3D Virtual Worlds and the Active Worlds Toolkit

**Our contribution to the discussion of spatially explicit,
multi-participatory
software platforms for the
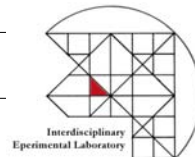Interdisciplinary Experimental Lab**

Katy Börner & Shashikant Penumarthy

InfoVis Lab, SLIS, IUB

Woodburn Hall 220, Dec. 1, 2004

Overview

3D virtual world universe http://iuni.slis.indiana.edu/ and the

tracking/visualization tools we developed
http://ella.slis.indiana.edu/~sprao/research/virtualworlds/index.php
This presentation continues my talk on "Using 3-D Virtual Desktop Worlds to
Study Spatially Referenced Human Behavior", 1/14/2002.

NetLogo http://ccl.northwestern.edu/netlogo/ interface/scripting language which I
believe is very easy to use - it is not designed to support the experiments you are
conducting).

Modular software architecture of the IVC software framework we developed
http://iv.slis.indiana.edu/sw

Information Visualization Laboratory at SLIS, IUB

Interdisciplinary
Experimental Laboratory

IV LAB
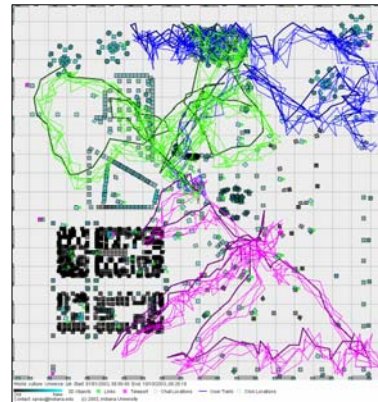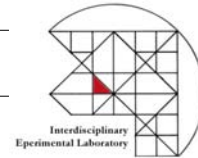
Analysis and Visualization of

➢ User Activity Patterns over Time and Space

➢ Structure and Dynamics of Scientific Fields
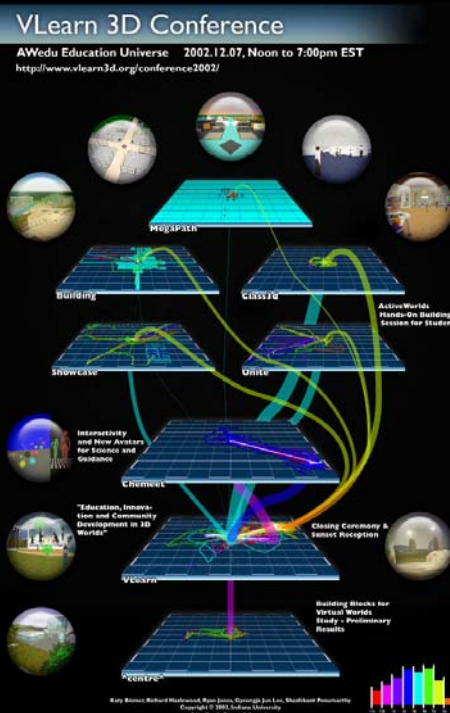
➢ Scholarly Information Diffusion

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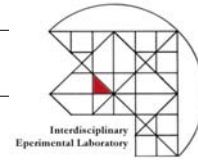---

Social Diffusion Patterns

Temporal-spatial distribution of Conference attendees

➢ Conference worlds are represented by square, perspective maps, each labeled by its name.

➢ Worlds accessed at the beginning of the conference are placed at the bottom, worlds accessed later toward the top.

➢ Next to each world is a circular snapshot of the virtual venue. Short descriptions of the main sessions are added as text.

➢ Major jumps between worlds are visualized by transparent lines. The thickness of each line corresponds to the number of traveling users. Color coding was used to denote the chronological paths of the conference sessions.

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VLearn 3D Conference
AWedu Education Universe   2002.12.07, Noon to 7:00pm EST
http://www.vlearn3d.org/conference2002/

Why 3-D?

