



Visual Collaboration and Learning Patterns in 3D Virtual Worlds

Emergence, Elements,
Examples, Evaluation

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Agenda Island



1. History



2. Forms



3. Benefits



4. Study



5. Risks

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Collaborative Knowledge Visualization: Our Research Program Grid



Virtual Worlds – Background & History

- Virtual = „*approaching the actual without arriving there*“ Boellstorff
 - (e.g. ‚she is virtually my sister‘)
 - There is a gap between the virtual and the actual
 - World = large scale social context
 - in the sense of environment or space, but not only
- ⇒ Virtual World :
- Places, Sceneries
 - People & Events
 - Technologies/Artefacts
-

Virtual Worlds – Background & History

- MUDs (Multi-User Dungeons)
 - Text-based virtual worlds
 - *Adventure*, 1975, ARPANET
 - MMOGs (Massively Multi-Player Online Games)
 - including MMORPGs (Role-Playing)
 - *Ultima Online*, 1997, [.....], *World of Warcraft*, 2004
 - Web 2.0
 - Content creation / User-generated content
 - *Producer + Consumer = „Prosumer“*
-

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Varieties of Virtual Worlds

- Second Life
 - Content creation
 - Media integration
 - Stability Problems⇒ All-round solution

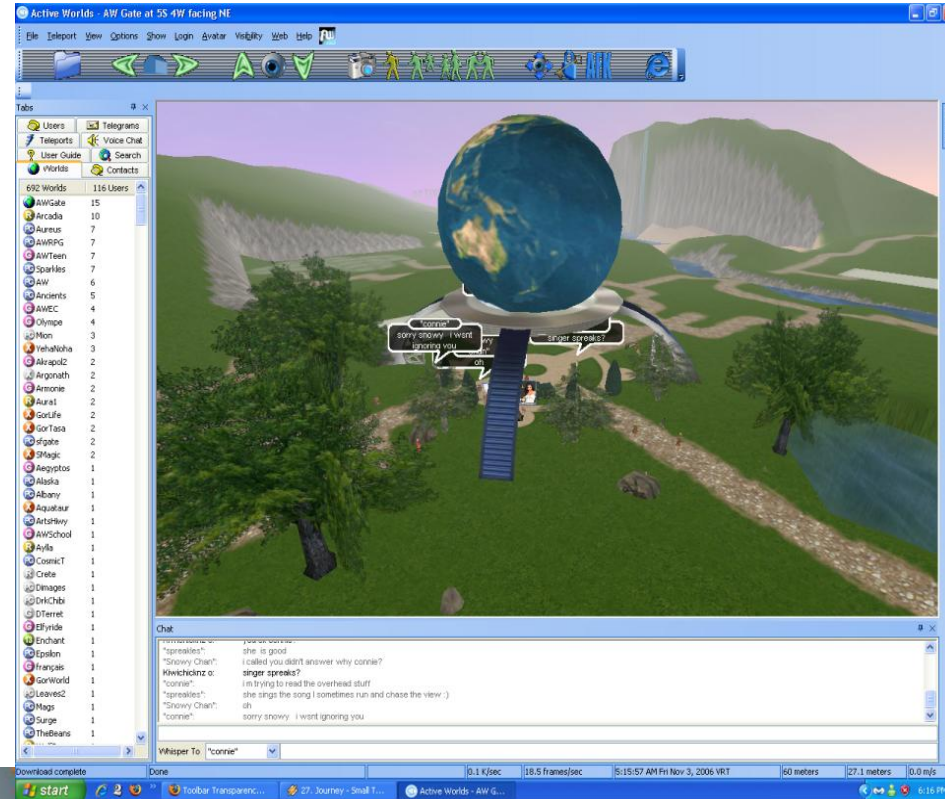
⇒ OpenSim

- Open-source project, based on Second Life code
- „Controllable“, extensible, progressing fast



Varieties of Virtual Worlds

- Active Worlds
 - Content creation
 - Video integration
 - „Controllable“
- ⇒ Corporate use
- ⇒ Rapid Development



