

SOCIAL CONSTRUCTIVISM IN A 3D IMMERSIVE WORLD

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Abstract: The use of 3D virtual environments is an area of growing interest and importance for higher education. At Appalachian State University, the principles of social constructivism inform our thinking as we construct teaching and learning environments. Our experience suggests 3D immersive virtual worlds support the formation of learning communities and group construction of knowledge. Virtual worlds such as AET Zone offer participants a sense of presence, immediacy, movement, artifacts, and communications unavailable within traditional Internet-based learning environments. This paper will report our experiences with an award-winning virtual, immersive learning environment. The results of our experience demonstrate the efficacy of 3D virtual environments as tools for the formation of authentic communities of practice.

Basic Tenets

At Appalachian State University, an underlying foundation or *Conceptual Framework* (Reich College of Education, 2005), based upon social constructivism, was developed by the College of Education and provides a clear guide to teaching and learning in our 3D web-based courses. These basic concepts are:

- Learning occurs through participation in a Community of Practice;
- Knowledge is socially constructed and learning is social in nature in a Community of Practice;
- Learners proceed through stages of development from Novice to Expert under the guidance of more experienced and knowledgeable mentors in the Community of Practice;
- An identifiable knowledge base that is both general in nature and also specific to specialties emerges from the Community of Practice;
- All professional educators develop a set of Dispositions reflecting attitudes, beliefs, and values common to the Community of Practice.

The 3D environment we have created, AET Zone, supports the five assumptions of our College's conceptual framework about teaching and learning. It provides a space in which community can be formed and nurtured. Through interactions, both planned and serendipitous, students begin to create knowledge together. They talk about the work they are doing in class, they share ideas, processes, and resources with one another and contribute to the base of knowledge that exists in their field. Throughout this process, they move from novice to expert, both in terms of knowledge and skills, but also in terms of their abilities to work collaboratively and inside a virtual learning environment using tools previously unknown to them. Their beliefs about teaching and learning are challenged, refined, and shaped by the process of learning together in an authentic social world of dialogue and discovery (Sanders & McKeown, 2007).

AET Zone: A 3D Web-Based Learning Environment

Descriptions of Appalachian State University's 3D web-based learning environment (Appalachian Educational Technology Zone or AET Zone) have been noted in research (Bronack, Riedl, Tashner, 2006; Riedl, Bronack, & Tashner, 2005 and Tashner, Bronack, & Riedl, 2005). AET Zone is based upon a version 4.1 Active Worlds Universe Server (<http://www.activeworlds.com/>) that provides a means to build virtual worlds for students and instructors and other invited guests to meet and work together in ways not found in other learning environments that are currently available. This environment is characterized by significant components of space, movement, physical presence and co-presence, conversational and presentation tools with small and large group shared workspaces, and metaphors and artifacts that assist collaboration and learning online in new and different ways. Students, faculty and guests, represented by avatars, move through the 3D world spaces interacting with each other and with artifacts within the worlds. These artifacts may be linked to different resources, web pages and tools necessary to provide content and support for various kinds of synchronous and asynchronous interactions. Small and large group shared workspace tools enable interactive conversations in text chats, threaded discussion boards, audio chats and group sharing of documents, web pages, and other types of application software as well as other resources.

Our online learning environment is unique. It is designed to meet the needs of learners engaged in self-directed meaningful activity within a community of practice of novices as well as experts.

Creation of Community

One of the primary tenets of social constructivist philosophy is the construction of knowledge in communities of practice – the notion of learning as a social activity (Vygotsky 1978). According to Wenger (2006), “Communities of practice develop around things that matter to people. As a result, their practices reflect the members' own understanding of what is important.” Tools in AET Zone are offered in support of the kind of problem solving that happens when information occurs in activity. Prompts and activities offer all learners the ability to participate in projects, discussions, and other activities at different levels of complexity as they develop and gain more experience. Finally, learners have multiple opportunities throughout AET Zone to turn interactions into artifacts and ways of knowing into expertise.

The importance of community in online learning environments is a growing topic of discussion. Shea et al (2002) cite agreement with a growing body of researchers that a sense of shared purpose, trust, support, and collaboration—i.e., a sense of community—is an essential element in the development of quality online learning environments . . . that online learning community may be established through effective instructional design and organization, the facilitation of productive discourse, and helpful direct instruction, all components of teaching presence. A study by Liu et al (2007) showed significant relationships between sense of community and perceived learning engagement, perceived learning, and student satisfaction with online learning experiences. Positive relationships were also shown between feelings of belonging to the community and social presence in the online courses. Sense of belonging to a social community was also positively linked to instructor presence and facilitation. Another study of online course work by Lee et al (2006) shows that students cite community-centered approaches to learning and establishment of a constructivist learning environment as essential for building community during the course experience.

