GAMEs Kids Play at School Could Lead to Higher Test Scores
By Don Bowman

In RU’s Games, Animation, Modeling and Simulation (GAMEs) Lab, a seven-person team of programmers and graduate students is bringing the newest instructional technology to the public school classroom with an eye on boosting students’ Standards of Learning (SOL) scores.

“Almost all kids play video games, a cultural phenomenon that is here to stay,” said Matt Dunleavy, an assistant professor of teacher education and leadership in the College of Education and Human Development, which includes the GAMEs Lab. “We hope to capture or leverage its powerful immersive capability to enhance instruction.”

Through its iLearn project, the GAMEs Lab is developing iPad and iPod touch-based mobile technology applications and testing their efficacy in the city of Radford and Pulaski County public schools. The work is underwritten by a $1.6 million grant from the Virginia Department of Education. The grant also enables the GAMEs Lab to provide training and training materials for teachers on how to most effectively use the iPads and iPod touches that the school districts have purchased and deployed.

“Everything we do is geared toward enhancing teaching and learning with mobile technology,” Dunleavy said.

For example, children holding GPS-enabled handheld computers or cell phones would walk about in a designated place and respond to video, audio or text information cued by their arrival at a particular point. In a game called “Buffalo Hunt,” with content based on Virginia SOLs, students learn about Native-American culture and about teamwork. Students on their school playground might become virtual Native-Americans facing two questions: Why are their people getting sick? Why are the buffalo dying?

Besides the two local school districts, the GAMEs Lab is working with New River Community College (NRCC) to design and test games that can support the schools’ drive to achieve SOL benchmarks with a series of apps and games for students of all ages.

“We work across the K-12 spectrum and focus on mathematics, where SOL scores are critical,” said Tom Brewster, deputy superintendent for administration and academic support for Pulaski County Public Schools. “We have created a hybrid of early adopters among our faculty and high-need classrooms to see what can be done with this technology.”

According to Brewster, it is too early to empirically assess results of the technology in Pulaski County, but “formative evidence” shows scores improving. The scores from the schools’ final tests at the end of the current school year will more clearly tell the tale, he said.

The RU team and its partners are following the students’ progress with great interest, Brewster continued. “The developers at the GAMEs Lab have been very creative and are highly engaged in the product and its effectiveness in the classroom. They want to know, ‘Does it work?’ and eagerly solicit feedback from the teachers.”

Dunleavy said the lab is “working to marry the power of the pedagogy we find within video games with the latest in cognitive science on how people learn to create a package that students find engaging and that they are willing to do in and out of school.” In collaboration with NRCC, the GAMEs Lab has developed 18 standards-aligned apps, which have been downloaded over 44,000 times from seven different countries through Apple Computer Inc.’s iTunes site. In March the GAMEs staff released a new game, “Disaster Chasers,” and within two weeks it was downloaded 6,000 times.
At Radford's McHarg Elementary School, Carol Wojtara has incorporated the technology in her first-grade classroom to augment conventional teaching. She uses iPod touches in activities like word study, reading comprehension and math drills.

"I can't imagine teaching without them," Wojtara said. "I love being part of something that is paving the way for other students and teachers."

Wojtara pointed out that the games and apps are just part of a technology package that the iLearn project has brought to her classroom. She uses the platform to create specialized podcasts for her students and to make "Keynotes" presentations that are accessible to the students in free times during the day.

"We have fewer students who seem to feel left behind, so I see a tremendous impact," said Wojtara, who has used apps from the GAMES Lab to help her 21 pupils master SOL-mandated skills like telling time and working with money.

Wojtara describes the relationship between her school's faculty and the GAMES Lab team a partnership: "It is nice to have developers who can listen and help create solutions that are specific to my classroom."

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**Technology and Publishing**

**Triumphs for GAMES Grads**

Building on experience in the RU GAMES Lab, these recent graduates are finding career success in their field.