Varieties of Virtual Worlds

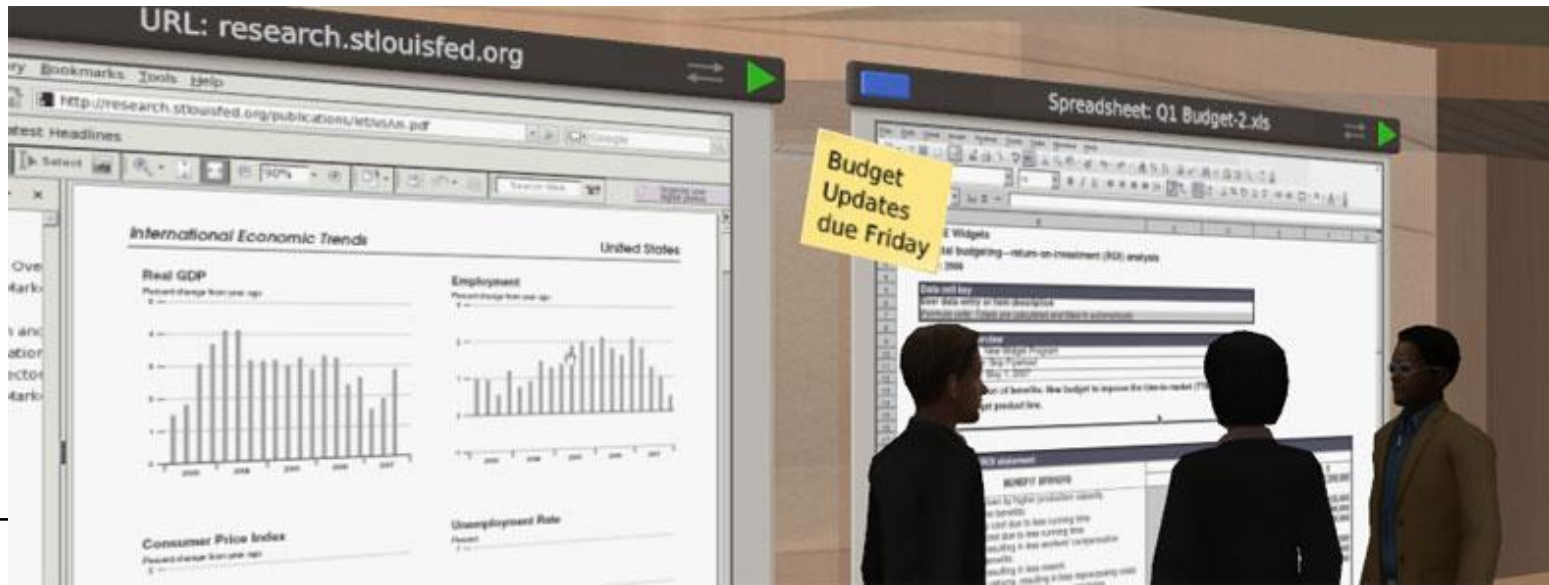
- OLIVE (Forterra)
 - Accurate physics
 - Whiteboarding, App Sharing, SameTime Integration
 - „~controllable“
- ⇒ Simulations
- ⇒ Collaborative Work



Varieties of Virtual Worlds

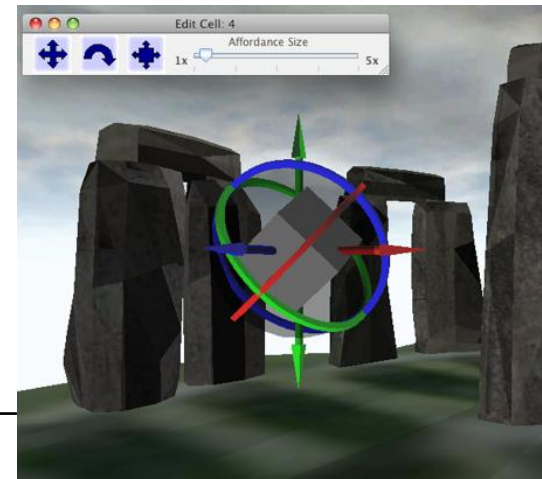
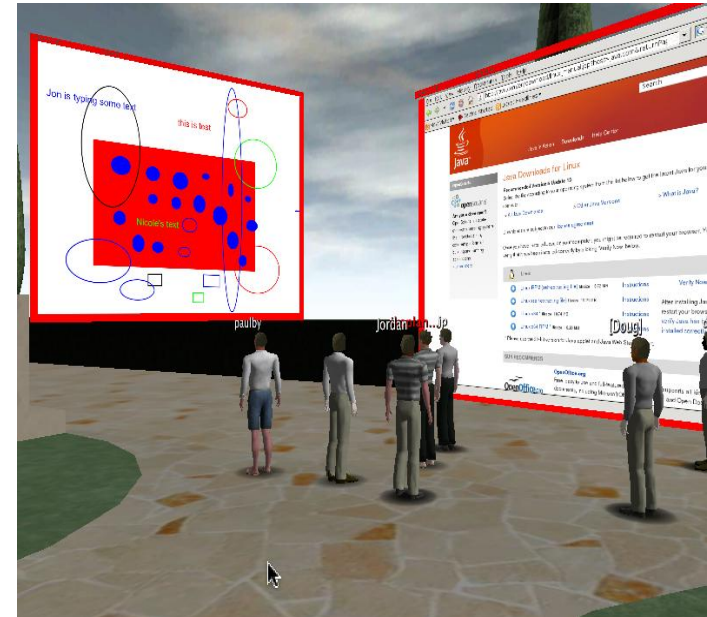
- Qwaq Forums
 - Collaborative Document Editing
 - App Sharing in Development

⇒ Document Collaboration



Varieties of Virtual Worlds

- Sun's Wonderland
 - Content creation, AppSharing
 - Video/PDF viewers, Whitebrd.
 - „Controllable“, extensible
 - ⇒ Flexible (API)
 - ⇒ Very promising project



