Collaboration Advantages of 3-D Virtual Immersive Environments

By Karl M. Kapp, Ed.D., CFPIM, CIRM, Professor of Instructional Technology, Bloomsburg University
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Collaboration Advantages of 3-D Virtual Immersive Environments

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Introduction

Working together to achieve organizational goals is the norm in business and industry. Collaboration occurs when research and development departments work with sales departments on the development and placement of new products; when manufacturing personnel coordinate with field service specialists to efficiently repair products at customer locations; and when social marketing departments work with legal departments to create the right blend of engaging in conversations within a marketplace and staying within regulatory requirements.

Not only has collaboration increased within organizations, but the past 10 years has seen an explosion in collaboration across organizations. Technology platforms like wikis and blogs enable the coordination and orchestration of capabilities around specific endeavors by individuals acting as free agents, as opposed to the command and control of resources by a single authority.

The term “crowdsourcing,” coined by Jeff Howe in a June 2006 Wired magazine article, captures the concept of coordinating the thoughts, ideas, and energy of a group of individuals—not affiliated with one another—to achieve an end result. This requires an implicit agreement among the contributors to work toward a common goal and allow their original ideas to become shaped and molded by divergent thoughts and ideas to create an end product greater than the sum of its parts.

Smart organizations are establishing collaborative working arrangements between universities and research and development departments, among multiple independent consultants focusing all efforts on a specific deliverable, and even among competitors collaborating on the development of a new product. The focus on collaboration is driven by the need to innovate, the need to bring together disparate individuals to solve complex problems, and the need to reach across traditional boundaries to obtain the necessary knowledge.

While the ability to collaborate is crucial for both organizations and individuals, the tools and methods of collaboration have, in the past, been cumbersome, unscalable, and cold. To achieve success across geographical, functional, and organizational boundaries, collaboration tools...
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Elements of Successful Collaboration

Successful collaboration does not occur by accident. It requires a careful coordination of efforts, tasks, and expected outcomes. The coordination becomes even more difficult when the collaboration occurs over a distance or across traditional cultural or organizational boundaries. Collaborations are most successful when participants are able to effectively:

- Handle differing opinions.
- Work toward a common understanding.
- Communicate openly and honestly in a peer-to-peer relationship.
- Learn from one another.
- Visualize a final, mutually agreeable outcome.

Shortcomings of 2-D Virtual Collaboration Platforms

While 2-D virtual synchronous environments provide the ability to communicate over distances, they tend to add barriers and obstacles that inhibit collaboration and undermine many of the elements listed above. In 2-D collaborative environments, a number of interactive tools are employed. Floor controls (i.e., emoticons, raising hands, etc.), white boarding tools, breakout rooms, chat, application sharing, polling, and Q&A are all designed to help drive interactivity.

Ironically, the very tools designed to encourage interactivity in 2-D collaboration tools add to the sense of isolation and amplify the fact that the people collaborating on the project are not all in the same place at the same time working on the same problem. This is acutely evident when people “zone out” during 2-D sessions, because the level of immersion is too low and engagement in the process is not 100 percent.

Engagement and collaboration in 2-D synchronous environments suffer, not because of a lack of interactive tools, but because of a lack of immersion in the activity itself. While current collaboration platforms do allow for virtual interactivity, they do not afford the immersive experience that drives...
sustained engagement. As a result, most Web conferences, meetings, and work sessions are sub-optimized. Participants find it difficult to collaborate in a meaningful way when the element of immersion is missing from their interactions with co-participants.

By adding immersion to the equation, organizations can foster higher-quality interactions among employees who work at a distance, employees of different companies, and participants who collaborate to achieve a specific outcome in a specific time frame.

Virtual immersive environments make rich personal exchanges possible without the need for formal structures or face-to-face interactions. Instead, collaborations can be based on an immediate market or organizational need, and then disbanded when the need is addressed. The nonlinear dynamics of VIEs are challenging the traditional structures of enterprise. In fact, a recent study from IBM’s Global Innovation Outlook suggests that, “The future might consist of a billion one-person enterprises—people who act as free agents moving freely and frequently from project to project as their skills, focus, and passion shift.”

