The Power and Benefit of Using Virtual Worlds for Real World Collaboration, Learning, Productivity, and Innovation

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Web 2.0 technologies are gaining greater acceptance in the workplace as they promote intra- and inter-organizational collaboration and productivity. The marriage of these technologies with 3D virtual world technology, as in Forterra Systems' OLIVE™ (On-Line Interactive Virtual Environment) software, will bring even greater opportunities for organizational effectiveness by extending the application of these technologies in new ways throughout organizations while at the same time reducing the psycho-emotional inhibitions to collaboration posed by distance and time zones.

This paper looks at this marriage of technologies and their potential as environments not just for collaboration and productivity, but also for learning and innovation. It also asks and answers some of the questions that challenge decision-makers, implementers, and program designers across organizations:

- How can learning best be accomplished within "Virtual Worlds 2.0"?
- Who is implementing Virtual Worlds 2.0 and how are they being used?
- What can we expect in the near future?
- How do we start a Virtual Worlds 2.0 initiative for our organization?

Three distinct groups of stakeholders will have immediate and direct involvement with the design and implementation of Virtual Worlds 2.0:

- Line-of-business decision-makers who are looking for cost-effective ways to improve operational efficiencies;
- Learning designers who are interested in adopting collaborative technologies to advance workplace learning and performance; and
- IT professionals who are juggling issues of data security; technology compatibility and integration; and, supporting organizational workflow.

The Virtual World Ecosystem

Virtual worlds (VWs) are as varied as the organizations that implement them. While their look-and-feel, their features and their foci may differ, at their core they share certain characteristics.

- **3D Environment** — from a user's perspective, the entire experience inside a virtual world is three-dimensional, geospatially accurate, and real-time.
- **Persistence** — the virtual world "lives on" whether or not users are "in-world". When users are in-world, any changes they make to the VW affect the world forever forward and for all users — until new changes occur.
- **Avatars** — users are represented in-world by an animated character, called an avatar. Graphical styles range from block figures to the fantastic to nearly lifelike. Depending upon the implementation, users either create or customize their own avatar, or they select from among a standard set of avatars provided by the system.
- **Multi-user** — while there are VW implementations intended as a single-user experience, VWs are at their most robust and effective when multiple users gather and interact.
- **Communication —** at the very least, users communicate via text. Ideally, 3D audio is included so that natural conversation is possible among groups of users. Often, users can create and even import content in-world for their own use and for sharing with other users.
- **Immersive and engaging —** with all the real-time, multi-sensory data provided in virtual worlds, users find themselves immersed in their experience as they engage with other users and content.

Note that each description above invokes a sense of space and time, for a virtual world seeks to create a separateness from the real world, whether as an extension or an alternative to the users' normal reality.

Virtual Worlds 2.0

The latest wave of technology innovation and Internet computing — dubbed Web 2.0 — has introduced sophisticated collaboration technologies to the workplace (often, to the chagrin of Corporate IT). Spurred on by the advances in social networking technology and the move of many enterprise applications toward a Software-as-a-Service business model, employees are finding a panoply of options for group interaction and collaboration available on the Internet, outside the corporate firewall (and outside IT's jurisdiction).

Web 2.0 technologies are now being incorporated directly within virtual world development platforms, such as Forterra's OLIVE. Social networking functions, by enabling users to create profiles that include information about personal areas of expertise and interest, allow employees to locate colleagues with similar or complementary talents and skills. Presence technologies help users know who else is in-world with them. New communications functionality and file-sharing open up many new possibilities for collaboration, engagement and beyond.

Virtual Worlds 2.0 for Collaboration and Productivity

Organizations, by their very nature, operate on the premise that groups can accomplish more and do it faster and better than an individual working alone. Of course, this assumes that members of a group can find each other, and that the distance and time zones that separate them inhibit neither their interactions nor their group work.

