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Tele-Immersion Prepares for Education Debut
Will virtual reality's latest incarnation add a new dimension to learning?

By Jodi Mailander Farrell
for Office.com

Nov. 28, 2000— Rearranging office furniture from a distance may sound improbable, but it turns out it's possible if you've got virtual furniture and the right equipment. That is what New York and North Carolina researchers discovered when, in October, they collaborated in a groundbreaking experiment that allowed them to move computer-generated desks and chairs in a three-dimensional space. They shared the space on large screens in each of their respective states.

Appearing as if they occupied the same room, researchers at the University of North Carolina at Chapel Hill and a private, nonprofit research firm called Advanced Network & Services in Armonk, N.Y., moved the furniture around the simulated office between them, rotating and dragging the chairs and desks around the space — and each other — with a virtual laser pointer.

The researchers sat in cubicles wearing head-mounted trackers and polarized glasses. Two Sharp projectors, equipped with circular polarization filters, produced a separate image for each eye, mimicking the way our eyes interpret 3-D images naturally.

The Oct. 27 experiment was the second successful venture for "tele-immersion," a conceptual hybrid of virtual reality that is being developed as part of Internet2, a research project involving 170 academic institutions and 50 corporations to produce tomorrow's faster Internet and applications for it.

Like the Holodeck on Star Trek, tele-immersion visually replicates space in real time, producing a shared environment that makes it appear as if everyone is in the same place. If participants move their heads, they're able to look around and see objects or make eye contact with people as if they were there. Eventually, researchers hope to ditch the glasses and headgear, reducing the equipment to simple cameras for both 3-D acquisition and head-tracking.

By the end of the decade, when next-generation broadband is in place, tele-immersion's creators envision it eventually becoming the ultimate hands-on learning tool for schools and universities. Instead of talking about archaeology and handling fossils in class, students could use tele-immersion to wander around a real dig site, watching scientists uncover the Earth's secrets without leaving their classrooms, its developers say.

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National Tele-Immersion Initiative

Tele-immersion's capacity to employ computer-generated objects (like the furniture in the October experiment) means students could explore computer-generated models of historic sites, such as the Globe Theater in England or the Parthenon in Greece.

"What I see happening is kids really taking apart simulated versions of molecules, dinosaurs, whatever," says Jaron Lanier, the visionary behind the National Tele-Immersion Initiative and the scientist who coined the term virtual reality and helped develop it in the 1980s and 1990s. "People will have all these tools for thinking and teaching, but in the virtual world, where they can do so much more."

Despite its promise, some technology experts, such as Harvard University's Chris Dede, predict tele-immersion will never make the leap from the laboratory to the classroom.

Based on virtual-reality research, Dede and other researchers believe that VR immersion benefits learning in only rare, limited instances — say, if a teacher is trying to explain something in 3-D, such as how it feels to be in the center of a cyclone. Tele-immersion also can provide another frame of reference to help students understand a complicated process, such as Newton's laws, but Dede believes that there's no proof that it results in any greater gain of knowledge.

"There's a lot of problems with the tele-immersion community," says Dede, who is the Wirth professor of learning technology at the Harvard Graduate School of Education and co-director of its technology in education program. "They have this 'everything-goes-better-with-tele-immersion' attitude. That's fundamentally silly because it doesn't add anything. There's no compelling evidence that a great deal is gained in learning with it. ... People have these expensive tele-devices and are just killing themselves trying to find a reason for them."

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Dede also points out that no matter how cheap the technology becomes, it will always take more money for schools to purchase tele-immersion. And in the constant budget crunch most schools endure, that's money that can't be spared unless there's a widespread, demonstrated advantage.

Lanier and others involved in the development of tele-immersion see things differently. They predict it will be available as early as 2005 for some businesses, with the technology cheap enough for widespread use in 10 to 15 years.

Terry Rogers, the CEO of Advanced Network & Services, envisions tele-immersion improving one-on-one tutoring and crossing the geographical divide that separates inner-city schools from those in the richer, better-staffed suburbs.

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["Tele-Immersion," explanatory Web site from Internet2](#)

The real-time connection could link some of the country's finest teachers to students in high-poverty neighborhoods, he says. It also could connect American students to those in other countries.

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Lanier, who often lectures at universities, hopes it will raise the undergraduate experience to another level by doing away with video simulcasts to remote halls and off-campus classrooms.

"What I would like to see in the future is that eventually we'll be able to take students in remote locations and create the illusion that we're all in the same room," says Lanier.

Although he doesn't think tele-immersion will improve learning in lectures, even Dede admits that it could, in general, be a strong motivator for some students. He also suggests that tele-immersion possesses strong possibilities as a learning tool for medical students and for remote exploration of medical patients.

"This is a profound next step in human interaction, not just a slightly improved version of staring at a computer screen," says Rogers of Advanced Network & Services. "It's a whole different quality of experience."