Collaborative 3-D Virtual Worlds Offer

➤ Natural, multi-perceptual interaction engagement - spatial sound, animation, video, … (Brill, 1993).

➤ Exploitation of spatial metaphors. Connecting information to space. Spatial maps that ease navigation can be build more easily.

➤ Sophisticated self representation (avatars wave, dance, …, interact).

➤ Change of perspective – avatar view or third person view (Loftin, et al., 1993; Dede, et al., 1996)

➤ Presence (Barfield & Weghorst, 1993) & Telepresence (Steuer, 1995; Biocca, 1995).

Why 3-D? cont.

➤ Real context of interaction. Environment supports and triggers discussion.

➤ Shared awareness promotes informal communication of informed, frequent (Kraut et al., 1988; Whittaker et al., 1994).

➤ Abstract concept representation (Byrne, 1996; Winn, 1993).

➤ Worlds are available online 24/7.

➤ Bots.

➤ User logs.
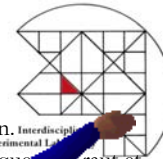
Available 3-D Desktop Browsers
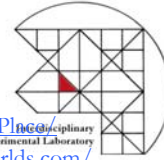
- Sony's Community Place http://www.sony.co.jp/en/Products/CommunityPlace/
- Active Worlds Technology by Activeworlds.com, Inc. http://www.activeworlds.com/
- Blaxxun's online community client-server architecture www.blaxxun.com/community
- Microsoft's Virtual Worlds Platform http://www.vworlds.org/
- Adobe Atmosphere http://www.adobe.com/products/atmosphere

(Many more are listed at http://vw.indiana.edu/tutorials/browsers/)

How many of you
have explored those?

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Basic Functionality

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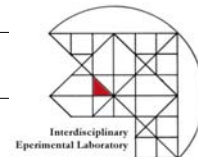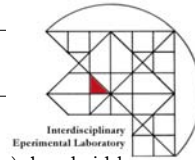
3-D Graphics Window

Toolbar
for Avatar
Actions

Web
Browser

List of
Worlds

Chat Window

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Desirable Characteristics

➢ Low price. Easy and fast download & install.
➢ Minimal hardware (disk space, processor power), software (multi-platform), bandwidth (modem) requirements.
➢ Technical stability & continuity.
➢ Handle large-scale terrain & high number of simultaneous users.
➢ Easy 3-D building & linking to 2-D Web space.
➢ User tracking and mapping facilities (log file statistics, world mapping, etc.).

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Active Worlds Technology
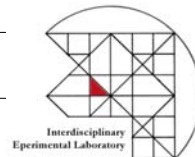
◆ The "main" Active Worlds UniServer hosted by Activeworlds.com, with over 30,000 registered citizens, uses approximately 18 megabytes of disk space.
◆ An Active Worlds UniServer with 10 worlds and 100 users in it simultaneously would typically use less than 5% of the CPU of a 400 MHz Pentium.
◆ The bandwidth is on average 50 bytes/sec per user. UniServer with 100 simultaneous users requires approximately 5K/sec of bandwidth.
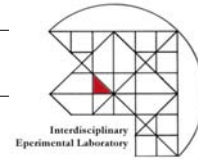
shared virtual spaces for learning

In Active Worlds you can:

• Shop online in our own 3D virtual reality mall and chat with store clerks
• Explore over 1000 unique virtual