Forterra Collaboration Whitepaper

Virtual worlds give users around the globe a common intersection point. Upon entering a virtual world, users can query a database of other users and their profiles to find the right team members for the job. Team members meet in virtual conference rooms, where their avatars provide visual cues about attendance and participation. In-world audio-conferencing features facilitate regular conversation, and file- and application-sharing capabilities enable document review and formal presentations. Some virtual worlds, like those developed using Forterra's OLIVE platform, even provide the ability to record an event for later retrieval and review.

Virtual Worlds 2.0 for Learning

These same collaboration technologies are opening up new approaches to collaborative learning, both structured and informal:

Structured learning — virtual classroom environments can be easily created and used in all the ways a real-world classroom situation is used. In addition to presentation capabilities, these virtual classrooms can be outfitted with whiteboards and streaming video, making the classroom even more media-rich, engaging, and interactive.

Some of the best uses of structured learning experiences in virtual worlds involve demonstration, rehearsal, and performance review of hazardous, highly complicated, and/or extremely costly procedures. These events, too, can be recorded for later review by a group or an individual. The power of these events is that a learner can make a critical error without critical or disastrous consequences, and can correct those errors in judgment or behavior through repetition and feedback.

As opposed to structured learning, where content and activities are organized in advance by an instructor or expert, and presented according to a set agenda, **informal learning** happens *ad hoc* and is guided and almost always initiated by the learner. In addition to the pearls of knowledge that a virtual world user can gather in the course of spontaneous interactions, social networking and collaboration tools assist the user in pinpointing the right experts to provide review and input to a project. Moreover, these tools can match a user with just the right mentor, and can provide the vehicle for meaningful association.

While spontaneity may drive many informal learning interactions, numerous examples of "planned" informal learning can be found. Sales organizations often promote informal learning models — whether through mentoring, coaching, even storytelling — to assist and support new members of the sales team. Senior team members and top performers

are expected to share their knowledge related to handling tough objections, strategies for defeating competitors, working through (not around) gatekeepers, and gaining trust of key decision-makers. Virtual worlds bring "newbies" in touch with in-house experts no matter where in the real-world organization that expertise may reside to help with anything from a quick question about how to handle a particular customer situation to coaching a sales team on a client presentation.

Virtual Worlds 2.0 for Innovation

New product design and prototyping is a costly business. It requires resources and personnel. Money and materials are routinely "wasted" as new ideas or approaches prove unworkable.

For many organizations, virtual worlds act as a "sandbox" for the development and testing of new products and procedures. Because content types are not limited to basic office productivity applications, users can use the sandbox and its associated content creation tools to build airplanes, stress test a bridge design, test drive nano-technologies, and plan the interiors of a high-rise office building. By employing virtual world technology, organizations are minimizing risk, saving money, and accelerating time to market — all because of the power of virtual world technology.

Proponents of virtual worlds in service of innovation point to another VW factor: avatars. Because so many VWs allow users to customize their avatars, users are free to represent themselves in any number of ways (within the limits of corporate policy). They may choose to adapt their avatar to resemble themselves, or they might construct an avatar that looks very different from themselves. These expressions of self can open up new avenues of creativity that feed into a less inhibited approach to innovation.

OLIVE Collaboration

Forterra Systems is releasing significant collaboration and training enhancements to OLIVE, starting with version 2.1 released in July. With each upgrade, new functionality brings new opportunity for users of virtual worlds based on Forterra's OLIVE platform.

In early 2008, IBM and Forterra announced a teaming agreement under which Forterra is integrating OLIVE with IBM's Lotus Sametime software (Unified Communications and Collaboration platform). This integration enables Sametime users to invite colleagues to meet immediately or to schedule a later meeting in a 3D room. Users communicate with Instant Messaging, and can display and discuss multiple documents or media in parallel including MS Office docs, videos, desktop applications, and white boards via anytime, anywhere connectivity through the Internet. Mobile employees can join a 3D meeting

discussion through the Sametime Unified Telephony integration. With the inclusion of these features, the OLIVE platform enables organizations to develop Virtual Collaboration applications.