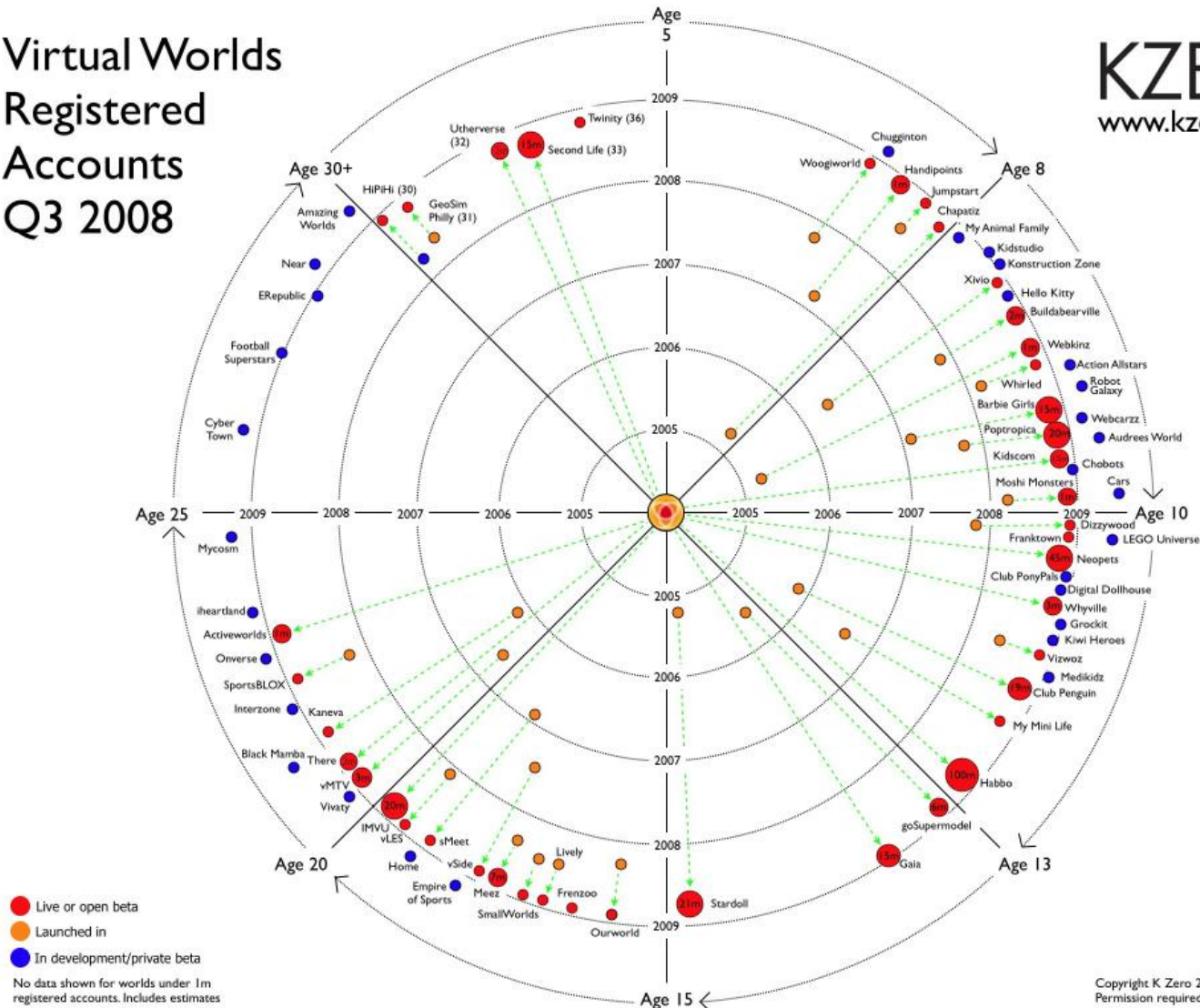
Still More Virtual Worlds

- There.com
 - Entropia
 - Kaneva
 - Twinity
 - Protosphere
 - web.alive
 - Multiverse
 - Club Penguin
 - 3DXplorer
 - Vastpark
 - MTV's worlds
 - Playstation Home
 - Habbo
 - HiPiHi
 - Gaia
 -and many more...
-

