Social Presence in Immersive 3D Virtual Learning Environments

Minjuan Wang, Sabine Lawless-Reljic
belleminjuan@gmail.com
San Diego State University

Marc Davies
Victor Callaghan
University of Essex

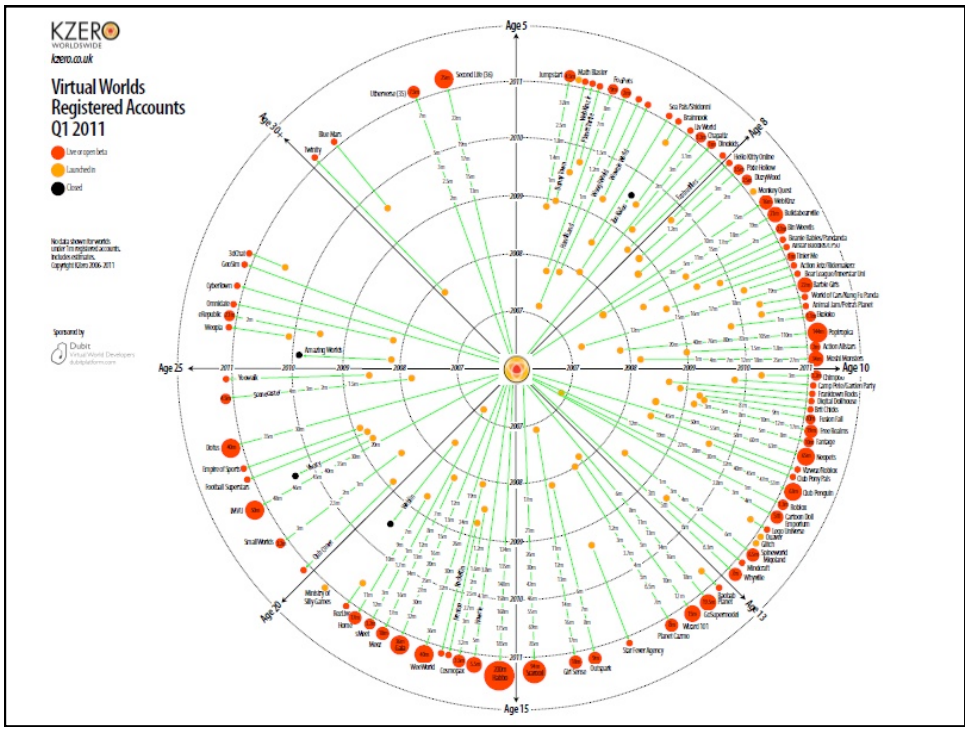
Our Absent but VIP Co-presenter

Background…

- Ambient Intelligence (AmI) has historically addressed the interaction of people with computer controlled physical worlds.
- Growing interest in their virtual counterparts, such as Second Life.
- Employ avatars to establish their social presence in a wide variety of ways.

Abstract

- This paper:
  - introduces two popular virtual reality tools
  - presents a comprehensive review of the literature related to social presence,
  - and describes our practical work in progress towards constructing a mixed reality iClassroom.


