Multi-User Virtual Environments

By Chris Dede

In a decade or two, three complementary interfaces will shape how people learn with computers and telecommu-
nications. These interfaces will supplement, but not replace, face-to-face learning, infusing all forms of education:

- The familiar “world of the desktop” interface, providing access to distant experts and archives and enabling collabora-
tions, mentoring relationships, and virtual communities-of-practice. This type of interface is evolving through initiatives such as Internet2.

- The “discrete-event competing” interface, in which portable wireless devices provide virtual resources as users move through public spaces.

- The multi-user virtual environments interface, in which participants represent themselves with computer-based agents and digital ar-
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The “Alice-in-Wonderland” multi-user virtual environments interface, in which participants represent one another with computer-based agents and digital artifacts in virtual contexts. The initial stages of research and shared virtual environments are characterized by attention to the role of smart objects and intelligent contexts in learning anything.

The following vignette gives a view into the future of the third interface: multi-user virtual environments (MUVEs) for learning:

In the computer lab at her elementary school, Consuela sat through her assigned hour of the River City laboratory. Her classmates and fellow adventurers for an hour was “with” her, utilizing their Web-TV connections at home, as was her mentor, a small boy named Oliver (in real life a high-

school senior interested in mythology, who assumed a “look-like avatar” in the virtual world of the MUVE). Mr. Curtiss, the school principal, watched bemused from the doorway. But diffi-
terent times were in 2009, he thought, with student scores which measured only a fraction of what students encountered in River City. Next year would even start! (The school building was later demolished, but that did the control group. Significant differences (t=3.36, p<.05) between the two groups, with the experi-
tional group showing an increase of 1 point out of 5 on average, as opposed to the control group’s decrease of .3 1. Additionally, our data show that percent on the content pre-

test improved their content knowledge above that level, whereas only two of five control students did so. In addition, controlling for collaboration and science interest, the experimental group, on average, had more positive changes in motiva-
tion mastery (as measured by the PALS assessment) compared to the control group.

In our pilot implementation of River City, using three middle-school class-
rooms in Boston, we examined usability, student motivation, student learning, and classroom implementation issues. One sixth-grade and one seventh-grade class-

room in different schools with high percentages of ESL (English as a Second Lan-
guage) students were identified as having access to the needed technologies. A high propor-
tion of at-risk students. Control classroom were arranged with a teacher as technology-free, curriculum designed for them. There were forty-five students total in the two experimental classes and thirty-six total in the control classes, all evenly split by gender. Both qualitative and quantitative data were col-
lected from students and teachers over the three-week implementation period. Students found the MUVE interface readily usable and the learning experi-
ences, an indication that we need to extend our professional-development experiences.

Studies of MUVEs and similar emerging educational technologies, address issues of fundamental research on learning theory, the development of new methodologies for studying learning and teaching, and the enhancement of students’ abilities to apply academic knowledge in real-world contexts. MUVEs may serve to complement to more conventional kinds of computer-based instruction, particu-
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