OLIVE in Action

Although there are many potential use cases for virtual worlds, most enterprises are finding high return-on-investment (ROI) and a good starting point with deployments in the use cases noted below. There are additional soft benefits achieved by using a virtual world, such as improved relationships between geographically dispersed employees and enabling home office and mobile workers to feel connected to the company culture. The top use cases include:

- Ad Hoc Collaborative Meetings that range from team discussions, post mortems, sales presentations, regular status meetings, sharing best practices, or executive fire-side chats with employees.

- Training Environments that span from on-boarding new hires to providing soft skills training such as those needed for sales and call center personnel. Virtual worlds also are also ideal for delivering technical and team training for nurses, doctors and other healthcare professionals around medical procedures. Realistic or industry-specific 3D buildings, terrains, uniforms, equipment and

other props dramatically increase the realism and credibility of the virtual work environment.

- Large events like executive presentations, panel discussions, company off-sites, all employee meetings, partner forums, or conferences that can scale to 1000s of simultaneous participants. Companies are achieving $Ms of savings by avoiding travel for these events.

- Virtual product or marketing launches and be created to target audiences like reporters, analysts, customers, or strategic partners using a mixture of media types to get your message across like streaming video and MS® PowerPoint.

- Collaborative product design integrating 3D and CAD models of product or building concepts so product teams or supply chain partners can walk around, interact with, discuss and modify the design.

- War room/situation rooms integrate real-time data feeds to monitor situations and then provide relevant event analysis so the team can determine the correct tactical action plan. These rooms can be integrated with 3D data visualization capabilities.

What Can We Expect in the Near Future?

Virtual Worlds 2.0++ will bring a number of exciting advances in technology and in practice for knowledge workers and learning professionals.

"I Gotta Be Me"

As more people visit and work within virtual worlds, VW platform developers will have two choices: create very large libraries of stock avatars, or include functionality that enables users to personalize their avatars. This need will be exacerbated by two very different forces.

Game worlds and public social networking sites are raising users' awareness of increasingly lifelike avatars, and users will demand the same from business-oriented virtual worlds. In particular, facial animation technology, such as that developed by Image Metrics, will be integrated with VW avatars, making it possible for avatars to accurately convey human emotion.

As VWs have more and more simultaneous users, stock avatars will confuse users' ability to distinguish one tall, slender, brunette female avatar from another. Even with (sometimes, because of) customization options, differentiating users from one another can be challenging. To overcome this, VW technology developers are providing "name tag" features that allow users to display identity information. Forterra, for example, allows users to display name tags that contain up to four text lines, enabling fairly detailed identity information to be displayed.

An exciting advantage of identity systems is their integration into other company authorization and privilege systems. Not only will users be relieved of multiple registrations and logins, but whatever privileges a user has vis-à-vis corporate resources and information will transfer directly to the VW environment, granting and denying access to in-world content, including "restricted areas" of the VW implementation.

Importance of User-Generated Content

Avatars are not the only form of content that users will contribute to virtual worlds. Beyond text documents, spreadsheets, and slide decks, collaboration requires many different kinds of applications and file types. Applications that allow real-time, multi-user collaboration will become increasingly important. In the meantime, VW technology will need to offer a robust set of rich Internet applications in-world, and will need to accept all the major file types within an industry or job category.

As users of every description and role gain confidence in their content-generation abilities, new issues will emerge around cross-platform content compatibility and portability. Users are likely to join more than one virtual world (my organization's, my customer's, my vendor's, my professional association's) where portability of both 3D content and avatars will important for adoption. Republishing in multiple proprietary formats is impractical at best. The push for standards in this area is quickly gaining momentum starting with 3D content interoperability based on the COLLADA file format.

