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Institute to Study Connections Between Computer Gaming, STEM Learning

By Katie Ash

A new research institute will investigate the connections between interactive computer and video games and science, technology, engineering, and math learning. Microsoft Research, an arm of the Seattle-based Microsoft Corp., and a consortium of universities and education organizations, led by New York University, launched the institute Oct. 7.

With a $1.5 million grant from Microsoft Research that was matched by the consortium of educators in New York—which includes Columbia University, Dartmouth College, the City University of New York, Teachers College, Columbia University, and the Rochester Institute of Technology, among others—for a total of $3 million, the **Games for Learning Institute** plans to undertake a three-year project.

John Nordlinger, the program manager for the gaming initiative at Microsoft Research, says he suspects that is just the beginning, however.

"We'd be shocked if [that time] wasn't extended," he says, noting the institute has already attracted attention from other foundations.

The rising popularity of computer and video games makes this is a perfect time to conduct scientific research around them, says Jan L. Plass, an associate professor of educational communication and technology at NYU's Steinhardt School of Culture, Education, and Human Development and a co-director of the institute.

"Schools are, more and more, thinking about alternative ways of teaching and engaging kids," he says. "Games have surpassed movies in terms of sales and revenue, and as a result, there's been a lot of interest in games."

Kurt D. Squire, an assistant professor of educational communications and technology at the University of Wisconsin-Madison and educational gaming researcher, agrees that much more research in educational gaming is needed.

"This is absolutely a key area, and this is the kind of work that we need a lot more of," he says. "There's a lot of the field to be mapped."

However, Squire did express concern over the time frame of the project, wondering if three years would be enough time to successfully learn how games work and how they could be most effectively designed.

"Projects that really try to take a game and stick it into schools on a very short turnaround run into the problem of not really understanding how it is that learning happens out in the wild," he says.

'Crisis in Education'

Along with Plass, the institute will be co-directed by Ken Perlin, a professor of computer science at NYU's Courant Institute of Mathematical Sciences.

The Games for Learning Institute, which will be located at NYU, will focus primarily on games' connections with the set of subjects commonly referred to as STEM—an area of growing emphasis for education, business, and political leaders.

"There's a real crisis in education right now," Nordlinger says. "We need more folks getting into science and engineering."

So far, anecdotal evidence suggests that computer and video games have the potential to increase student engagement in those subjects, as well as teach important concepts, Nordlinger says. The institute aims to conduct research to verify—or disprove—those observations, he says, and specifically investigate the architecture of games to identify effective methods for teaching.

"We're asking what can we learn from games that can help us design better learning environments," adds Plass.

Rather than just focusing on whether games help students learn, researchers at the Games for Learning Institute want to identify the specific aspects of games

that are effective and come up with a blueprint for game designers to follow to make the most effective educational games.

"We want to take [the research] to the next level," Plass says, to provide game designers with "a systematic process that is based on design principles and informed by research."

Engaging STEM Learners

The institute will begin by studying middle school students, who represent a critical age for recruiting students into STEM subjects, researchers say.

"Research has shown that [students' disengagement with science] begins in middle school," says Plass. "They think [STEM subjects] aren't interesting. They think they're not cool. We want to see if we can change that."

The research will be divided into three phases.

During the first phase of the project, researchers will examine what makes games fun for students, if and how educational games transfer knowledge to students, and whether they're appropriate learning tools.

Next, the institute will break down the components of games to see what helps students learn at faster rates and what techniques are most effective for helping students learn.

Lastly, researchers will investigate how those techniques can be incorporated into games in order to make them as effective as possible.

Researchers will be looking at a variety of platforms, such as Nintendo's Wii and Microsoft's Xbox, for delivering games, but will primarily focus on "low-end platforms that could be easily available in schools," says Plass, such as hand-held applications and computer games.

Although the Games for Learning Institute does not have plans to produce its own large-scale game, researchers will develop mini-games to investigate specific research questions, Plass says.

All the materials created by the team of researchers at NYU will be made free for students to use.