

VITAL

Virtual Immersive Technologies for Arts and Learning



OHIO
UNIVERSITY

Excellence in research and development on virtual environments

Quarterly Newsletter of the VITAL Lab

Fall 2006 Issue

Inside this issue:

- VITAL Lab Overview
- Current Projects
- STEAM Presented Modules
- STEAM Module Development
- New Member of VITAL Team
- Computer Club Involvement

NSF GK-12 STEAM Professional Development Day

On Sept. 9, 2006, the NSF GK-12 STEAM project held its quarterly Professional Development Day, which took place in Stocker Center at Ohio University. Project instructors, graduate fellows, and middle school teachers reflected on the successes that the STEAM project has brought to them. It was also a time for further developments to the project to be carefully planned by the entire group. During the day, the current modules being developed were presented to the group.

The teachers and fellows were excited about the benefits that the NSF GK-12 STEAM Project brought to the Appalachian Ohio middle schools.

VITAL Laboratory Overview

A multi-disciplinary research and development unit, the VITAL Laboratory is a collaboration of the Russ College of Engineering and Technology (Computer Science and Civil Engineering), the College of Education (Instructional Technology), and the College of Fine Arts (the Aesthetic Technologies Lab). The mission of the VITAL Lab is to create appealing immersive virtual environments and synthetic worlds to enhance teaching, learning, and training activities. The VITAL Lab is working with the National Science Foundation (NSF), the Ohio Environmental Protection Agency (EPA), and

the Ohio Learning Network (OLN) to build virtual educational environments for use in Appalachian Ohio middle and high schools.

Active Projects

- Science and Technology Enrichment for Appalachian Middle-schoolers (STEAM)
- Improving Environmental Awareness of Water, Waste, and Land Issues in Appalachian Ohio (WWL Ohio)
- Educational Software Engineering Process
- Two Second Life Learning Communities

Current Projects

The STEAM project, funded by the National Science Foundation's Graduate Teaching Fellows in K-12 Education (GK-12) program, is a joint project between Ohio University's School of Electrical Engineering and Computer Science and College of Education. The project aims to broaden graduate education for Russ College computer science and engineering students and improve learning in science courses for middle-school children in the Appalachian area. STEAM graduate fellows are working with schoolteachers to create and deliver interesting digital curricular content that can produce learning with engagement among students in grades six through eight. This project will help enhance partnerships and enrich learning environments between Ohio University and the middle schools. Six middle schools throughout the Southern Ohio Appalachia region are currently involved. The participating middle schools are Alexander, Federal Hocking, Athens, Miller, Belpre, and Roseville. The STEAM fellows have taken on the duty to use their computer programming knowledge and skills to develop fun and interactive educational games that can promote learning in a new setting.

The fellows help with teaching scientific and math concepts to students, answering students' questions, and bringing in real world applications of science that the students can relate to.

Funded by the Ohio EPA, the **WWL Ohio** project addresses critical local environmental issues by promoting awareness of water, waste, and land issues among high school students in Meigs and Athens School Districts. Russ College graduate fellows enable the students to develop computer-simulated environmental models. Meigs and Athens high school students are forming teams to build interactive virtual environmental models and are competing against each other to see which team can build the most scientifically correct and immersive virtual environment.

(Continued on page 4)



Presented Modules in the NSF GK-12 STEAM Project

Star Life Cycles

“The excitement generated by a fellow’s discussions helps spark students’ interest in the sciences.”

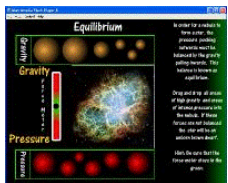
Kurt Nostrant
Athens Middle School Teacher

On Sept. 28, graduate fellow Mark Smearcheck presented his module on Star Life Cycles to Angela Adam’s 8th grade classroom at Miller Middle School in Corning Ohio. The module helped reinforce the concepts students learned in class.

The game has the unique aspect that the students can play several times and each time can get a different outcome. This feature kept the students engaged and playing the game more than once.

Angela said that Mark is a wonderful addition to her classroom and that students are impressed with his work and the real-world applications of science he brings into the classroom. Angela is excited that the STEAM project is able to bring technology into her classroom to aid in teaching hard-to-teach science concepts in a new interesting environment.

All of the students found Mark’s Star Life Cycles module to be very engaging and interactive. Some of the students even told Mark and Angela that they played the game at home.

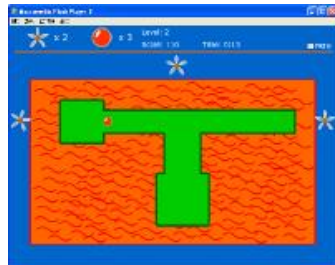


ForceIt!