3-D Virtual Collaborative Platforms

A 3-D virtual immersive environment is a software platform that allows participants to enter into a virtual 3-D world as an avatar—a three-dimensional representation of themselves. The person, acting through the avatar, can then interact with other avatars within the environment as well as manipulate items within the environment.

In many 3-D VIEs, the software allows for display of documents, such as spreadsheets, MS Word documents, and slideshows. Using Voice over Internet Protocol (VoIP) functionality, participants in the virtual immersive environment can communicate as if they were on the phone as their avatars interact. A screen capture of an avatar waving from his desk in a virtual immersive environment is shown in Figure 1. The avatar is being controlled by his real-world alter-ego, Karl Kapp, author of this white paper.
Advantages of 3-D VIEs for Collaboration

A huge advantage of VIEs for collaboration is that they naturally enable and support immersion and engagement in an environment. Three-dimensional virtual worlds encourage exchanging differing opinions, seeking common understandings, peer-to-peer collaboration, learning from one another, and visualizing outcomes. These environments are frequently used by groups to collaborate on topics such as enhancing sales skills, marketing a product launch, optimizing manufacturing processes, facilitating scientific research, collaborating on engineering designs, and immersing learners in the right learning context. The group shown in Figure 2 is collaborating on the launch of a new social media campaign.

Virtual immersive environments provide the opportunity for collaborators to be online in the same place at the same time, looking at and interacting with one another. This is far different from simply being logged into the same screen looking at the same slide. The 3-D VIEs provide a sense of “being there,” which ties to visual and mental cues, and makes communication, peer-to-peer exchanges, and visualization more effective.

A 3-D VIE is a highly immersive environment where collaborators act and interact in real time with one another and facilitators to accomplish a goal, complete a task, or solve a pressing problem. Three-dimensional VIEs create the proper conditions for rich human interaction around a task where peer-to-peer collaboration is enabled and appropriate cues are provided as the collaborators walk, talk, and interact in the environment. Collaboration barriers are reduced when working within an immersive, interactive environment.

Interactivity and Immersion Equal Engagement

A VIE has at its core the notion of leveraging both interactivity (I) and immersion (I) to achieve a level of engagement (E) that creates real and meaningful collaboration.
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Here is an equation that breaks down the components of a VIE for collaboration:

\[ \text{I} \times \text{I} = \text{E} \]

In a VIE, the people collaborating become actors in a virtual world where the technology creates the spatial, temporal, and material conditions for both immersion and interactivity, driving a multiplier effect on participant engagement. Participants see themselves in relationship to the challenge at hand, and experience the consequences of their actions as related to the accomplishment of a given activity or challenge. In a VIE, because of its truly immersive qualities, interaction is not disembodied and transactional. It is embodied and experiential. This feeds innovation, creativity, and the willingness to collaborate.

The addition of the immersive component brings with it the opportunity to move beyond the static, generic context of a 2-D environment, to an environment where participants interact with content in a way not possible without the immersive elements of a 3-D virtual world. A VIE provides the opportunity to immerse participants in a context that allows them to personally engage with one another and within the environment in an experiential manner.

Two colleagues can cluster around an object in the virtual world as they attempt to address a problem or bring up a spreadsheet and both examine it from the same virtual location in the same virtual space.

Disagreements or miscommunications that occur within the VIE are surfaced at the moment where the lack of knowledge or understanding intersects with the need to have that knowledge to successfully collaborate. Just as is the case within a physical work context, the motivation to collaborate to solve a problem originates from the inability to complete a task or solve a problem. The feeling of being “in the problem” facilitates collaboration and communication because participants are standing side-by-side collaborating, and are experiencing real-time difficulties and can observe the same in their online colleagues.

Activity-Based Collaboration Contexts

VIEs for collaboration require not only providing participants with the right content, but also creating the right context within which the content can be consumed and synthesized so collaboration can occur in an environment resembling the one impacted by the eventual outcome.

For example, if automobile designers are collaborating on a new design with engineers in one country, operations personnel in another country, and the
distribution team in a third country, the group can collaborate in a virtual automobile showroom, in the production facility, or even at a test track. The team can meet wherever it needs to and in multiple locations to foster the right level of context for the collaboration. They can work together in an area specific to the problems they are attempting to solve or task they are trying to accomplish.