Presence and Co-Presence

What characteristics differentiate the formation of community in a 3D immersive environment from a more traditional social constructivist setting? The most notable is that of presence, both of instructors and peers, in the learning community. Virtual worlds such as AET Zone offer participants a sense of presence, immediacy, movement, artifacts, and communications often unavailable within traditional learning environments. Schroeder (2001) notes, “Recently emerging research and the emergence of 3D web-based environments for teaching and learning is suggesting the importance of the sense of presence and co-presence in the development and evolution of online communities (as cited in Tashner, et al. 2007, p. 5). Our own experiences with teaching in an immersive learning environment support studies in social presence conducted by Rovai (2002) and Tu (2002), which suggest that sense of presence and co-presence do seem to be critical factors in creating and maintaining online communities. Tashner, et al. (2007) elaborate on how this occurs in the Zone:

As an immersive 3D environment, AETZone allows participants to ‘see’ the other participants (represented by avatars) present. Each participant is able to move through the 3D world by keyboard action. As one moves, one’s perspective changes, as does what is seen. This change in perspective as one moves, creates a sense of ‘presence’. A participant has the perception of being somewhere else. In addition, as one observes others in the environment, one has a feeling of being somewhere else with someone else or ‘co-presence’. These concepts lead one to experience a connected presence or mutual awareness of others. As the mutual awareness increases, so does the desire for and feeling of heightened engagement in the world and in the activities conducted within the world. Emerging from the analysis was a strong theme of the importance of both presence and co-presence in developing learning communities. Participants indicated that the feeling of isolation and working alone diminished as they become accustomed to working in the environment. As participants gain more of a sense of being somewhere and with somebody else, communication and collaboration is dramatically enhanced. Combining communication and collaboration tools with a sense of presence and co-presence provides opportunities for developing authentic learning environments.

As a result of these new opportunities for interaction and community building, we are thinking about our work very differently now. Our virtual world has helped us to interact more naturally and fluidly with our students. We can offer more opportunities for our students to take their own paths through resources and activities together, in groups and at times that make more sense to them. Structure and guidance are still provided, and a class within the virtual world may be as linear as any. However, we are more open to providing choices for the students within the 3D world, and the ability to help students construct individual paths through the virtual world is an essential element in that process.

Student Experiences in AETZone Participation in a Learning Community

“Communities of learners”, according to some, are groups formed to increase their understandings or knowledge base in specific areas. Jonassen (1997) cites the following necessary components for a learning community: active, constructive, collaborative, intentional, complex, contextual, conversational and reflective. Others use the term “community of practice” which seems to indicate communities of similar practitioners who are currently exploring various aspects of their practice together. Wenger (1998) states that communities of practice include: “... a joint enterprise as understood and continually renegotiated by its members..., mutual engagement that bind members together into a social entity... and the shared repertoire of communal resources (routines, sensibilities, artifacts, vocabulary, styles, etc.) that members have developed over time....” Others seem to use the terms learning communities and communities of practice interchangeably.

In either case, the literature suggests several main themes that emerge as useful guides for developing online virtual communities. An overview from a recent Academic Impressions conference on building learning communities states that such communities:

... Foster peer-to-peer collaboration, communication, interaction, resource sharing, negotiation and social construction of meaning, and expressions of support or encouragement among students. A blended or online learning community must have its own meeting or gathering space, as well as a defined set of members' roles and norms for resolving disputes (Academic Impressions, 2006).

Several common themes consistently emerge from these descriptions of learning communities. Communication, collaboration and support are central to their development and maintenance. Other factors include shared resources and authentic reasons to join together. Recently emerging research and the emergence of 3D web-based environments for teaching and learning is suggesting the importance of the sense of presence and co-presence in the development and evolution of online communities (Schroeder, 2001). Using such characteristics as these as both a vision and a guide, Appalachian State University has been studying ways to develop an environment that continues to foster and support a wide variety of learning communities that may be identified with these characteristics. Development and support of communities within 3D immersive worlds used for learning requires consideration of how students will move through the course environments in collaborative ways, means to enhance the communication between students, guests and instructors and how participants will interact with the various resources in the environment that contribute to building meaningful communities of learners.

A student survey in 2007 indicates that these efforts have been successful:

Table 1

As a student in the Instructional Technology program, I feel that I am part of an effective and supportive learning community.

	<i>Percentage</i>
Strongly Agree	71.9%
Agree	21.5%
Disagree	2.5%
Strongly Disagree	4.1%

Table 2

The Instructional Technology program promotes continuous, collaborative and active learning.

	<i>Percentage</i>
Strongly Agree	81.8%
Agree	11.6%
Disagree	.8%
Strongly Disagree	5%

Discussion

The immersive web-based 3D environment of AET Zone is one which provides students with a constructivist learning experience. By purposeful construction of an environment which provides tools for communication and collaboration, along with the provision of formal and informal opportunities for shared learning, instructors have worked to facilitate a sense of presence and co-presence which allows for a true social constructivist experience.

This emphasis of the creation of a community of learners is clearly acknowledged by students. 93.4% of respondents agree or strongly agree that they feel part of a community of learners, with the same percentage reporting that their experiences in AETZone have been those of active, collaborative learning. Certainly, the support of program faculty as noted above is critical as well. One student commented, "This world has made us in touch with one another. The real time contact allows us the ability to reach the instructor or panel of instructors for needs I have."

These results are directly in line with those of earlier informal qualitative analysis (Tashner, et al, 2007). In that instance, communication, collaboration, sense of presence and co-presence, development of leadership, and support were all cited by students as key factors to a learning experience in the program and AETZone.

Conclusion

Participants in AET Zone report a variety of positive experiences and learning outcomes from their work in this 3D virtual environment. The notions of presence and co-presence on the part of all members of this community of practice are key in the creation of shared construction of knowledge in a social constructivist learning environment. These virtual communities develop within the AETZone for several reasons, including social networking, small group task completions, and authentic discussions for topics of mutual professional interest. An important theme that emerges is the strong sense of presence and co-presence while in AETZone, a factor critical in fostering the learning community.

The AETZone is a unique environment for learning for our graduate students. The tools, support, and constructivist environment lend themselves readily to the creation of learning communities.

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