Open Virtual Worlds Offer Untapped Potential to Spur Organizational Innovation and Education*

Open virtual worlds such as Second Life have until recently been an environment predominately populated by cyber explorers and individuals seeking a vicarious alternative for self expression in collaboration with other visitors and game players.[1] But increasingly, open virtual worlds are proving well suited platforms for scientific and educational experimentation, exploration, evaluation, brainstorming and propositional test and evaluation trials.

The prospects of using open virtual worlds to stimulate organizational innovation and excellence have, for the most part, gone unnoticed by senior government officials, though there are exceptions. Those exceptions are generally resident in our professional military education organizations, but those exceptions are, by and large, subordinated to the traditional physical-world approach to educating our future leaders. However, over the past 18-24 months, governmental focus on the use of open virtual worlds has shifted into high gear.

The US Army has taken a significant leap in exploiting virtual worlds for training purposes. The National Oceanographic and Atmospheric Administration has taken aggressive steps to engage open virtual world visitors to generate interest in scientific career fields. But perhaps the most telling move regarding government interest in the use of open virtual worlds was the establishment of the Federal Consortium for the Use of Virtual Worlds just over a year ago. The consortium is led by a team resident at National Defense University but includes partners from throughout the US government, industry and other educational organizations.

The emergence of this highly innovative and interactive technology offers educators across the spectrum great opportunities to enhance traditional teaching methodologies because a closer fit can be designed into the linkage between open virtual worlds and how people prefer to learn and interact socially within and across communities of practice (as suggested from research on the connections between human cognition and the sociology of learning and performing[1]). Without question, the accessibility and fairly unconstrained nature of open virtual worlds affords visitors significant freedoms, on a scale considerably larger than possible with the use of simpler cyber-based tools or environments, to engage in malicious and inappropriate behavior counter to the decorous norms of the general society.

Such unconstrained freedoms, indigenous to open virtual worlds, demand a principled design approach. These environmental freedoms necessarily require responsible stewardship by organizational leaders to design, program and inhabit open virtual worlds that maximize the beneficial elements of these environments while ameliorating the unsavory.

The chart below is a sampling of potential uses of open virtual worlds to enhance , learning and performance in an organization.

[1] For an excellent summary of the research see: Bransford, J., Brown, A., & Cocking, R. (2000), *How people learn*. Washington, DC: National Academy Press. For additional information on the role of communities in support of learning see also, Wenger, E. (1998). *Communities of practice: Learning, meaning, and identity*. New York, NY: Cambridge University Press.

Technology	Process	People
• Provide access to technological capabilities that may not be affordable or readily accessible in the physical world due to cost, locality, proximity, and distance constraints. • Offers opportunities for sharing, linking and mixing the best of physical and virtual technologies across training, education, and performance-support environments. • Enhances the ability to leverage and scale technological innovations in terms of cost and time to implement or modify, with increased accessibility.	• Can support processes involving the mixture or blending of virtual and physical workflows, systems, and organization structures (e.g., combination/integration of paper and electronic document management processes, virtual and physical office hours, support/service activities, data exchange and interoperability, real-time process analytics across virtual and real-life work environments, virtual rapid-prototyping, product design, development, testing, and implementations). • Can provide global and distributive connection/outreach for using 3D benefits in support of complex operation processes, decision-and performance support systems (e.g., distributed combinations of real and remote-controlled craft, collaborative remote instrumentation and procedures (e.g., surgery, research).	• Can provide the means or support for social-learning environments that are more closely aligned to real-life by recognizing the value people place on interactivity and richly-laden stimuli in the form of multiple and diverse visual and auditory sensory inputs. • Can reduce artificial-environment induced disbelief by providing high-end (quality design) immersive tele-presence capabilities; this can strengthen the role and power of affect for enhancing learning and performance, enhancing believability and valuing of effort/outcomes, thus making for a closer alignment between the environment and how the brain associates, codes and processes information (e.g., see research on situated cognition and environmental context-dependent memory).
Creativity	**Collaboration**	**High-risk Prototyping and Immersive-Experiential Learning**
• Can provide 3D tools and landscape for creating and linking both imaginary and life-like features (the blending of art and life) for exploring the art of the possible. • Can open up new ways of thinking from exposure to diverse cultures, different perspectives, and practices outside of existing community, domain, or culture.	• Can offer similar or improved advantages over standard web-based collaboration tools wherein virtual meeting and learning spaces are coupled in near-seamless ways with synchronous and asynchronous data sharing and communication tools. • Can be used to broaden network of collaborative expertise, and improve access to requisite variety of experts, within and across domains situated in context of challenge or environment.	• Can offer the means for engaging users with high-risk prototyping and experiential learning activities wherein failure does not result in the loss of life or equipment; also can help with intersecting disciplines (e.g., language and culture) into immersive scenarios (see next point below). • Can offer immersive capability in support of life-like scenario and experientially-based learning activities and challenges (e.g., using anchored-inquiry instruction methods) for developing higher-order knowledge and skills associated with the development of critical-thinking and advanced problem solving.
Place/Identity/Community Presence & Continuity of Experience Within Community	**Collectiveness**	**Semantic Enrichment**
• Can help foster a sense of place, identity, and community presence over longer periods and across multiple real-life workplace	• Can help with forming reciprocal (or mutual engagement) action-oriented relationships and activities across levels of creativity,	• Can provide for more powerful ways to define, link, interpret, and visualize data and to integrate data into increasingly powerful

