

Motion sickness reality in virtual world, too

December 20 2010

Clemson University psychologist Eric Muth sees motion sickness as potential fallout from high-end technology that once was limited to the commercial marketplace moving to consumer use in gaming devices.

Microsoft's Kinect is the latest example of technology with the potential to use a helmet-mounted display to immerse the gamer in a 3D virtual world. It uses sensors and software to detect body movement and positioning to control responses in a game environment, although he said the risk of [motion sickness](#) from Kinect itself likely is low.

"What was once limited to the military and high-tech research, where users were screened and monitored for negative reactions, is available now to the public," said Muth, who is director of Clemson's Human Factors Institute. "You're not talking about carefully selected users like pilots and astronauts. Anybody with a few hundred dollars to spend can use it and the access will spread. The downside could be that people sensitive to visual disorders and susceptible to motion sickness suffer symptoms ranging from nausea to [seizures](#). There needs to be a lot more research into the side effects."

Muth's research focuses on helmet-mounted displays that are used in virtual-environments technology. Before coming to Clemson 11 years ago, Muth spent three years in the Navy as an aerospace experimental psychologist working on wearable monitors and tracking systems to improve military training and to monitor soldiers, sailors and marines during combat. Now he uses helmet-mounted displays to study motion sickness, nausea and other upper gastrointestinal discomforts — the area

of his graduate studies at the Pennsylvania State University under Robert Stern, a pioneer in biofeedback.

"Basically, when people are exposed to stimuli from a helmet-mounted display in the lab, it involves linking a subject's head movements to the changing view in the virtual environment," he said. "The response is complicated. It's not just a perceptual adjustment.

"Years ago research showed that the brain can re-set an upside-down view of world to be right side up. Constantly changing images pose a bigger challenge for the brain, which has to deal with 'lag': the time it takes the computer system to update and display changing visual images corresponding to the users head movements. This may be a variable linked to motion sickness and other symptoms related to helmet-mounted devices."

Muth and the other researchers at the Human Factors Institute seek to improve the way people interact with technology and devices.

"Helmet-mounted devices are going to be found everywhere as video gamers and the public get caught up in virtual reality," said Muth. "We have already seen the popularity of 3D movies, and 3D television is making its way into our living rooms. We need to know more about the side effects and how to deal with them. I would not allow my kids to use this technology before checking their susceptibility to the downsides, and even then I would limit and monitor their access to the [virtual world](#)."

Provided by Clemson University

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