**Chris Webb '09** Developer of educational technology and instructional design.

**A.I. Tucker '10** Third place and $5,000 prize, 2010 Virginia Mobile Learning Apps Development Challenge for his game "Govenomics." Tucker is now working at DevelopEase, a local iPod and iPod touch app development company.

**David Payne '10 and Daniel Burgess '10** Payne and Burgess began as programmers in the GAMES Lab as undergraduates. In 2009, Payne and Burgess respectively won second and third place in Virginia Mobile Learning Apps Development Challenge for their games "Freddy Fraction" and "Fraction Factory." They are now designing software and doing quality assurance work for FreshAR and are co-founders of Mogo Mobile.

**Brittney Simmons '11** In January of 2011, Dunleavy published a book chapter on AR assessment with Brittney Simmons who was a School of Teacher and Education Leadership graduate student. Simmons is second author on the invited chapter.

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**GAMES Lab Leader Parleys Seed Grant into Research Powerhouse**

By Don Bowman

Matt Dunleavy came to RU in 2007 from a post-doctoral fellowship at Harvard University. Immediately upon arriving, he was able to secure a $20,000 seed grant from the Office of Sponsored Programs and Grants Management to develop mobile technology applications and curricula for elementary, middle and high school students. Since then, Dunleavy and his GAMES Lab team in the College of Education and Human Development have transformed that grant into a $2.2 million research and development program.

"Right now, someone somewhere in a lab is working on something that will be released soon that will totally change the game," Dunleavy said, citing "disruptive technologies" — a term for innovations that disrupt an existing market. "The iPad and iPhone are good examples. They are game-changers that completely altered the landscape of multiple industries, and the GAMES Lab is figuring out how to use them in the..."
classroom to improve education and what they mean for students’ teaching and learning.”

To develop and rate the success of iPad and iPod touch games in the classroom, Dunleavy won a $1.6 million grant from the Virginia Department of Education. That project is being done in collaboration with teachers and administrators in the Pulaski County and city of Radford public school systems and New River Community College. Dunleavy and his colleagues in the RU GAMEs Lab also won a prestigious $500,000 grant from the National Science Foundation to develop augmented reality games.

Augmented reality (AR) uses handheld computers and GPS receivers to create simulations or games that are played in a real physical space, such as a school playground. In a typical app, students walk around the school grounds while a map on their handheld devices shows virtual objects and characters superimposed on the real space. When a student comes within 30 feet of a digital object, AR and GPS software trigger video, audio and text files that pose problems while giving clues for solving them.

The GAMEs Lab’s groundbreaking work in augmented reality is drawing national attention. The 2011 edition of the New Media Consortium’s Horizon Report, which examines the impact and use of emerging technologies in teaching and learning, recognized the GAMEs Lab’s ROAR (Radford Outdoor Alternative Reality) project as a leader in the field.

When Dunleavy and two of his programmers, Daniel Burgess and David Payne, could not find suitable software they could use to develop their AR learning games, they wrote their own. Called “FreshAiR,” the new software can be used by teachers and students who want to create their own AR games or projects. Plans are underway to market FreshAiR through a start-up company, Mogo Mobile, created in collaboration with the RU Foundation. It is the university’s first patented intellectual property.

“What Matt has done with his research is textbook technology transfer,” said Dennis Grady, dean of the College of Graduate and Professional Studies, which includes the Office of Sponsored Programs and Grants Management. “First you have an idea, then you write an exploratory grant to flesh out the idea, then you write state and federal grants to prove the concept, then you file a patent to protect the idea and perhaps commercialize it. We hope to have several more faculty follow in his footsteps as they see the value of doing sponsored research.”

“To me that is a big story,” Dunleavy said. “With a National Science Foundation grant, the GAMEs lab invented its own software that has commercial viability and that can be taken out into the marketplace. That will result in entrepreneurship and jobs being created in this area.”