KZERO
WORLDSWIDE
kzero.co.uk
Virtual Worlds
Registered Accounts
Q1 2011
Live or open beta
Launched in
Closed
No data shown for worlds under 1m registered accounts. Includes estimates. Copyright KZero 2006-2011
Sponsored by
Dubit
Virtual World Developers
dubitplatform.com
Age 5
Age 8
Age 10
Age 13
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Age 25
Age 30+
2011
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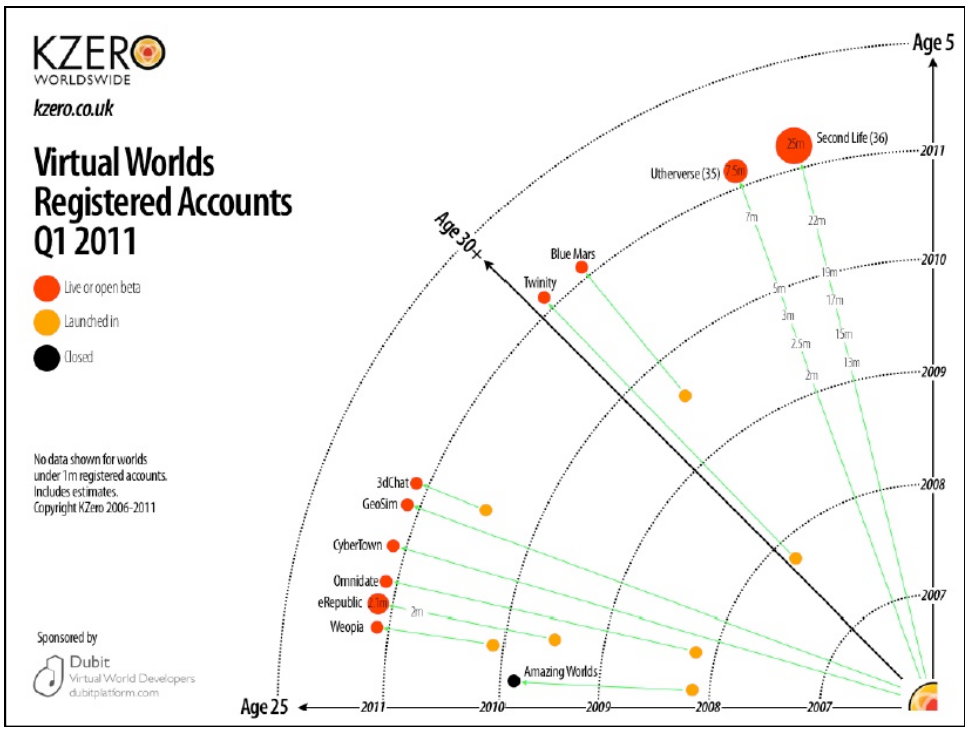
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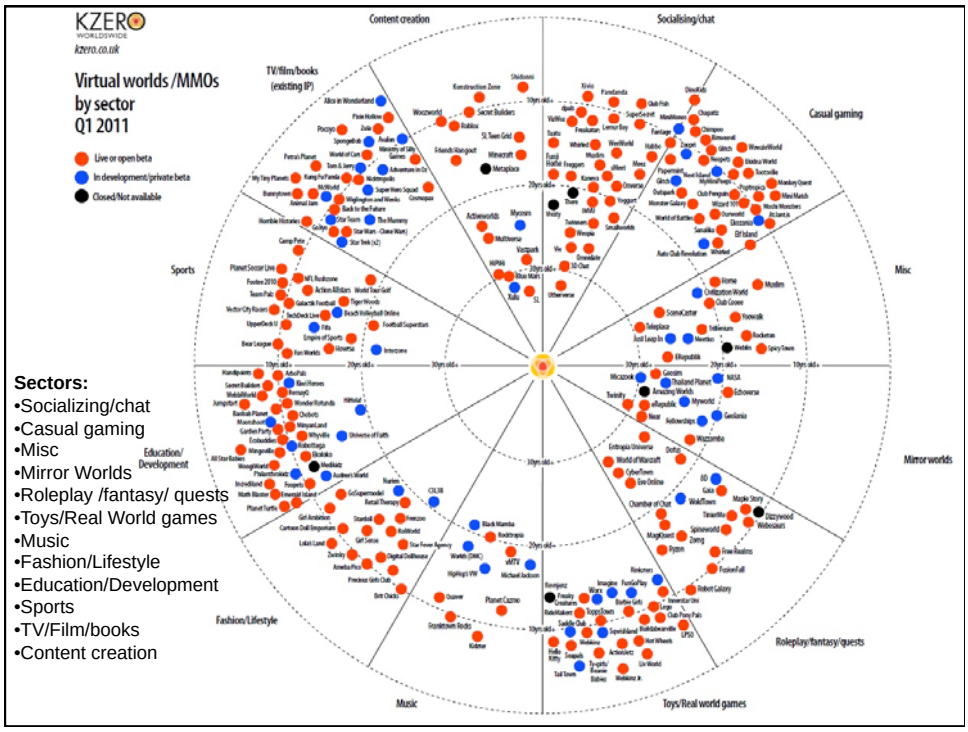
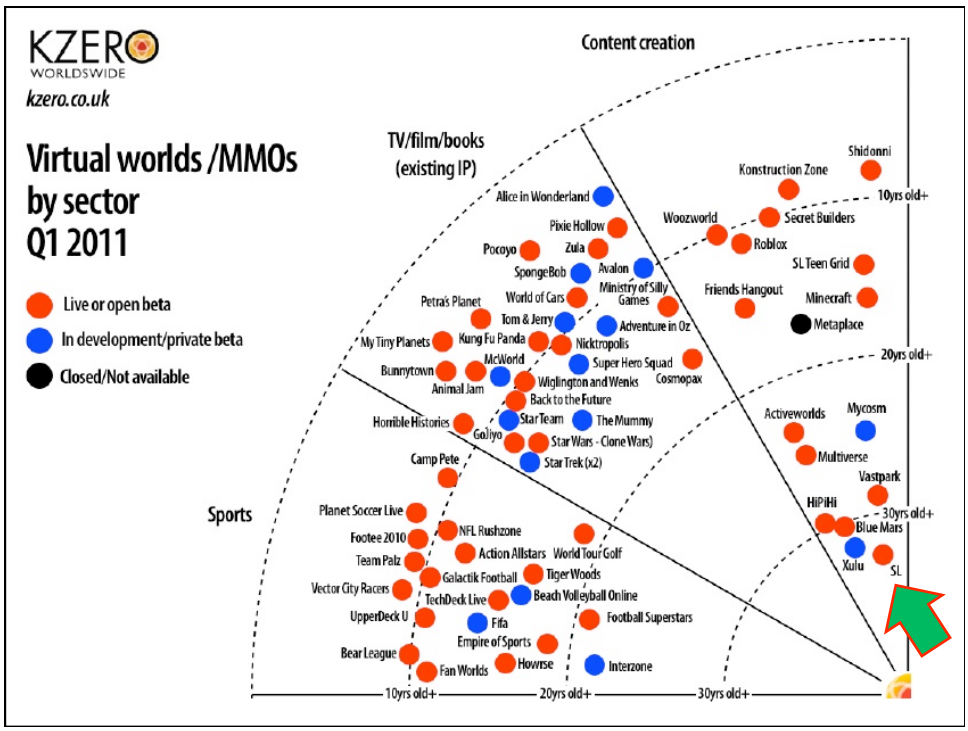
Second Life (36)
Utherverse (35)
Blue Mars
Twinity
3dChat
GeoSim
CyberTown
Omnidate
eRepublic
Weopia
Amazing Worlds