Overview of Virtual Worlds

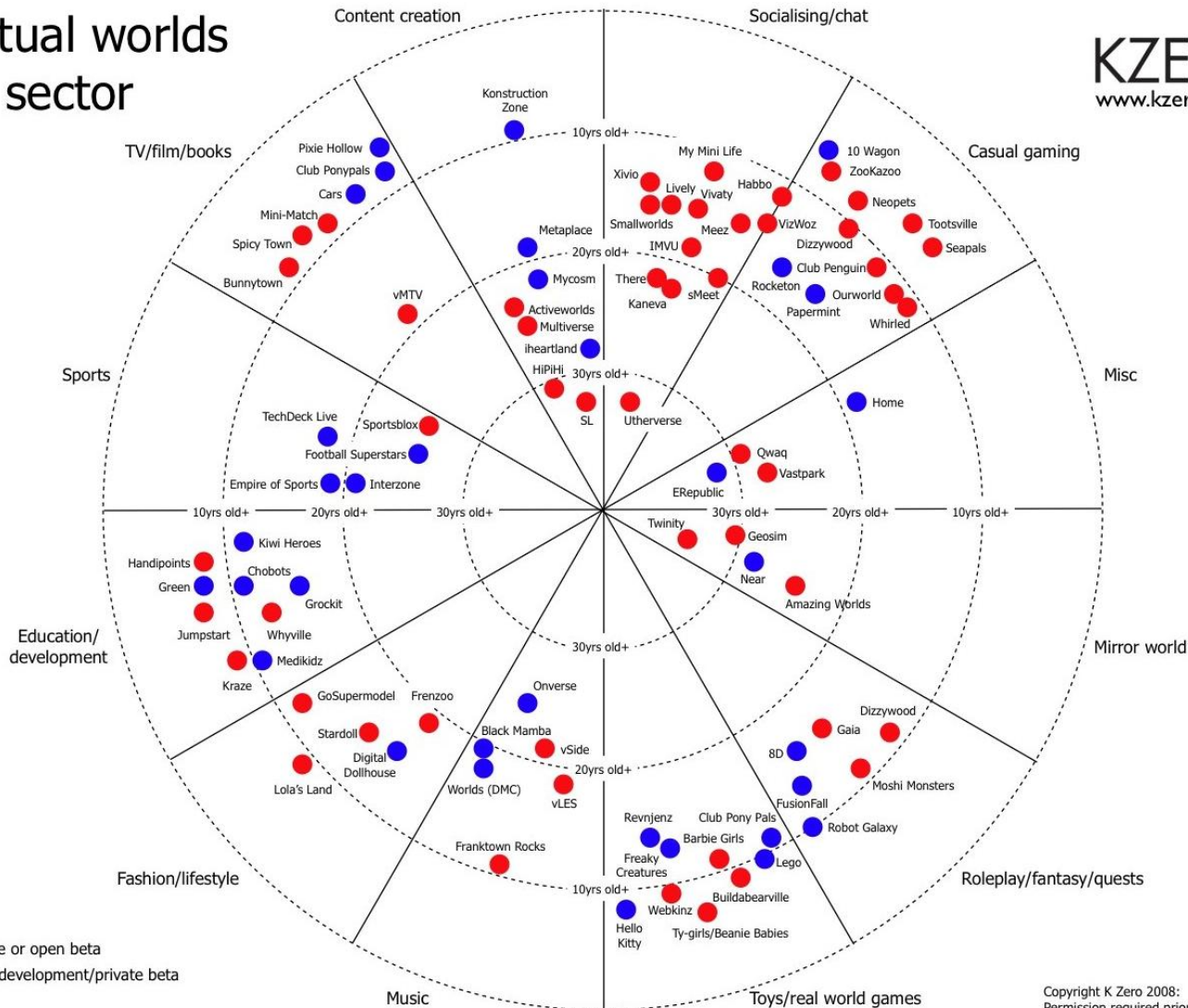
Virtual Worlds
Registered
Accounts
Q3 2008

KZERO
www.kzero.co.uk



Overview of Virtual Worlds

Virtual worlds by sector



Virtual Worlds – Key Elements

- Immersion
 - a) Sensory immersion: Virtual Reality (VR)
 - b) Mentally/emotionally involved: Virtual Worlds (VW)
 - Presence
 - Feeling of 'being there'
 - Measured mainly in VR so far
-

Virtual Worlds – Key Elements

■ Avatars

- „I think of avatars as I think of musicians - why do we need them beyond their musical creations? (...and I do think we need them)“

Kim Flintoff

⇒ Current Research

■ Place / Space

- Fully configurable, responsive environment
- Shared space (socializing, collaboration, ...)

⇒ Current Research



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Stipulated Benefits of Virtual Worlds for Collaboration & Learning

- **Flexible:** from nearly anywhere, anytime, with anyone
 - **Cheap:** low setup costs, no travel costs
 - **Memorable:** picture superiority effect (dual coding theory)
 - **Engaging:** Immersion & Presence lead to increased attention
 - **Rich:** interactive avatars and objects allow for extended communication repertoire.
-

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Research & Virtual Worlds

■ in virtual worlds

- Anthropology (Culture)
 - Economics
 - **Education**
 - Law and politics
 - Psychology
- Sociology / Communities
 - ...
 - Collaborative Work

■ on virtual worlds

- Computer Graphics
- Human-Computer-Interaction (HCI)
- Network Communication
 - ...