changes and locations for lifelong continuity of practice where the landscape can consist of both physical and virtual geography or mixed combinations (Note: people susceptible to identity diffusion, dislocation feelings and/or proclivity towards an inability to distinguish between real and imaginary facets may be at increased risk with the use of virtual worlds over extended periods of time; there is currently little research on the nature of this risk or the relationship of the risk to developmental levels of people).	collaboration and social networks regardless of geophysical location, organizational structures, and institutional affiliation. • Can help support collective intelligence (via both implicit and explicit means) and give people greater opportunity to practice the construction of knowledge using visualization, media sharing, and game-playing tools situated in context and linked via relationships in virtual space.	knowledge structures and systems.[2] • Can help people change the organizing principle of visualized data and knowledge from across products, process, people or concepts, and their connections, to form a more complete picture or understanding of a topic.

Collectively, the propositions presented in the above table should be considered factors in the design and use of virtual worlds to enhance learning and performance. Also, anticipated benefits are more likely if virtual world propositions are appropriately blended with real-world learning and performance support environments and aligned with the organization, processes, and technology. The use of open virtual worlds for interactive and collaborative teaching and training purposes is not longer just a possibility; it is reality.

Interaction in these virtual environments will be spurred on by necessity in what has emerged as a globalized community of nations and societies. The following suggestions provide leaders the necessary springboard for introducing the use of virtual worlds to enhance learning and performance in "virtually" any organization:[3]

- Clearly communicate the vision for the use of virtual worlds, resource for a cyberstructure to support their use, and then give ownership of the virtual world environment to your people,
- Help steward the design of the virtual world environment for meaningful connections or integration with the organization to support your best people and to encourage them to support one another for obtaining expected benefits so the whole is greater than the sum of the parts,
- Give your people enormous leeway and support and provide them with the means to get honest feedback from everyone about how well the virtual world is designed, operated, and refined to support learning and performance in the organization,
- Encourage the use of virtual worlds to explore, prototype, take risks, and learn from failures in the organization that could not be easily or readily done in the real world,
- Create a virtual brain trust and knowledge network, using the open virtual world, to learn from one another, stay tuned to innovations happening around the world, and to constantly improve, and