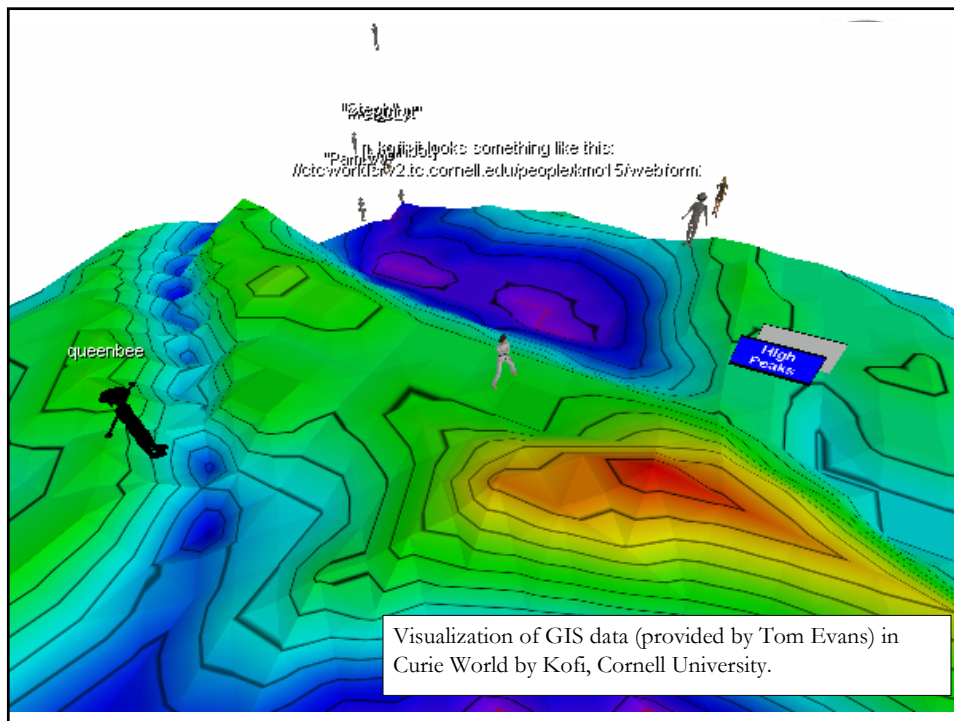*Spatially explicit, m*

AW Eduverse Browser

Is available
- In the SLIS Shepherd Lab.
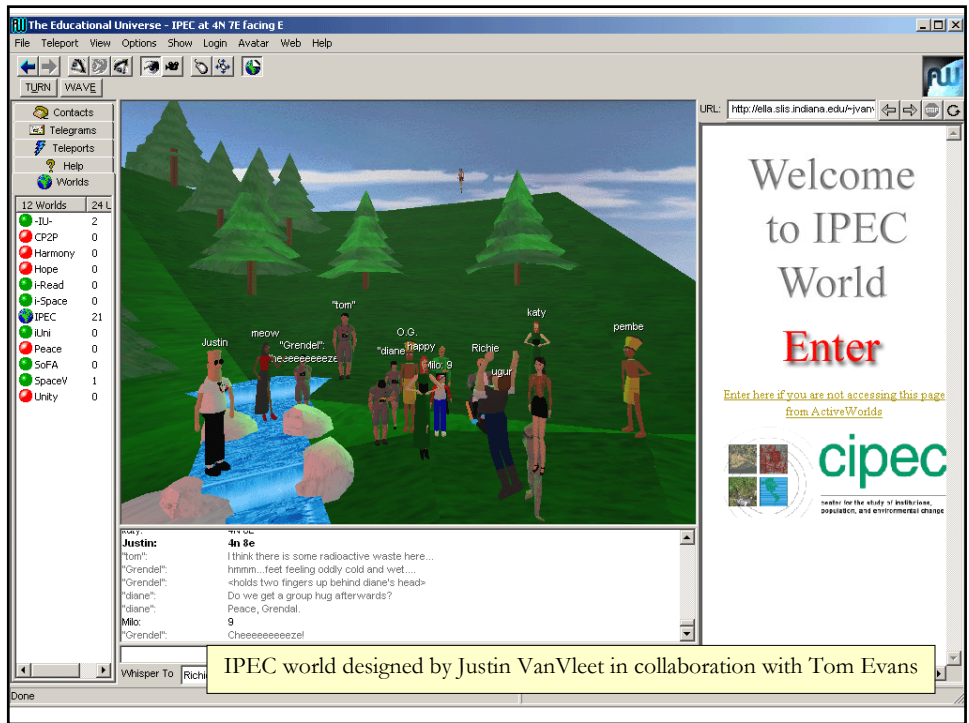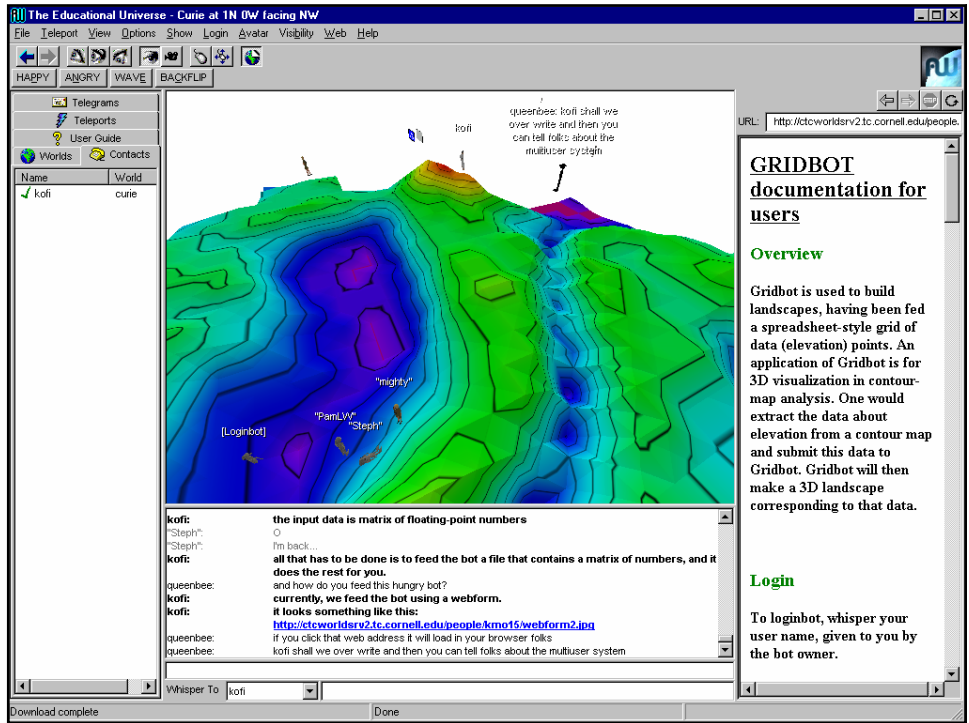- On all IUB and IUPUI UITS computers.

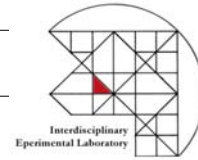- Feel free to download the browser and visit the AW universe or EduVerse via
  http://iuni.slis.indiana.edu/participate.html

Tutorials:
- Active Worlds http://www.activeworlds.com/
- Active Worlds Help http://www.activeworlds.com/edu/help/
- Active Worlds Resources
  http://www.activeworlds.com/community/resources.html
- Newsgroups http://www.activeworlds.com/community/news.html

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Visualization of GIS data (provided by Tom Evans) in Curie World by Kofi, Cornell University.

IPEC world designed by Justin VanVleet in collaboration with Tom Evans

Needed Extensions to Augment & Guide

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Eperimental Laboratory*

➢ Overview map with landmarks.
➢ What places to see, what to do?
➢ What are the most popular places?
➢ What is new?