Our Research Focus

- Goals
 - Support collaborative *work* through 3D Visuals
 - Support collaborative *learning* through 3D Visuals
 - Motivation
 - It is **unclear how to benefit** from virtual worlds
 - Media richness allows for **memorable experiences**
 - It is **unclear how to design** valuable experiences
-

Our Research Approach

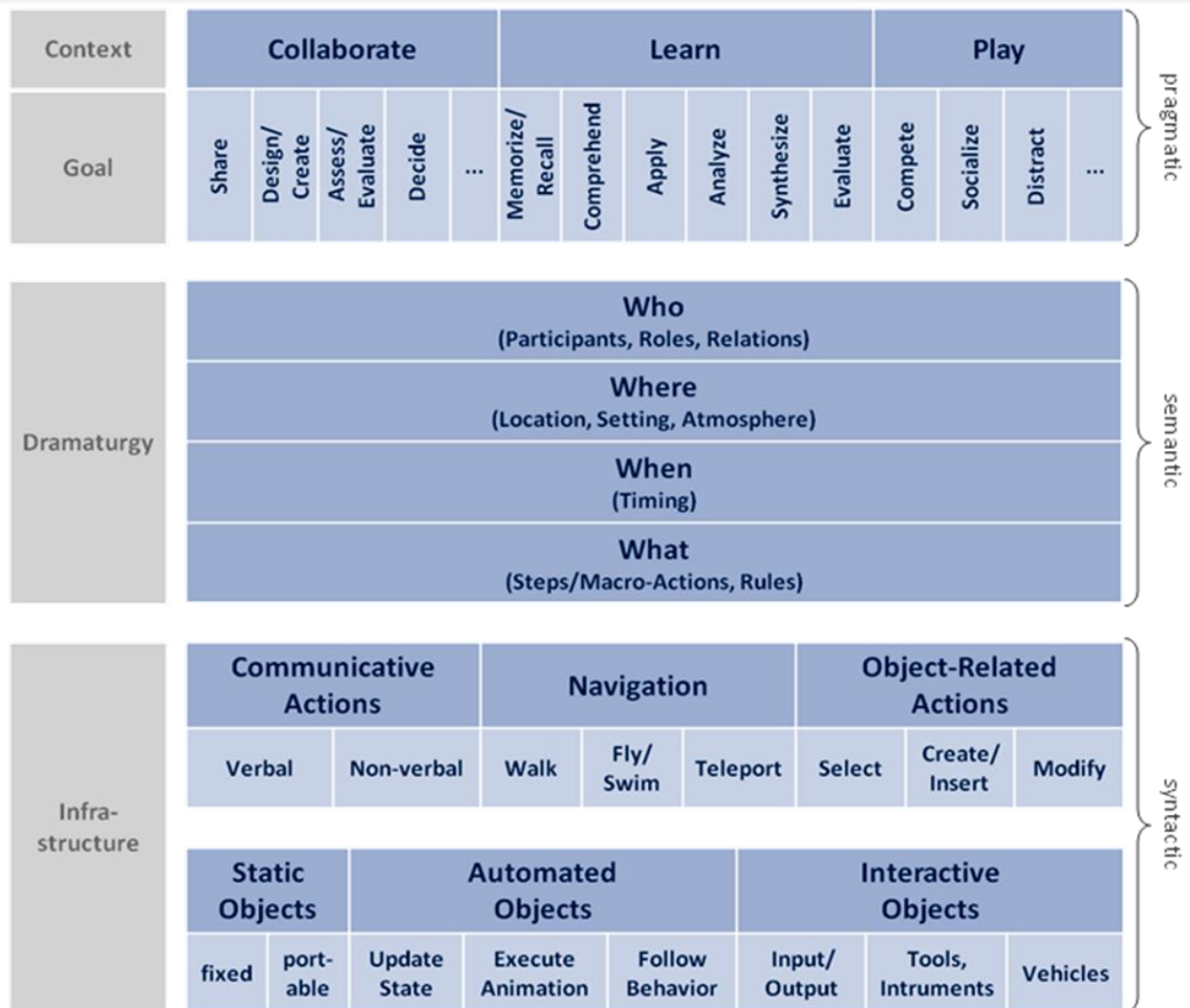
- Pattern

"Description of a known solution to a specific type of problem."

- Collaboration pattern




"Techniques, behaviors, and activities for people who share a common goal of working together in a group."

