Virtual EnvironmentsScience Learning via Multi-User EcoMUVE: Promoting Ecosystems

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EnvironmentMUVE: Multi-User Virtual Virtual

• Immersive simulated world
• Virtual representation called an avatar
• Move through virtual environment
  objects and tools
• Interact with digital
• Interact with other
  users and with
  computer-based agents
Rationale

that are hard for students to understand. • Ecosystems have complex causal dynamics • We have seen that Multi-User Virtual Environments (MUVEs) can help students engage in authentic science inquiry and gain a deeper understanding through immersion in virtual worlds. based curriculum that will enable a richer understanding of ecosystems and complex • Our goal is to develop EcoMUVE as a MUVE-causality.
EcoMUVE project specifics

Education Sciences, U.S. Department of
Research project funded by the Institute of
June 2012)
Timeline: July, 2008 - July 2011 (extended to
• Targets middle school science (ages 11-14).
• Two MUVE-based modules: Pond and Forest an inquiry-based approach.
• Each module is a two-week unit to teach about ecosystems and complex causal patterns, using
Why MUVEs for Science Education?

- Increased engagement in learning in school settings.
- Simulated experiences otherwise impossible.
- Supports for accessing and visualizing complex phenomena.
- Exploration over time, place, size, and scale – ended environment.
- Jigsaw pedagogy – problem-based, open-ended.
- Opportunities to take on roles, work in teams, supports inquiry.

MUVES create a **shared immersive experience** that contextualizes learning and
learning Immersion
engagement, and
exploration, discovery. • Species scavenger hunt – opportunities for self-directed • Links to food web
Food Web tool

You have 15 out of 52 connections.
Effects at a distance and over time

eutrophication of a local pond. Long period of time. Students discover that fertilizer runoff from a distant development causes the eventual Effects in ecosystems are often at a distance and over a
Non-obvious causes cannot see play a critical role in the pond ecosystem. pond, helping students understand that organisms that they A submarine tool explores the microscopic organisms in the
Module 2: Forest
Recent research

BioMUVE during Spring, 2011. • Over 20 teachers and 1200 students used both modules. • Each classroom used either Pond, Forest, or diverse populations of students. • Broad range of classrooms: 4th/5th – 9th grade, /–9 5th
• Study of the Pond module and a similar non-
• Many teachers participated in a comparison MUVE curriculum. We collected lots of data…
Goals for Fall 2011

interviews, and logfiles. • Data collected last year includes pre-post surveys, student artifacts, video,
• We have funding this year to:
  – score, enter, and analyze the data
  – finalize the curriculum materials implementations – and possibly run further classroom
have background or skills in: Research projects – do you

• Assessment, statistical methods
• Ecology and ecosystem science
• Middle school science teaching
• Curriculum development
• Flash or other web programming
• Gaming and virtual environments
• Graphic design
EcoMUVE project tasks

Data, including:
1. Help with scoring and analysis of both qualitative and quantitative assessment
   a. Pre-post surveys
   b. Student interviews
   c. Teacher interviews
   d. Student artifacts
   e. Logfiles
   f. Videos
Concept Maps

- Hawks
- Chipping sparrow
- Ovenbird
- Fewer shrubs
- Fewer mammals
- Fewer ticks
- White-tailed deer
- Fewer trilliums
- Nolves
- Lyme disease
- Fewer visitors
Log file data

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EcoMUVE project tasks

including:

2. Final editing of project materials,
   a. Project website
   b. Curriculum materials
   c. Teacher training materials
   d. Assessments
   e. Flash-based tools (food web, learning
   f. On-line surveys
EcoMUVE project tasks

possibility this fall. Additional classroom data is also a 3. Working with schools and collecting experience.

Interview background, teaching for classroom visits, videography or – Useful to have flexible daytime schedule