➢ Who is online?
➢ Whom can I ask for which information?
➢ When is xx typically available and where?
➢ …

> *"What attracts people most,*
> *in sum, is other people."*
> (William H. Whyte)

Needed Extensions to Evaluate & Study (I)

*Interdisciplinary
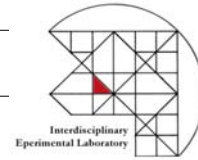Eperimental Laboratory*
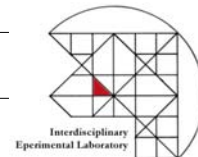
General usage patterns
  Where do users login from? Who are they? How long do they stay?
  Do they login regularly or irregularly?
  How many people are in the world at which time?
  Are there general bursts of activity?

Navigation patterns
  Which general routes do users take?
  What are the most popular places?
  How do people move and place themselves in urban space?
  Are there well-traveled paths that may indicate a particular problem solving strategy?
  Which places are multi-way branching places, pass through places, or (final) destination areas?

Needed Extensions to Evaluate & Study (II)

Manipulation patterns

    Who manipulates which objects, when?

Conversation patterns

    Where do people talk?

    Which places in 3D are used for long, intricate, never-ending   discussions and which are sites of quick exchanges?

    How long, about what, whom do people talk to?

    What is the size of conversational groups?
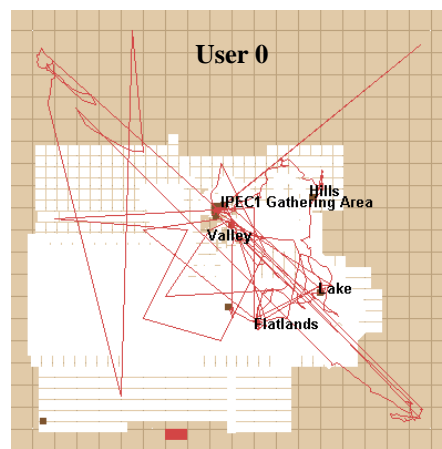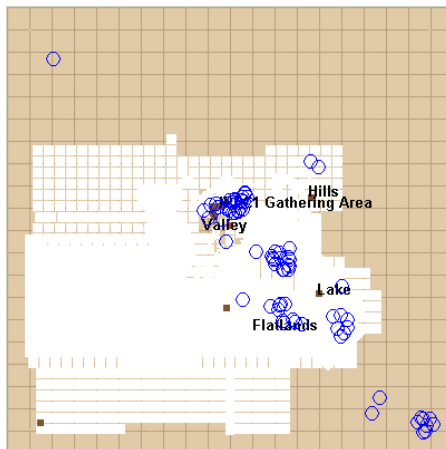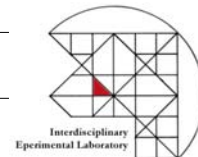
    How do conversational topics evolve?

    How does the environment influence conversational topics?

Web access patterns

    Which web pages are accessed by whom, when, from where, and how often?

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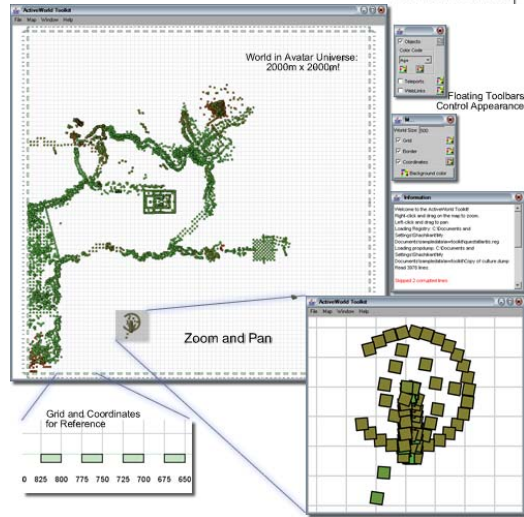## First Maps & User Visualizations