Simulations

Structured learning in the form of advanced simulations, as noted before, is a compelling and effective use of virtual world technology. Elaborate simulations, however, can be very expensive to create, since so much of the content (in this case, what the environment looks like and how it's equipped) must be created from scratch. As VW platforms and vendors continue to expand their offerings, pre-developed content will be available to fast-track this design and development process; Forterra's OLIVE already has corporate, medical, emergency response, military, and retail content packages, as well as a Scene and Terrain editor and content to support various types of meeting configurations.

The 3D Website

Leading corporations are typically focusing their initial VW rollouts on internal collaboration and learning applications to yield greater productivity gains. This strategy works well for intranet-oriented deployments where enterprise IT groups can include OLIVE on the legacy PCs that are supported by their organizations. In the near term, leading VW platforms like Forterra's OLIVE will use a rich client-server architecture that leverages the computing power of mid-grade existing laptops and desktops already deployed by corporations.

Virtual worlds are growing in appeal as customer-facing applications, often as extensions of corporate websites. Partners and customers will gain access to 3D portals as natural extensions of the current 2D portals that give them access to expertise both in document and written formats as well as to subject matter experts. Leading companies are starting to plan 3D environments integrated into their company's website to provide education around their products and services as a new way to market to prospects. Forterra will offer support to both rich clients and browser clients for OLIVE applications in 2009, enabling VW implementation that combine intranet and extranet systems in the same deployment.

Virtual Meets Mobile

With third-generation (3G) telephony, smart phones/PDAs and mobile Internet devices, new forms and methods of collaboration and communication will be possible. In the context of virtual worlds, development of full-featured mobile clients will bring road warriors and other mobile workers in-world to participate fully with their colleagues.

We can certainly expect the form factors and capabilities of mobile devices to change, improve and advance. Ultimately, mobile devices and laptops will converge into a single device. This kind of device will become the preferred tool for communication and collaboration. These technology advances will free more and more people from their desks and offices, also making future generation mobile devices the primary means for accessing and participating in virtual worlds.

SCORM Compliance

Standards, or reference models, have already found their way into the learning world in the form of SCORM (Shared Content Objects Reference Model). SCORM is a compilation of technical specifications for web-based e-learning. SCORM goals are to enable interoperability, accessibility and reusability of web-based learning content for industry, government, and academia. As a result, SCORM-compliant content developers

are assured that their content will operate with any SCORM-compliant Learning Management System — a real win for e-learning consumers.

SCORM 2.0 is intended to be an interoperability model that, like its predecessor, can be used strategically across market sectors and geographical regions. One of the overarching criteria for SCORM 2.0 is the support of multiple learning paradigms and teaching methods, e.g., immersive learning environments, informal learning, community-based learning, blended learning, and collaborative learning. At the same time, SCORM 2.0 will ensure convenient migration strategies to preserve existing investments in systems and learning materials.

For VW technology providers, SCORM conformance is vital. Some of these providers, like Forterra Systems, have already ensured that their platforms are compliant with the current version of the model, SCORM 2004. As the next version (2009) of SCORM is released, VW platform technology developers will need to pay close attention to the new requirements.

Convergence of Learning Moment and Performance Moment

At the time of this writing, a national office supplies chain is airing a television advertisement suggesting that if everyone could hit a big red button on their desk whenever they needed more paper clips or printer ink, the store would instantly provide the needed supplies.

So it is in the world of workplace learning. Providers and consumers alike look forward to the mythical moment when answers to every question, feedback and guidance on performing any procedure, and coaching for every decision are instantly available at the touch of a button.

Virtual worlds are not a panacea in this regard. Nonetheless, social networking, collaboration tools, and presence technology are all compressing the time between identifying a learning need of a user and optimal performance on the user's part.