Graduate fellow Jim Wyllie has developed a very addicting game called ForceIt! which visually demonstrates the effects of Newton’s laws on an object. The game involves 18 different levels. At each level the player must successfully move a ball across a course with the use of fans.

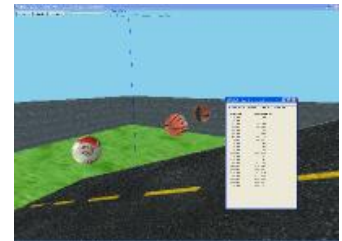
Jim’s game was introduced to 8th grade students in Jackie Hlubb’s classroom at Belpre Middle School in Belpre Ohio. The students had the chance to play this game several times in the computer lab as well as at home. Jim and Jackie noticed that the students were able to take the prior knowledge that they learned in the classroom and effectively use it to accomplish each level of the game.

Jim and Jackie were astonished when the bell rang for the students to move on to their next class, everyone was so involved in the game that they didn’t even notice the time!



Velocity and Acceleration

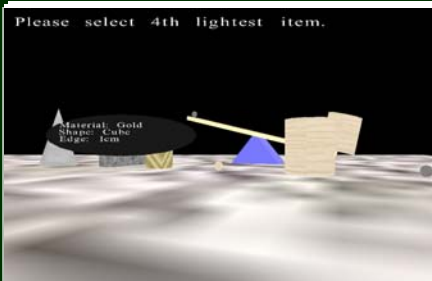
Graduate fellow Scott Nkyl has developed a 3D environment which allows for the customizable simulation of objects rolling down a ramp. This helps to demonstrate Newton’s laws of motion.



As the objects are rolling down the ramp, the simulation collects real time data of the objects’ motion without the chance of human error. These data sets can be graphed and shown to students to help display the different aspects of Newton’s laws.

Scott demonstrated this module very early in the year to Kurt Nostrant’s 8th grade classroom at Athens Middle School. Kurt has expressed how much Scott’s presence in the classroom excites the students and helps them to gain a more enthusiastic approach to science.

Mass and Volume



At Roseville Middle School, graduate fellow Chad Mourning recently presented his Mass and Volume module in Tim Taylor’s 6th grade classrooms. The module helped to reinforce the idea that objects can be the same size yet have different masses and that larger objects can have a lower mass than smaller objects. The module allows students to interactively use a balance to test the different masses of objects.

Chad’s module helped the students of Roseville Middle School form a better understanding of density, volume, and mass and how these concepts relate to one another. “All in all, the kids enjoyed it. Tim and I both think it was a success, and the students definitely learned” from the module.

NSF GK-12 STEAM Module Development

Where in the Rock Cycle is Taterman?

Graduate fellow Eric Petri has been developing a Rock Cycle module for Becci Hartline's 6th grade students at Belpre Middle School. The students are able to choose between three characters and then they must travel through the Rock Cycle to catch Taterman. The unique aspect of Eric's module is that it includes audio clips of Eric reading the information to the students with the option of replaying the clips if necessary. This is a great feature for students who struggle with reading and comprehending written material.

Becci enjoys having Eric in the classroom to assist her with incorporating more technology than ever before. She is excited about how well the STEAM project has been able to help her teach science in new and innovative ways.



"I am even more excited about the STEAM program than before. It is going to be a great year!"

Becci Hartline
Belpre Middle School
Teacher

Chemical and Physical Changes

Chemical and physical changes is a concept that many student struggle with each year. Graduate fellow Mitchell Leitch has taken the task of developing a wonderful animation-based game for students. The module presents the students with an animation, then the students must decide whether the change that occurred was a physical one or a chemical one.



Mitch is working with Keith Macartney's 6th grade class at Federal-Hocking Middle School. Mitch feels that his chemical and physical changes module helps the students to learn the material from a new perspective: on the computer screen.

Keith notices that the students are extremely excited when Mitch is in the classroom. Mitch feels that his presence in the classroom gives the students the inspiration to ask insightful questions regarding the material being covered that day.

Energy Golf

Graduate fellow Josh Schendel is one of the two fellows who is bringing Second Life, a 3-D online virtual environment, into the middle school classrooms. Josh has developed a game called Energy Golf in Second Life. With the help of Second Life, Energy Golf is a very interactive environment for students to learn about different types of energy and how they relate to one



another. Josh is working with Mary Ann Hopple's 7th grade classroom at Athens Middle School. Mary Ann enjoys having Josh in the classroom with her to assist with the students that are having difficulty understanding certain science concepts.

