Virtual Collaboration
Applied Projects and Tools

Nov. 12, 2009
IDT Roundtable
Online learning may involve synchronous (real-time) and asynchronous collaboration. Learners work together in virtual teams to learn; conceptualize ideas; solve problems; design presentations; develop plans and models; simulate experiences, and form professional relationships. This presentation will spotlight some virtual collaborations for student projects and the technological tools used (learning / course management systems, blogs, wikis, immersive “synthetic world” sites, and others).
Ground Rules: Virtual Collaborations

- Joint, cooperative, and coordinated efforts that are technologically mediated over time and distances often with stand-ins for people’s telepresences and co-presences (“awareness tools”) and expressions of the shared designs and decision-making.
- Built around “common ground” understandings, terminologies, and practices... built around common purposes.
- Involve both informal and formal (and unstructured and structured) interactions; may involve one-time or recurring collaborations; short-term and long-term collaborations.
Virtual Teaming Work

1. Icebreakers and introductions
2. Oversight, record-keeping, and orchestration
3. Work parameter and objective definitions
4. Role definitions
5. Specific tasking
6. Standards setting
7. Resource distributions
8. Design and prototyping
9. Decision-making
10. Development
11. Review
12. Launch
Lean to Thick Channels

Lean Mediation Channels

- Email Systems
- Electronic Mailing Lists
- Web Logs / Blogs / Video Blogs / Micro Blogs

Learning / Course Management Systems
- Collaboratories
- Electronic Portfolio Systems

Web Conferencing Tools
- Live Video
- Live Chat

Repositories
- Referatories
- Digital Libraries
- Knowledge Structures
- Wikis

3D Immersive Spaces
- Persistent Virtual Worlds
- Games
- Simulations
- Virtual Labs

Augmented Reality
- Augmented Virtuality
- Mixed Reality
- Parallel Worlds

Thick Mediation Channels

Lean-to-Thick Mediation Channels Continuum
Cobbled Information and Communications Technology (ICT) Solutions

- Single-source ICT solutions for “co-labor”
- Multi-source ICT solutions

“Successful virtualization does not depend on the degree of technological sophistication. It’s how the tools are used that matters.” -- Sajda Qureshi and Ilze Zigurs (2001, p. 85)
Virtual Collaboration Technology Functions

- Representations of people’s presences (social presence)
- Audio and video (live stream, recordable), video conferencing
- Annotation, commentary, and decision-making
- Shared visualizations; simultaneous sketch, tabletop manipulations
- Ability to share digital files and virtual prototypes (for concurrent design)

- Authentic records of people’s works
- Levels of information and functionality access
- Data integrity
- Versioning of digital files and annotations
- Clear workflow
- An approvals or decision-making process
- Open and multi-channel communications

Synchronous  Asynchronous
Virtual Collaboration Technology
Functions (cont.)

- Privacy protections (for various stages of development)
- Innovation and ownership protections (for legal and provable sequence of design)
- Public / non-public work sharing and archival
- Synergies from live interactivity
- Space and context awareness and orientation
- Uninterrupted work environment
- Private communications (text, audio, and graphical); semi-public, and public communications
- Raw files repository / digital archives (offering distributed access to resources)
- Shared organizational memory
- Shared collaborative work spaces (desktop, computer top)

Synchronous

Asynchronous
Virtual Collaboration Technology Functions (cont.)

- May occur in augmented reality spaces (real spaces with virtual information and overlays fed into the real-time physical spaces; augmented reality videoconferencing)
- May occur in augmented virtuality spaces (online spaces with live real-time information or “objects” fed into the online spaces, the interactions of virtual objects with dynamic real objects that affect the virtual space)
- Rich interactivity tools for communications and design (tactile, auditory, visual, immersive; olfactory and taste)
- Structuring creativity and work
- Multi-lingual accommodations
## Mixed Elements

### Strategic Approaches

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<tr>
<th><strong>Mixed Time</strong></th>
<th>Asynchronous to synchronous, variable pacing</th>
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<tr>
<td><strong>Quality of Interactions</strong></td>
<td>Informal to formal; asymmetric to symmetric; complementary to competitive; flat organizational or hierarchical</td>
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<td><strong>Group Mix</strong></td>
<td>Partial group to full group participation; mono-cultural to multi-cultural; revolving group members; loosely coupled (diffuse) or tightly coupled</td>
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<td><strong>Communications Channels</strong></td>
<td>Lean channel to multi-channel communications</td>
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<td><strong>The Design Work</strong></td>
<td>Individual design to shared, group design; prototyping to final design and development; partial to complete project work; undefined or “evolving” to defined objectives</td>
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<td><strong>Decision-making</strong></td>
<td>Autocratic to democratic decision-making</td>
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<td><strong>Virtual Team Life Cycle</strong></td>
<td>Short-term to long-term</td>
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<td><strong>Distance</strong></td>
<td>Local, and semi-local to remote</td>
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Rationales for Virtual Collaboration

- Need for “cross-functional” and cross-cultural virtual teamwork and mediated communications skills (written, oral, multi-medial, and video-based) for “computer supported cooperative work” (CSCW)
- Increased learner retention through community-building
- Artifact creation for electronic portfolios (student/novice, amateur, and pro) with peer and expert feedback
Rationales for Virtual Collaboration (cont.)