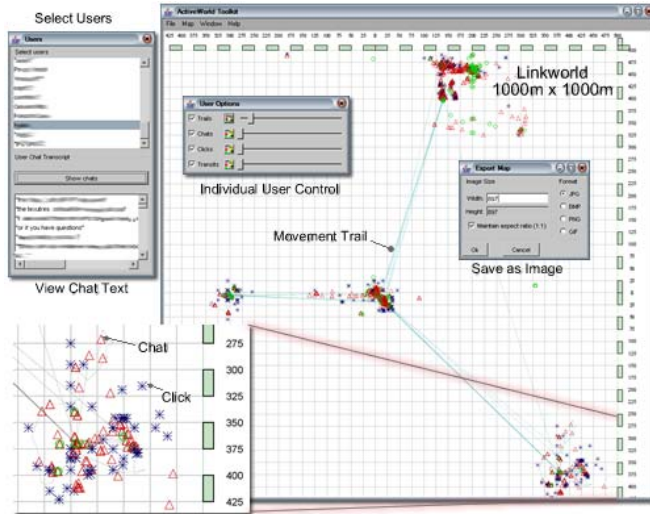*Spatially explicit, multi-participatory software platforms … 2004.12.01*

Today's Tracking/Visualization tools

Active Worlds Toolkit

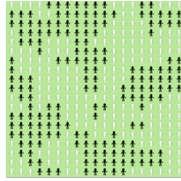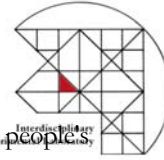http://ella.slis.indiana.edu/~sprao/research/virtualworlds/index.php

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2) NetLogo

SitSim by Nigel Gilbert models one theory of how people's attitudes are influenced by other people.

The impact of one turtle on another is calculated using an inverse power law, that is, the influence of one turtle on another is inversely proportional to their separation. So a nearby turtle is more influential than one far away. The influence also depends on the other turtle's persuasiveness, its 'strength'.

http://ccl.northwestern.edu/netlogo/models/community/Sitsim
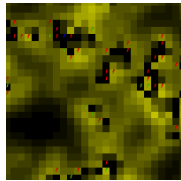
Wealth Distribution by Michael Gizzi, Richard Vail, and Tom Lairson models the "The rich get richer and the poor get poorer" effect. It extends Epstein & Axtell's "Sugarscape" model but uses grain instead of sugar. Each patch has an amount of grain and a grain capacity (the amount of grain it can grow). People collect grain from the patches, and eat the grain to survive. How much grain each person accumulates is his or her wealth. (Gini index measures the gap between the actual line and the 45° line)

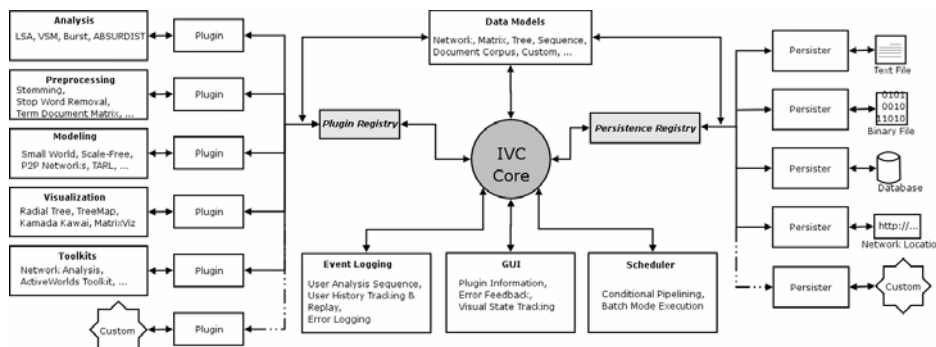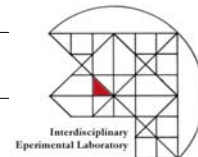*http://ccl.northwestern.edu/netlogo/models/community/new_wealth_distribution*

Many other models are available at
http://ccl.northwestern.edu/netlogo/models/community/Sitsim

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3) IVC Software Framework – Core
(http://iv.slis.indiana.edu/sw)

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