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Active Architecture

This slide at Gloria Marshall Elementary School at Spring Independent School District in Houston, along with other architectural elements in the school, is intended to be a teaching tool, encouraging students to question and discover and engage them in fun, active and exciting opportunities for learning. The architects considered how each design element could be an opportunity for learning and physical activity. In this case tlhe slide serves as a teaching tool for lessons about both DNA and static electricity. In addition, a science garden and eco pond at the front of the school promotes activity outside of the classroom and provides opportunities for hands on math and science lessons.

The Houston project also reflects a growing interest among architects concerning how physical structures can be built to encourage physical activity. In its December (2012) report, Healthier Communities Through Design, (www.aia.org/localleaders) The American Institute of Architects (AIA), lay out a road map for towns and cities to promote physical activity among their residents. The report includes case

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Luis Ayala/SHW Group

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Rehabilitation Meets Virtual Reality

This article was based in part on a story by Lanita Withers Goins that appeared in the UNCG Magazine

Anyone who has ever had to undergo physical rehabilitation can attest to the monotony of it all. The treadmill becomes a "dreadmill." Stretching elastic bands, pulling on cables, and straining against diabolical machines aren't very high on anyone's bucket list. And there is always the possibility that someone is doing the rehab exercises incorrectly. Help is on the way from researchers in the department of kinesiology at the University of North Carolina at Greensboro.

Enter Dr. Chris Rhea, director of the new Virtual Environment for Assessment and Rehabilitation Laboratory (VEAR lab). In a lab equipped with a treadmill, cameras, computers, and an activity space, Rhea and his students are creating virtual worlds, replicating real-life situations to help patients rehabilitate injuries, disease, or the effects of aging.

Chris Rhea,

Rhea's interest in this area began with his PhD studies at Purdue University examining how humans use vision to control their walking. He then joined a virtual reality lab at Brown University for his postdoctoral training to develop virtual environments that could be used to enhance a patient's walking control. Rhea's original research focused on patients who have had reconstruction of the anterior cruciate ligament (ACL) in the knee, and his team has expanded their virtual reality intervention training to include patients who have had strokes.

Creating Virtual Worlds in the VEAR Lab at UNCG

Rhea believes the virtual atmosphere can offer clinicians "a more precise, optimal way to rehabilitate someone." Rhea and his staff build 2-D and 3-D environments for patient rehabilitation. These can include immersion in a virtual-reality environment like a busy sidewalk scene where patients will be able to practice the movements necessary to weave in and around pedestrian traffic, and a situation in which an avatar is projected onto a large screen. By following in the avatar's footsteps, patients replicate a proper walking pattern. "Some of this may seem like a game to patients, but what we are really doing is giving a very scientific prescription to rehabilitate their walking mechanics. We're building into the environment the movement patterns that they are lacking."

The VEAR Lab's focus on physical rehabilitation makes it unique. Fewer than 10

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New Building Holds Promise of Bright Future for Auburn's Kinesiology Program

a new building, you get more interest," said Russell, an associate professor of exercise pedagogy. "Along with the new building, we have an opportunity to expand our services to the community, Auburn University, and beyond. The more good people, the more resources, the more productivity, the more it helps with acquiring funding and supporting our research and outreach efforts."

-SJH

Mary Rudisill contributed to this story

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Top Athletes Excel in Mental as Well as Physical Skills

Female athletes were able to keep up with their male peers when it came to speed of mental calculations and reaction times, while the female nonathletes were not.

Overall the elite volleyball players displayed a higher level of cognitive function in reacting to a changing environment. They noticed objects in their peripheral vision more quickly, detected changes to a complex scene, and were not distracted by irrelevant information, indicating a higher level of executive cognitive functions.

Through both of these studies, the bigger question of whether these abilities come from intense athletic training or inherited traits still remains unanswered. Researchers agree that the opportunity to track children from a young age through their athletic careers would help to clarify that question.

While scientific evidence has always shown a clear correlation between physical activity and cognitive function, Faubert hopes that these findings with elite athletes will shed some light on the cognitive development for us mere mortals as well. "We are finding a huge difference. It's not even close. It's like they are coming from a different planet," he said. "That's why we think we are on to something special."

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Rehabilitation Meets Virtual Reality

other labs in the United States are devoted to this type of work, and opportunities for collaborating with others working on a variety of applications are vast. Rhea is collaborating with researchers in his own department who are studying anterior cruciate ligament injuries, researchers at Winston Salem State University who are working with children with cerebral palsy, researchers at Bradford University in England investigating therapeutic techniques for treating patients with leg amputations, and clinicians at UNC Chapel Hill on rehabilitation regimens for stroke patients.

The virtual-reality training interventions are developed in the VEAR lab and then disseminated into a clinic using a mobile version of Rhea's lab. "We understood at the onset that our challenge was not only to develop virtual-reality interventions that would have a positive influence on walking rehabilitation, but also to develop a way to deliver our training into a clinic or home-based setting." Rhea and his team have developed the REVIVE (Rehabilitation Engagement Visualized In Virtual Environments) project, which will begin to test their interventions in local clinics.

The team is also continuing to develop user-friendly ways to provide research-grade assessment outside a traditional laboratory. For example, Winston-Salem State University and East Carolina University are collaborating on an application for a smart phone that taps into the phone's accelerometer. By activating the application and attaching it to the patient's thigh, the person's walking behavior can be recorded and analyzed in nearly any setting. "We aim to develop assessment and intervention applications for physical therapy that can be used in a flexible and cost-effective manner."

-SJH