- Virtually disperses problem-solving and project-based learning for greater efficiencies and more diverse skill sets
- Pervasive / ubiquitous virtual meetings and virtual decision-making
- A student taste of “modern organizational life” (temporary, geographically dispersed, loosely coupled, and cross-organizational virtual teams)
Why virtual collaborations in your fields?
What types of virtual collaborations would be most beneficial for your domains?
Educational Theory

- Active learning for deep learning transfer (hands-on applied learning and practice); simulations; experiential learning
- Situated cognition (learning in context)
- Constructionism (the building of meaning in an individual)
- Constructivism (socially defined and co-created learning)
Educational Theory (cont.)

- Communities of Interest (knowledge exchange)
- Communities of Practice (enhancing practitioners in the field through mediated means with changes over longitudinal time)
- Networks of Practice (informal and emergent social networks that facilitate information exchange around shared topical interests, also electronic communities or virtual communities)
Educational Theory (cont.)

- Collaborative inquiry / problem–based learning / project–based learning
- Learner empowerment (co–creation of curriculum through topic proposal and selection)
Collaboration

- Activity theory (Bodker, 1991)
- Distributed cognition (Hutchins, 1990; Lave, 1989)
- Organizational factors (Heath & Luff, 1992)
- Cooperative and adversarial collaboration (Cohen, et al., 2000), with “advocacy, secrecy and partial revelation” in the latter
- Role supports (Smith, et al., 1998)
- Information modeling (Wright, et al., 2000)
Collaboration (cont.)

- Team knowledge (Blickensderfer, et al., 2000)
- Group work success or failure (Dix, et al., 1998, as cited in Johnson & Hyde, 2003)
- Collective efficacy (Carroll, Rosson, & Zhou, 2005)
- Virtual team research
- Virtual creativity research (Nemiro, 2004)
- Community learning networks, virtual learning environments (longitudinal endeavors) (...); computer supported collaborative work (CSCW)
• Generic / Tailored to a Learning or Training Purpose
• Stand-alone / Combined - Integrated
• Enable collaborative fluencies and “scaffolding” (for range of participants)
• Enable human creativity (“design studio culture”)
• Enable work tracking and crediting
Learning / Course Management Systems

- Full-suite tools (calendaring, desktop videoconferencing, email, digital repositories, group tools, whiteboards)
- Synchronous (concurrent) communications
- Asynchronous communications
- Digital file archival and delivery
- Learner trackability
- Collaborative note-taking, image drafting, planning and other tools
Learning / Course Management Systems (cont.)

- Role definitions
- Privacy protections
- Instant messaging (add-on); Web 2.0 technon add-ons
- Tailored Systems: “collaboratories” / instructional systems
Web Logs / Blogs / Microblogging

- Author or multiple author-based
- Publishing to the world
- Multimedia enabled (video blogs or vlogs, mobile blogs or moblogs, photo blogs or phlogs, and others)
- Respond-able by participants and viewers
- Real-time sharing of “tweets” (micro-blogs)
Wikis

- Mass-writable and mass-editable, real-time updated, multimedia-based, and reversible
- Topical focused (i.e., emergency-based, work-team, fantasy villages, and academic topic-based)
- Public or private
- Continuing into the future
- Guided by community mores and legal policies
3D Immersive Synthetic Worlds

- “Teleimmersion” in collaborative virtual environments (CVEs)
- Intercommunications and interactivity
- Simulation exercises
- Context-sensitive shared work
- Contributions to a shared virtual world / co-building
- May be synchronous or asynchronous
- May be locked or unlocked (protected or not)
3D Immersive Synthetic Worlds (cont.)