Josh and Mary Ann are looking forward to bringing Second Life into an educational environment and are eager to see how the students will act in such an immersive 3D world. Josh is also involved in the middle school's Computer Club and contributing new ideas and interests that the club will want to explore.

HUD & Redi Experiment

Graduate fellow Bruce Bilyeu is also bringing Second Life to a local middle school. He has already built an interactive science lab and is currently building experiments to fill the lab. Sarah Korte's 8th grade at Alexander Middle School will be having her students perform each experiment developed by Bruce to instruct the students about the importance of the Scientific Method and safety concerns in the lab. Bruce has also developed a versatile tool called a Heads-Up Display (HUD), which allows students to have a more interactive experience with

each experiment by letting the students form their own hypotheses and follow the outlined procedure. Bruce's module aims at reinforcing important fundamental concepts.



Visit Us Online
<http://vital.cs.ohiou.edu>



Editors

Eric Petri, ep161302@ohio.edu
Andrew Goodnite, goodnite@ohio.edu

New Member of VITAL Team

Andy Goodnite joined VITAL in September 2006 as the assistant director for the lab. As a recently retired Major with the United States Air Force, he brings a wealth of project management and leadership experience to the project. Andy also has an excellent scientific background, with a Bachelor's degree in atmospheric sciences, minors in both math and physics, and a Master's degree in meteorology. Andy lives in The Plains with his wife Regina and daughters Jessica and Amy. Regina is a full-time homemaker; Jessica is working on her International Affairs degree at OU while Amy is attending Athens High School. Andy and Regina enjoy walking, so if you're ever in The Plains and see them on their evening walk, stop by and say hello. Andy also enjoys weight lifting, hiking, biking, wood-working and church activities.



Computer Club Involvement



Josh Schendel has taken his fellowship work at Athens Middle school to a new level. Josh actively participates in the middle school's Computer Club and helps to promote new topics of interest.

Currently, Josh is introducing the Alice computer program to the students. Alice is a user-friendly programming application that helps students to learn the fundamentals of computer programming while making visual objects do certain tasks.

When Josh demonstrated the capabilities of Alice to the students, the students thought it was a great tool and felt it would be an easy program to use.

Josh has reported that some students have already developed significant simulations in Alice and conquered many of the programming foundations. Students who may be interested in computer programming can use Alice to get a head start in learning many of the essential topics. At the 7th grade level, this is an exceptional accomplishment for a middle-schooler to achieve. Josh will continue to work with the Athens Middle School computer club throughout the year and he is excited to see what other developments the students will come up with.

Current Projects (continued from page 1)

The **Educational Software Engineering Process** project, funded by the NSF and the Special Interest Group on Computer Science Education, is designed to enrich student experiences and improve student learning in software engineering courses. The lab has adopted the service learning approach pioneered by Purdue University, the stabilize-and-enhance approach proved effective by Rice University, and the open-source software development approach shown to be successful by the software community at large.

Two **Second Life Professional Learning Communities**, sponsored by the Ohio Learning Network, are introducing immersive learning environments to Ohio University and Appalachian Ohio high schools and middle schools. The goals of these learning communities are to:

- 1) create teaching aids and interactive science experiments in Second Life that are based on university curricula and the Ohio K-12 Science academic Content Standards
- 2) help instructors learn to use Second Life teaching aids in class
- 3) establish an active community of K-12 teachers and Ohio University faculty members who are interested in introducing the Second Life synthetic world to their classrooms."

Number of Middle School Students Reached through STEAM

Bruce Bilyeu and Sarah Korte — Alexander — 136 students
Mitchell Lietch and Keith Macartney — Federal Hocking — 63 Students
Scott Nykl and Kurt Nostrant—Athens — 101 Students
Joshua Schendel and Mary Ann Hopple — Athens — 107 Students
Mark Smearcheck and Angela Adams — Miller — 74 Students
Eric Petri and Rebecca Hartline — Belpre — 86 Students
Jim Wyllie and Jackie Hlubb — Belpre — 76 Students
Chad Mourning and Tim Taylor — Roseville — 60 Students

VITAL Project Leaders

Chang Liu, Ph.D. — liuc@ohio.edu
David Chelberg, Ph.D. — chelberg@ohio.edu
Teresa Franklin, Ph.D. — franklit@ohio.edu
Tiao Chang, Ph.D.— chang@ohio.edu
Katherine Milton, Ph.D. — milton@ohio.edu
Christopher Kessey—kessey@ohio.edu
Andy Goodnite — goodnite@ohio.edu