Our Research: Collaboration Framework

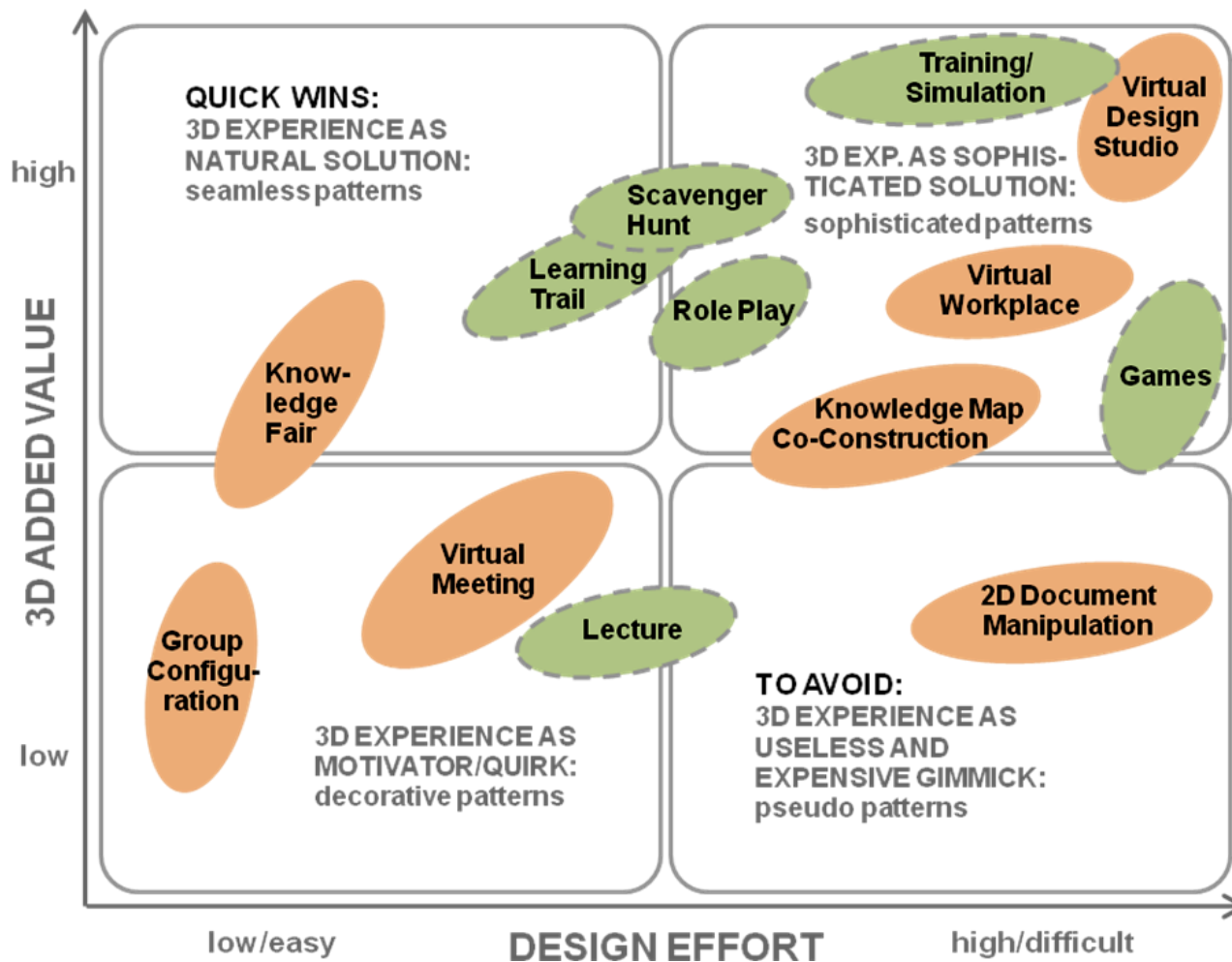


from: Schmeil, A., & Eppler, J.M. (2009). FaVE 2009, Berlin.

Our Research: Collaboration Patterns

Name	Virtual Team Meeting	Virtual Design Studio	Spatial Group Configuration	Virtual Knowledge Fair
Context	Collaborate – project meeting, team meeting, management meeting, etc.	Collaborate – product development, design session, architectural review, etc.	Collaborate – voting by position, division into groups, revealing similarities, etc.	Collaborate – internal knowledge sharing, dissemination, find partners, etc
Goal	Share – knowledge transfer Decide – decision making	Design – design of a physical or virtual object or building Assess – assess, annotate, modify drafts	Decide – vote Share – show preferences and opinions Assess – decide with moving cause	Share – exchange experiences and project information, present work or new products, advertise, network
Dramaturgy	Who: < 15 team members	Who: < 6 designers, product engineers, architects	Who: > 10 or > 30 individuals, depending on utilization	Who: > 30 specialists
	Where: virtual team or meeting room	Where: functional design room	Where: vast field, either subdivided into areas or framed by symbols	Where: convention center, pavilions, show rooms, or other stands
	When: < approx. 1 hour (duration)	When: < approx. 4 hours (duration)	When: < 5 minutes (duration)	When: duration of up to an entire day (synchronous) or week (asynchronous)
	What: define the agenda, discuss its items, screen options, reach decisions, document decisions and next steps, as well as responsibilities	What: prepare design room, agree on design scope, import drafts, edit and modify designs, try out design alternatives, export approved versions	What: define the alternatives for voting/assessing, subdivide area and/or place symbols, let users position their avatars on the field, analyze result	What: prepare stands and hallways/paths showing information and demos, run/execute scheduled lectures and presentations, look after visitors
Infra-structure	Actions Verbal – talk, chat Non-Verbal – show, affirm, decline, vote Create/Insert – upload documents Modify – co-edit documents	Actions Modify – model, sketch, annotate Create/Insert – upload documents Select – select objects or parts Non-Verbal – point, show perspective	Actions Walk – position avatar on a field subdivision or close to a symbol, to communicate vote, decision or assessment answer	Actions Verbal – chat, talk, present Non-Verbal – point, draw attention, demonstrate Walk – roam the fair, meet others
	Objects Fixed – places to sit Interactive – information screens Automated – statistics displays	Objects Interactive – modeling tools, sketching tools, annotation tools Fixed – environment of the object	Objects Fixed – symbols and/or field subdivision Automated – position interpreter for automated data analysis and statistics (optional)	Objects Interactive – modeling tools, sketching tools, annotation tools Fixed – environment of the object
Screenshots				