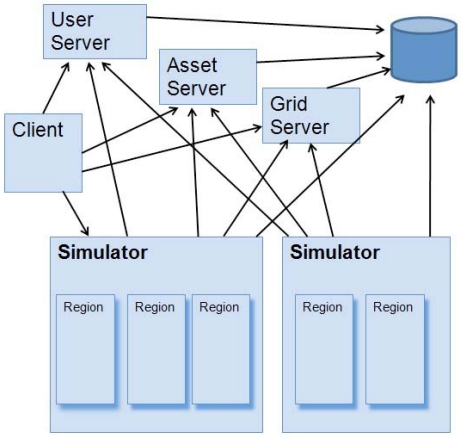


Sectors:
- Socializing/chat
- Casual gaming
- Misc
- Mirror Worlds
- Roleplay /fantasy/ quests
- Toys/Real World games
- Music
- Fashion/Lifestyle
- Education/Development
- Sports
- TV/Film/books
- Content creation



Second Life

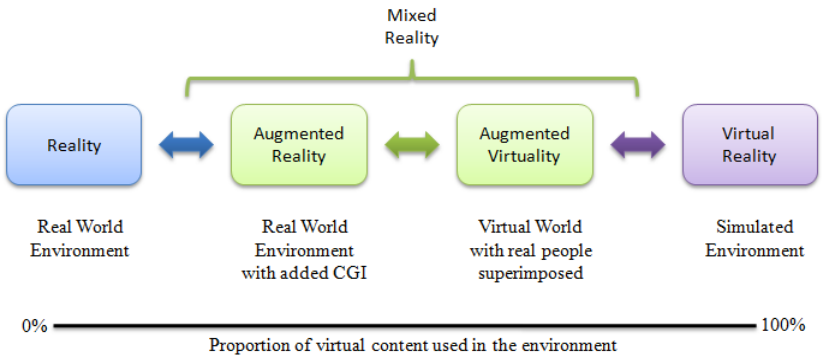
•Linden Scripting Language
•Web-based (browser based version coming soon)



Source: Intel Software Network

What is Mixed Reality?

- Milgram's Reality-Virtuality (RV) Continuum
  - Mixed Reality bridges the real and virtual worlds
  - Categorised by the ratio of physical to virtual content

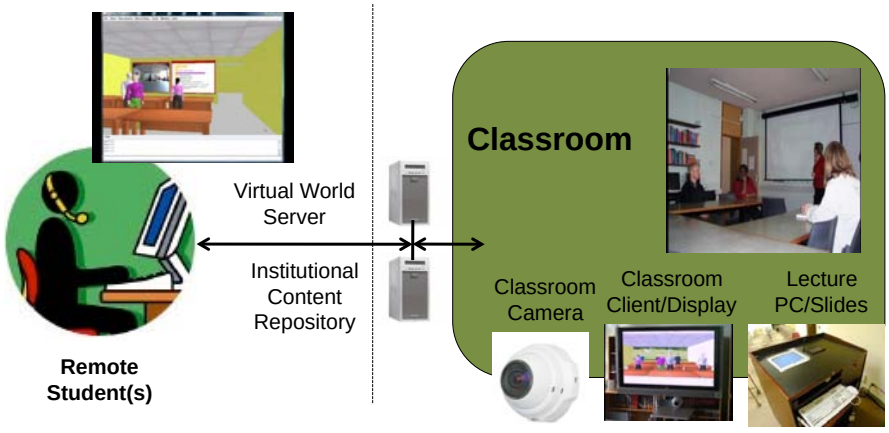


RealXtend: Mixed Reality System

- Virtual world
  - Built using the open-source RealXtend software
  - Derived from OpenSim (& Second Life)
  - Programmed using C# and Python
  - OGRE graphics engine
  - Graphical content created using the *Google SketchUp* graphics editor, and modified *Google 3D Warehouse* models