- May be private or public spaces
- 3D objects, textures, and forms; reconstructions of real-world phenomena
- Locations for *machinima* capture
Parallel Worlds / Mixed Reality

- Combining real-world and immersive world collaborators as if they were co-located (Morde, Hou, Ganapathy, Correa, Krebs, & Rabiner, 2004)
- Kinesthetic and muscle memory learning in mixed reality, augmented reality, and ambient intelligence spaces
- Making use of location
Games and Simulations

- Collaborative multi-player games
- Situated learning (business strategy, teamwork, design, and communications)
Virtual Laboratories

- Virtual physics laboratories for the “acquisition, transfer, creation and sharing of expertise” (Gabrielli, Hodapp, & Ranon, 2006)
Volunteer and Grid Computing

- Volunteer computing power (BOINC)
- Participatory citizen science – information collection and dissemination through mobile phones, and remote sensing
Co-creation and Sharing

- Google Docs™
- Flickr™
- Wikipedia™ / Mediawiki Technologies
- YouTube™ / Vimeo™

- Shared video projects
- Slideshows
- Notes
- Research
- Imagery from the field / fieldwork
Which technologies would be useful for your in-field virtual collaborations?

What live virtual collaboration projects are occurring in your fields?
Live Projects

Research
Peer Critique
Design
Simulations
Environmentalism
Foreign Language Learning
Cross-Cultural Experiences
Social Scenarios
Location-Sensitive Collaborations
Research

- Built around information spaces (digital repositories, digital libraries, knowledge structures / ontologies, and referatories) and collaborative technologies (like wikis)
- Information-seeking and problem-solving
- Co-authorship of papers
- Collaborative co-editing
Peer and Real–World Critiques

- Message boards used for giving feedback to students for their writing, videos, photos, designs, blueprints, visuals, and electronic portfolios (collections of digital works with analytical annotations)
- Real–time webinars for expert / professional critiques from anywhere in the world
Design

- Digitally enhanced physical tabletops (with projected images and sounds)
- Remote labs
- Industrial design / product design
- Architectural design
- Interior design
- Landscape architecture
Design (cont.)

- Accessible design spaces
- Real-time product assembly design (manufacturing workflows); process redesign work
- Open-source software design and continuing enhancements
- Collaborative scriptwriting
Mock trials
Case studies
Historical re-enactments
Role plays
Business-based leadership
Virtual plays (via avatars)
Surgical team coordination in treating a patient
Environmentalism

- Information collection and diagnostics in the field (against wireless-accessible repositories of information or with live subject matter expert collaboration)
- Citizen and scientist “collaborations”
- “Sustainable virtual world ecosystems” with biologically-inspired AI
Foreign Language Learning

- Live interactivity in a textual and oral virtual world focused around a different language
- Problem solving in a foreign language learning space
- Social interactions
Cross–Cultural Experiences

- Immersion in a virtual restaurant setting with culturally sensitive AI (artificial intelligence) ‘bots
- Immersion in an Iraq context with natural language AI ‘bots
- Cultural diversity
- Sociological research of virtual groups and communities
Social Scenarios

- Customer relation management
- Medical professional “bedside manner” practices and client interactions
- Law enforcement interviews of individuals in their homes
Location–Sensitive Collaboration Techno

- Co-located mobile-enabled in augmented reality spaces (or small-size digital displays or installations)
- Involving geographic information systems (GIS) and global positioning systems (GPS) devices
- Usually “mixed reality”
- May involve haptic (touch) devices
- May involve hand-held projectors, laptops, tablet PCs
Location–Sensitive Collaboration Techno (cont.)

- May involve head-mounted displays
- May involve wearable devices
- May involve physical environmental props
- May involve human actors in the environment
Applied Location-Sensitive Collaborations

- Games
- Tours
- Museum experiences
- Visualizations
- Problem-solving
- Treasure hunts
- Virtual-enabled field-to-office diagnostics
- Team communications
- Decision support systems in live locales

- Butterfly hunting
- Plant identification in-field
- Citizen science information collection (sensors and mobile devices and location-sensitive digital cameras)
- Kinesthetic practices
- Broadcast interactive dance collaborations / virtual performances
- Goal-based learning
Where do you think the future is headed in terms of virtual collaborations?
The Future

- **Scalability**: From dyadic teams (pairs) to small-scale to large-scale (or “wide-scale”) interactions and collaborations; small-to-large project sizes

- **Unintentional Collaborations**: Elicitations, data-mining for hidden information

- **Ad Hoc Collaborations**: Ad hoc collaborations around crisis situations; informal and unplanned (spontaneous) collaborations

- **Rich Channels and Expressions**: Mixed reality collaborations with rich interfaces and modalities
The Future (cont.)

- **Improved Accessibility**: Accessibility constructs to enhance collaborations
- **Augmented Reality**: The receding of tools into the background but with “task and experience dominating” (Pingali & Sukaviriya, 2003)
- **Ownership**: Enhanced ownership tracking and protections of original ideas and innovations
- **Collective Efficacy**: Additional virtual community enablements and “collective efficacy”
References

Conclusion and Contact

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