Our Research: Classification of Patterns



Our Research: Collaboration Experiments

- It is still unclear...
 - ...what value virtual worlds might add
 - ...what enhancements are needed for/in virtual worlds
 - ⇒ Isolate features of Virtual Worlds
 - ⇒ Evaluate / compare to other collaboration technologies (chat/messenger)
-

Our Research: Collaboration Experiments

- **Project goal:** Development of a website that illustrates the financial crisis, tailored to non-experts
- **Project roles:** PM, Content, Development, Marketing



from: Schmeil, A., Eppler, J.M., & Gubler, M. (2009). ICICKM 2009, Montreal.

Experiment: Task 1: Information Sharing



Experiment: Task 1: Information Sharing



Experiment: Task 2: Grounding



Experiment: Task 2: Grounding



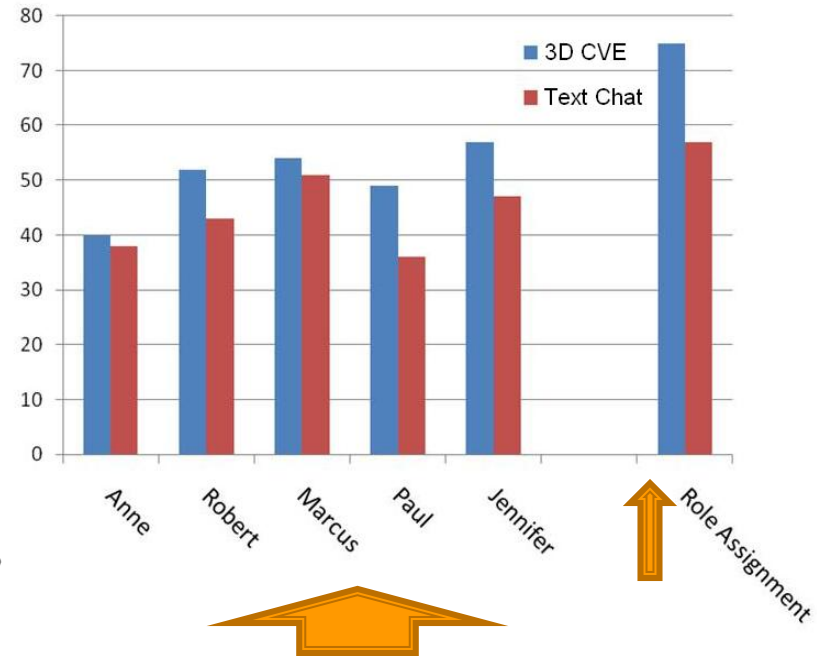
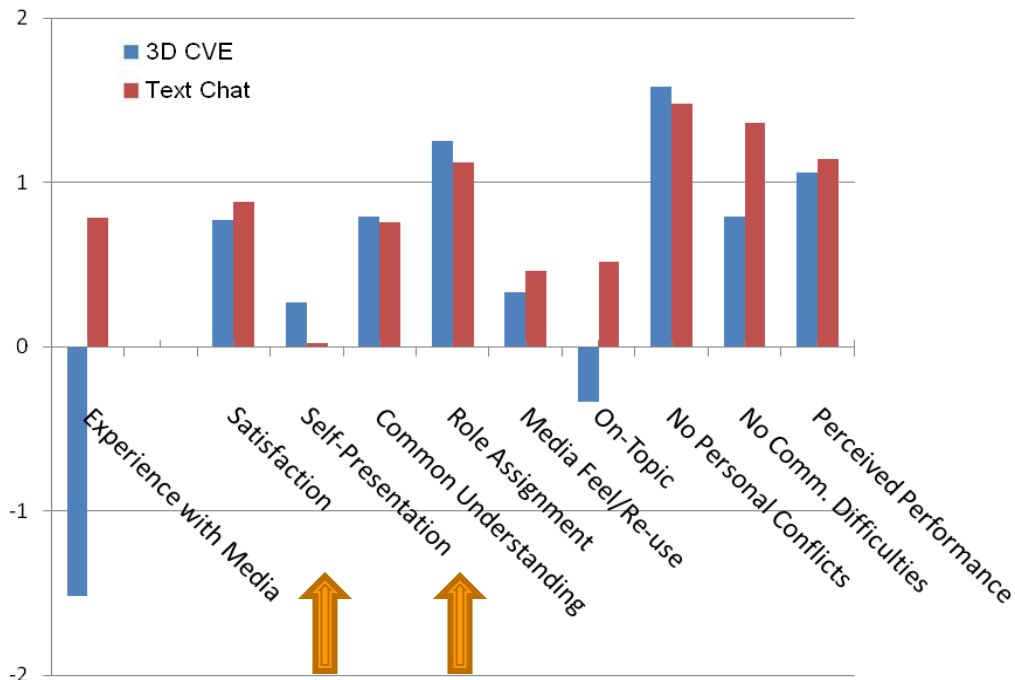
Experiment: Task 3: Decision-Making