- Physical Environment
  - A real world intelligent environment outfitted with sensors, smart devices and other technologies
  - OSGI UPnP wrappers for each intelligent device
  - Java bridge to link physical devices to the virtual world

iClass System Topology



Virtual Reality and Social Presence

- **Sense of presence:** MUVEs have the potential to "significantly reduce the subjective feelings of psychological and social distance often experience by distance education participants" (McKerlich, 2007).
- **Sense of place:** MUVEs are "richly expressive environments that immerse the participant in a setting that includes sound and visual cues, rich textures, and realistic perspective…and vividly create a sense of place" (Johnson & Levine, 2008).
- **Sense of power:** MUVEs allow users "to move around in the virtual world and see it from different angles, to reach into it, grab it, and reshape it" (Rheingold, 1991).

>>Multiple media in a two-way technology

Immediacy

>>Behaviors that bring instructor and students closer together in terms of perceived psychological distance (Andersen, 1969; Mehrabian, 1969).

Immediacy behaviors are conveyed by :

- **Verbal cues** - include calling students by name, using inclusive pronouns, using humor, providing feedback…(Gorham, 1988)
- **Nonverbal cues** – include gestures, vocal variety, smiling at students, making eye contact…(Richmond et al, 1987)



Social Presence

- **Definition**: The feeling that other persons are present even though the characteristics and behaviors of those persons may be represented and observed via mediated communication rather than physical and direct observation (Short, Williams, & Christie, 1976)

- Cognitive synthesis of several factors such as capacity to transmit information about facial expression, direction of looking, posture and nonverbal cues (Short et al, 1976).

Conference Speaker/ Instructor Friend Group

Co-presence

- **Definition:** The perception and response to embodied agents in the same shared space (Bailenson et al, 2005).

- Differences of variables based on **short-term interaction** (common foci of attention, mutual awareness, collaborative task performance) and **long-term interaction** (persistence of character, groups, environments, choice of social rules and conventions, relation between real and virtual (Schroeder, 2002).


MEDIA
TECHNOLOGY
visual
audio
text
manipulative
Two Way
tele-presence
co-presence
social presence
transactional distance
Engagement
User Creation
Immersion
PRESENCE IN 3D
Mental Interaction
Physical Interaction
Mental Immersion
Physical Immersion
immediacy
nonverbal immediacy
verbal immediacy
facial expressions
gestures
Instructor Immediacy Behaviors

Instructor Immediacy

Richmond, Gorham, & McCroskey (1987) to measure nonverbal immediacy.

Examples of nonverbal items

1. Sits behind a desk while teaching.*
2. Gestures while talking to class.
3. Uses monotone/dull voice while talking to class.*
4. Looks at the class while talking.
5. Smiles at the class as a whole.
6. Moves around the classroom while teaching.
7. Has a very relaxed body position while talking to the class.

Gorham (1988) to measure verbal immediacy.

Examples of verbal items

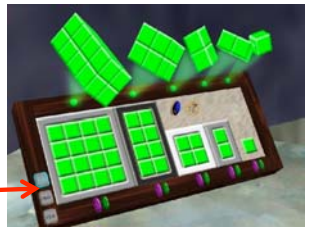
1.Uses personal examples or talks about experiences s/he had outside of class.
2.Asks questions or encourages students to talk.
3.Uses humor in class.
4.Addresses students by name.
5.Refers to class as "our" class or what "we" are doing.
6.Provides feedback on student work through comments, discussions.

* *Presumed to be non-immediate, reverse coded for analysis*

Presence in Second Life

- Text chat: Also called back channel, allows audience to participate simultaneously without interrupting speaker
- Audio via headset
- Body language: via automation (e.g., blinking, smiling, pacing) and avatar puppeteering (e.g., waving, pointing, nodding)
- Building tools based on primitive shapes
- Uploading of user-created objects (scripts, animations, textures, etc.)

Hands-on subquanning object created by Dream Realizations to engage kinetic memory in-world.



Second Life User Interface