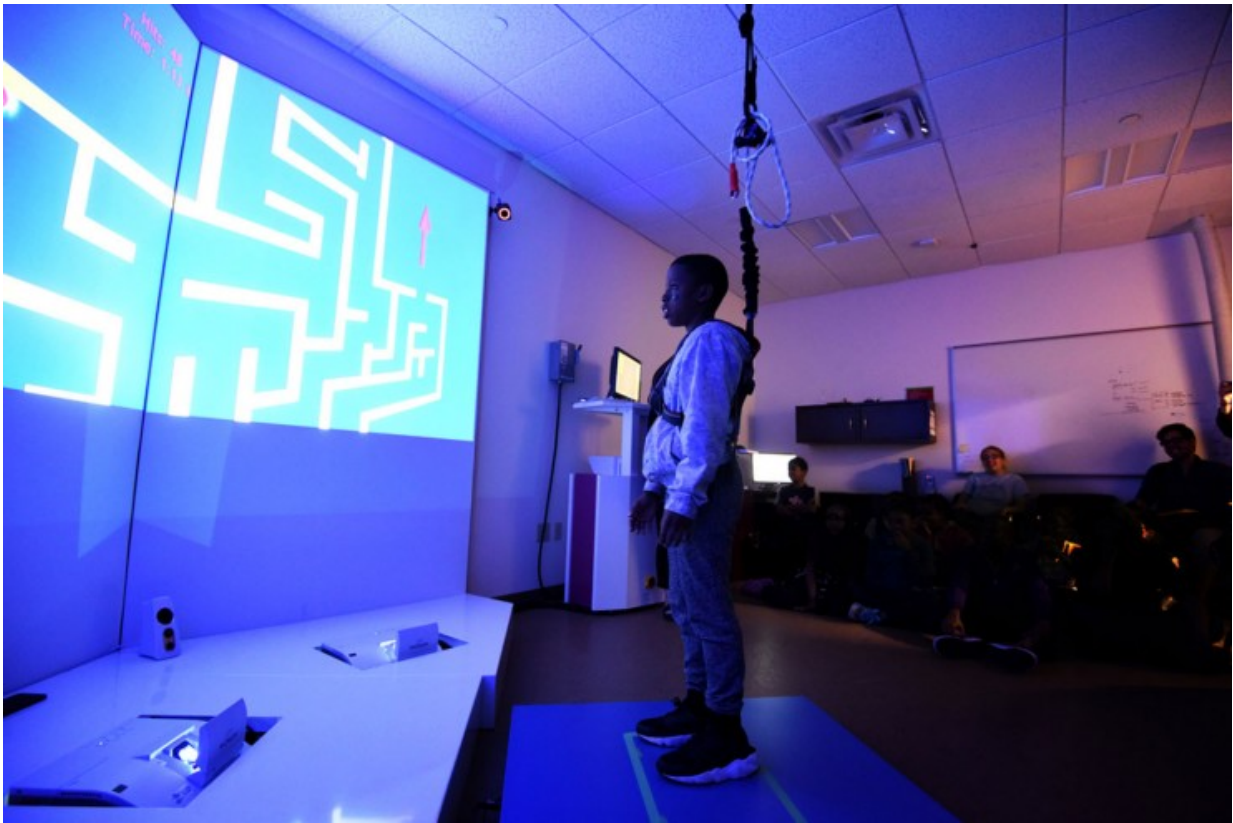


# Using virtual reality to advance physical therapy

June 17 2016, by Casey Bayer

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A fifth-grade student visiting Northeastern's ReGame VR Lab tries out one of physical therapy professor Danielle Levac's virtual reality games. Credit: Matthew MODOONO/Northeastern University

Northeastern's Danielle Levac develops video games to make physical

therapy more fun, motivating, and rewarding for patients—especially for children with movement impairments, such as those with cerebral palsy.

Levac, professor of [physical therapy](#) in the Bouvé College of Health Sciences, invited a group of fifth-grade students from Boston's Ellis Mendell Elementary School to visit her lab last week. The young students sat in the Rehabilitation Games and Virtual Reality Laboratory illuminated by floor-to-ceiling screens with virtual worlds on them, and learned about what [physical therapists](#) do and how research can benefit their patients.

"Why do you think a physical therapist would use games like this in physical therapy?" Levac asked the group. "One reason is so we can help people to move a part of their body that may have gotten hurt in an accident or damaged by a disease."

The students then tried out some of Levac's unique games, mazes, and tasks as they learned about [virtual reality](#) and how it can be used to track progress and motivate patients.

With a background in pediatric physical therapy, Levac understands that a virtual reality task or game needs to be hard enough to challenge patients and motivate them to improve, but not be so hard that they get frustrated and give up. During the visit, Levac had the students test out four different games. She will use information gained from these exercises to inform her own interdisciplinary research.



Credit: Matthew MODOONO/Northeastern University

WHAM, the Wearable Health and Activity Monitor, is the result of a collaboration between Levac's lab and the Enabling Engineering student group. It uses a sensor and an accelerometer to detect movement and energy expenditure during video game play.

"We want to test this with kids who have problems moving, so we first need to test it with you to see how it works," Levac told the fifth-graders.

With the WHAM on their wrists, the students whacked large balls at targets and jumped through bubbles in a [virtual environment](#) created

using an Xbox 360 Kinect. The information collected from the students' play will be used to make it easier for parents and therapists to monitor kids' progress and understand how they use their bodies during game play.

Students also virtually opened and closed desk drawers using an Oculus Rift and then tried a reaching-and-balancing task in both a physical and virtual environment.

"Think about moving your body so that the light turns from red to green," Levac instructed a student as he tried to figure out how his movements on a force plate in the physical world corresponded with the color shift.

Part of what Levac studies is the difference between learning and repeating new tasks in the physical and virtual world. Each posed its own challenges for the [students](#) as they worked out how to move through the games.

"This one is super hard," Levac said, referring to the physical version of the reaching-and-balancing game. "That's why we're trying to figure out how to make it easier or harder for others. It always takes a bit of time."



Credit: Matthew MODOONO/Northeastern University



Credit: Matthew Modoono/Northeastern University

Provided by Northeastern University

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