New Learning Models

Virtual worlds not only allow for innovative product and process design, but also for innovative approaches to learning design. Collaborative learning, the focus on group interaction and teamwork in service of a specific learning goal, will segue naturally into true cohort learning experiences. Cohort learning, of course, focuses on the learning needs of an intact or newly forming workgroup. Team learning objectives, team performance, and team excellence are the goals of cohort learning — each of which can be furthered through the use of virtual world implementations of collaborative technologies.

Even with the (for many) new focus on "the group," attention to the individual user experience will not diminish. Customized avatars and personal profiles (as discussed above) may elicit creativity, but they must be examined for their effectiveness or intrusion into the cohort learning experience. How, for example, does anonymity effect group cohesion during the learning experience? Do avatars that appear as seven-foot tall rabbits in pants serve to enhance or distract from the group's purpose? Does this in any way impact the transference of new skills from the virtual world to the real world?

These concerns are likely to have considerable impact on learning designs, as learning designers will need to concern themselves as much, if not more, with organizing and structuring the learning experience, as with parsing and presenting learning content.

Preparing Your Organization for a Virtual World 2.0

A number of factors contribute to the success of a virtual world implementation from an operational perspective. The following recommendations will help you evaluate your enterprise's readiness for a Virtual World 2.0 initiative:

1. Virtual world development and implementation is a team sport. The team should have representation from all constituent groups: sponsoring organization, users, learning organization,

media developers and IT. Each of these key players has a critical role to play, and delaying in "bringing them into the fold" can derail the entire project.

2. The first order of business for any virtual world initiative is to prepare a Concept Document. This tool documents all the functionality (not features! not specifications!) that the user community would like a virtual world to embrace. In many situations, a series of use cases will be helpful in describing the various ways that users envision interacting with other users and with content in a variety of situations.

3. Once the Concept Document is in place, Corporate IT must append its technical requirements. They may need to outline a number of network and data security issues, supported PC specifications, make cross-system compatibility and integration requirements, open connections into legacy applications, etc. By laying their requirements out at this stage, your team will have the greatest chance of selecting a VW platform and provider without any "gotchas" popping up later in the project. Indeed, failing to take this step can result in project shut-down, as some IT departments will nix a project that uses technologies that are not already on the "approved" list.

4. Present your concepts and requirements to the vendor community, and ask respondents to show and explain how their platform meets your needs. Vendors should have a deep understanding of each of the uses you foresee for your organization's virtual world, and should not just speak to these issues but also advise you on your overall implementation plans. Make sure to explore their support processes so you understand how much attention or not you will get from the potential vendor, and ask them to describe their product roadmap to ensure that their upgrade path matches your longer-term functionality needs.

5. Start the project with a pilot implementation, and invite pilot users to comment on their experience. Review the pilot program with your vendor, and discuss any changes that may be indicated by the users' feedback. Invite the vendor to offer suggestions for how best to modify your organization's virtual world so that users' needs are met while preserving your internal budget and time requirements.

Conclusion

Web 2.0 tools are providing new ways for people to collaborate. Unfortunately, many of the new Internet tools are not compatible with Corporate IT policy and practice. Developers of Virtual World 2.0 technology, like Forterra Systems, provide a mechanism to bring tools for collaboration, collaborative learning, group productivity and innovation within the corporate environment, thereby keeping critical activities within or working through the corporate firewall and under IT's protection and support.

Virtual World 2.0 technology, such as Forterra's OLIVE, is being adopted by corporate, education, health care, and military/defense organizations. In each instance, these organizations are recognizing demonstrable benefits in collaboration and productivity, learning and innovation.

New ways of working are being introduced as issues like distance, time zone, language, and culture decline in relevance when groups meet and interact in a virtual world. Informal learning approaches are gaining acceptability, and learning designers are shifting focus from content presentation to learning experience design.

Ultimately, the success of a Virtual World 2.0 relies on two things: adequate planning by a cross-functional implementation team; and, selection of a vendor, such as Forterra Systems, that fully understands not just the technology they provide, but also the customer business requirements and environment.