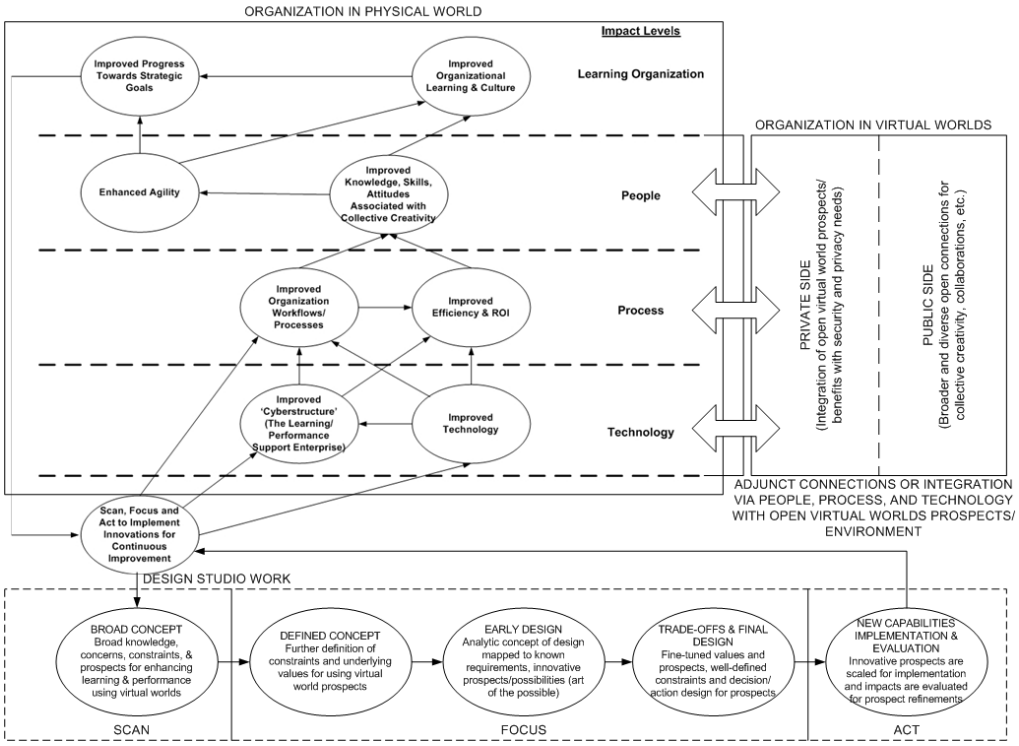
[2] For additional information see Shadbolt, Nigel & Berners-Lee, Tim (2008, Oct). Web science emerges. *Scientific American*, pp. 76-81.
[3] Suggestions were modified from recommendations on collective creativity offered by Catmull, Ed. (2008, April). How Pixar fosters collective creativity. *Harvard Business Review*, pp. 65-72.

- Mentor your people to use the virtual world to build trust and respect for one another, harness collective creativity, tap into the strengths of every person, and to fully engage everyone to turn out the best work and continuously improve.

The above suggestions parallel a way of leading the use of virtual worlds for the benefit of the organization through action logic very similar to a strategist as defined by David Rooke's and William Torbert's research conducted using the Leadership Development Profile instrument.[4] Under their developmental leadership model, outlining seven transformations of leadership, a strategist operates at the higher sixth-level of thinking for a leader. The strategist demonstrates consistent capacity to innovate and to successfully transform their organizations by creating shared visions and fostering collaborative environments in the organization. [5]

The following framework provides an action logic map a strategist can employ to innovate the use of open virtual worlds into an organization (see diagram below). According to this model, the action logic is primarily based on the value of collective creativity, collaboration, and importance placed on both personal and organizational transformations for timely, iterative, principled change for strategic progress and continuous improvements. The directional arrows depicted in the diagram suggest interdependencies between the facets of organization, people, process, and technology for supporting innovation. As such, the action logic of a strategist would very likely consider how innovative propositions will likely effect or alter not only intended paths between facets, but potentially the

'THE WORK OF INNOVATION' FRAMEWORK FOR BENEFITING FROM OPEN VIRTUAL WORLDS



[4] Rooke, D., & Torbert, W. (2005, April). Seven transformations of leadership. *Harvard Business Review*, pp. 1-12.
[5] Ibid. pp. 5-6.

holistic effect across all facets in achieving practical improvements for strategic results and benefits.

Another feature of the framework is the importance placed on requisite variety introduced by open systems using closed loops; where new ideas or ways of thinking from diverse external perspectives, along with internal feedback, are employed to improve and adjust the system. Timeliness of change is also suggested in the framework via the importance placed on the use of design studios to scan, focus, and act to implement innovations. Another feature of this model is an ability to envision how open virtual worlds can be effectively designed and balanced to support both private and public access needs. It also recognizes the connections or integration with the organization's cyber structure and technology infrastructure. But perhaps most important, this model provides a means of imagining innovative processes and better ways for supporting how people learn and perform.

Fundamentally, the model places a premium on the unique elements open virtual worlds offer such openness, creativity, collaboration, and feedback necessary to identify and scale promising innovations and to achieve practical improvements for strategic results and benefits. Ultimately, the model rests largely on a strategist to steward its application in ways aligned with a clearly communicated vision for a principled approach to using open virtual worlds for benefit of an organization.

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