As another example, first responders collaborating on the best method of clearing an accident from a dangerous stretch of road can actually stand on the highway in question and observe traffic cresting the hill. They could gain a sense of spacing and distance as they drive virtual cars down the highway, and observe when they first see the accident and apply the brakes.

In a less dramatic example, a sales team can determine the proper place for each team member to stand, the coordination of hand-offs from one slide to another, and the proper time to demonstrate the product being discussed. A team that is meeting for the first time at a client location to present a million-dollar pitch can rehearse as much as they need in a VIE. This is demonstrated in Figure 3, as the avatar rehearses pointing to a booklet that will be distributed during a client presentation.

These activity-based collaboration contexts can be engineered in 3-D VIEs so that the environment helps to surface insights and ideas. The moments of sharing can be experienced in an environment similar to the actual work environment. This makes the collaboration authentic, meaningful, and immersive.

**Formal and Informal Collaboration**

It is important to make a distinction between formal and informal collaboration. In most instances, the focus is on formal collaboration activities. VIEs are established specifically to foster collaboration in a given space, such as an automobile factory or a stretch of highway. These areas typically also have access to virtual white boards, document displays, and the ability to quickly
bring documents and digital assets into the virtual meeting space. While establishing and fostering collaboration in a space specifically built for collaboration is important to having a collaborative experience, it should not be the sole focus.

Often it is the times between formal work efforts and time on task that results in the “aha” moments of collaboration. The discussion at the proverbial “water cooler” relating to a point raised earlier in the session finally puts the complex problem or task into perspective. Some organizations, in physical spaces, have designated a lounge area for after-session activities where people can mingle and reflect upon their activities in the hopes of fostering more collaboration and deeper insights.

This type of informal collaboration—an important part of the overall collaboration process—needs to be built into any VIE session attempting to foster collaboration. Creating an informal space for avatars to meet before sessions, during breaks, and after the informal meeting time has ended allows for a relaxed reflection on the topic at hand and will lead to insights, partnerships, and breakthrough moments that are not possible in highly structured formal sessions.

When leveraging the abilities of 3-D VIEs to foster collaboration, be sure to build both formal and informal gathering times into the agenda. The result will be an increased generation of ideas and insights.

Conclusion

Collaboration is a requirement if organizations are going to remain competitive and harness the intellect of both internal and external resources. The challenge is in creating the right environment in which true collaboration and sharing can occur over a distance and is scalable to many contributors.

Traditional two-dimensional tools break down distances and allow a limited level of collaboration, but are missing the element of immersion. Adding a three-dimensional aspect to collaboration enhances it by creating a warmer environment in which multiple participants can join together in the same virtual space at the same time and address the same issue. The future of distance collaboration is within 3-D VIEs, where participants can travel to various locations depending on the needs of the effort.
About the Author

Karl M. Kapp, Ed.D., CFPIM, CIRM is a Professor of Instructional Technology in Bloomsburg University’s Department of Instructional Technology in Bloomsburg, Pa. In Bloomsburg’s graduate program, he teaches a capstone course using problem-based learning, in which students are formed into “companies,” write a business plan, receive an e-learning Request for Proposal (RFP), write a 40-page proposal, develop a working prototype, and present their solution to representatives from various learning and e-learning corporations throughout the United States. He also teaches a course titled “Learning in 3D,” which teaches graduate students how to design learning in virtual immersive environments.

Karl consults with learning technology companies and government organizations on the use of technology for transferring knowledge to their employees. He has been interviewed by such magazines as Training, ASTD’s T&D, Software Strategies, Knowledge Management, Distance Learning, and PharmaVoice; and by television and radio programs concerning his work with learning and technology.

Karl is a frequent keynote speaker, workshop leader, and panelist at national and international conferences, as well as events for private corporations and universities. He is the author of four books on the convergence of learning and technology, “Integrated Learning for ERP Success,” “Winning E-Learning Proposals,” and “Gadgets, Games and Gizmos for Learning.”

His latest book, written with co-author Dr. Tony O’Driscoll, is called “Learning in 3D: Adding a New Dimension to Enterprise Learning and Collaboration.” Check out the book’s Web site at www.LearningIn3D.info.

You can keep up with Karl’s musings about 3-D virtual immersive environments and learning in 3-D on his widely read Kapp Notes blog at www.KarlKapp.blogspot.com.
References