Experiment: Task 3: Decision-Making



Experiment: Results



➡ Recall of team members' characteristics and of decisions is better in Virtual World Setting

n = 70

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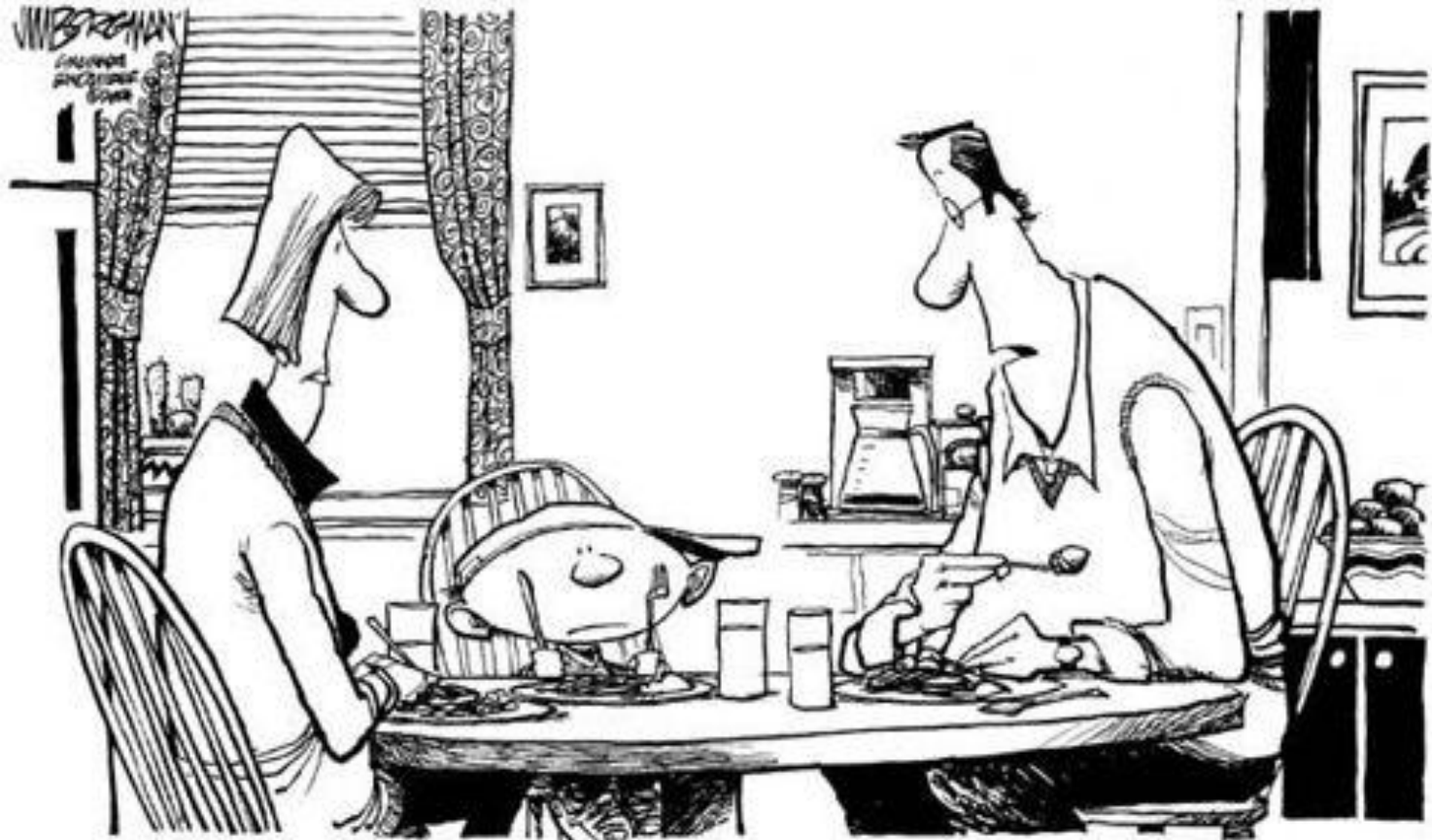


5. Risks

Risks to Consider or Avoid

- Distracting from task when Virtual World is novel.
 - Losing time in building & optimizing environment.
 - Oversubstitution for physical encounters.
 - Underestimating potential for latent misunderstandings.
 - Digital Divide problem emphasized.
-

Risks...



"WELL, YES, WE COULD READ YOUR BLOG... OR YOU COULD JUST
TELL US ABOUT YOUR SCHOOL DAY."

Further Information and Links to our work

- www.visual-literacy.org
 - realvirtualx.wordpress.com
 - www.knowledge-communication.org
 - www.youtube.com/KnowViz
 - www.risk-visualization.org
 - www.youtube.com/Viz4Mgmt
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