

Virtual Worlds: Further Development of Web-Based Teaching

Educational Technology

Research Paper

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Abstract

Significant components of the Instructional Technology Program at Appalachian State University have been moved into a 3D virtual world web environment. These include whole courses, course experiences and various student and faculty interactions. Virtual worlds provide opportunities to add elements of space, movement and physical presence, along with dimensional artifacts and metaphors not found in more traditional web-based counterparts. Students enter the 3D world from a desktop computer. Just as watching a play captured on film is different from watching a modern movie, teaching in a four-walled classroom is different from teaching on-line with web pages, and in turn, these experiences appear quite different from teaching in a virtual world. This paper reflects the experiences one group of IT faculty has had in teaching various courses built in a virtual world.

Virtual Worlds: Further Development of Web-Based Teaching

Introduction

Over the past several years, Appalachian State University's instructional technology graduate program has developed its courses within a three dimensional, multi-user domain. Based upon an Active Worlds Universe Server, these *virtual worlds* provide opportunities to add elements of space, movement and physical presence, along with conversational tools, artifacts and metaphors not usually found in more traditional web-based counterparts. Students, represented by avatars, move throughout course scenes interacting with other avatars as well as with various objects found in the course environment. Objects may be linked to web pages, conversation tools or other resources. While text-based chat is available for avatars to communicate on a large group as well as individual basis, additional chat rooms are provided for multiple small group discussions.

Our students are usually k-12 classroom teachers who want to integrate technology into their curriculum or who want to become instructional technology specialists in their schools or Chief Technology Officers' at the district level. Most of our students are teaching within a 100-mile radius of our university. However, in fact, most of our students do not come to campus for any classes. They take all of their courses in off-campus cohorts offered in locations near their home and/or their workplace.. While we depend on the use of virtual worlds for each IT course, we currently meet face-to-face regularly at the beginning of the program with reduced numbers and frequency of meetings as the members of a cohort gains understanding of what is expected and how to proceed. We also typically have an final class session for each course during which students present term projects and articulate their understandings.

Teaching in virtual worlds presents several new challenges to instructors. These new types of environments require the instructor to think differently about the role of teaching, learning, content and interaction. Such environments may be built to represent real or imagined learning spaces that may differ greatly from the traditional four-walled school classroom. No longer bound by bricks and mortar, nor time and place, instructors may create a new paradigm for instruction, for guiding and learning, and for sharing and communicating content and experiences among students who possess all levels of expertise. Instructors must think about ways students will move through a 3 dimensional space and interact with various artifacts, tools, content and other students. They must also seek to develop learning communities in which opportunities to communicate with other students, whether in their own cohort or another, are a central part of the experience. This paper will focus on our experiences of teaching in a virtual world.

Underlying Assumptions

As learning opportunities continue to migrate toward the web, an instructor of web-based courses must closely examine the belief system underlying the instructional process and especially the role of the instructor and what is expected of students. The mere

presentation of information may not be as valid as engaging students in interacting with information. This is particularly important as we consider teaching in virtual worlds

Glasser, Holmburg (1995) and Wedemeyer (1981) clearly emphasize that learners have the responsibility for learning. The role of the learner changes from a passive recipient toward more active personal responsibility. As Students take on the role of learning, they build their own individual mental frameworks for understanding based upon the contexts of their individual experiences and prior knowledge and perceived needs. Bielaczyc and Collins (1999) state that a learning community must exhibit a diversity of expertise, shared objectives, an emphasis on learning how to learn, and ways to share what is learned. The College of Education at Appalachian State University has developed a Conceptual Framework that guides instruction within the college. This conceptual framework for teacher preparation is based upon six assumptions:

- Knowledge is socially constructed and learning is social in nature;
- Learning occurs through participation in a Community of Practice;
- The development of educators proceeds through stages from Novice to Expert under the guidance of more experienced and knowledgeable mentors in the community of practice;
- Cognition is distributed; that is individual thinking and problem solving are revealed through socially contextualized practices;
- An identifiable knowledge base emerges out of the Community of Practice that is both general for all educators and specific to specialties and content areas;
- All professional educators must develop a set of Dispositions, including attitudes, beliefs and values

Our use of virtual worlds is an attempt to develop teaching/learning communities that build upon these basic assumptions and precepts.

Establishing distributed learning communities

We have been experimenting with teaching 1-7 sections of the same class in the same virtual world environment during the same semester. Specific sections may meet on different days, and at different times and each with a different instructor. For instance, in the Computers in Educational Settings course, we have 7 groups (about 130 students from many different k-12 schools and districts around our region, working with three instructors) exploring the same content in the same world. However, this large group is using the same threaded discussion board to discuss the same issues together. As all three instructors have one or more of these sections, we are each engaged in the discussions, projects and efforts of the entire group. Small groups form within these larger groups for various projects, assignments, small group discussions, and other needs. We have also noticed some interaction between classes, where members of a different course (such as Hypermedia in Instruction) will "visit" the "Computers in Education" students or may revisit projects and resources in classes previously taken and completed. Occasionally, a former student will return to explore resources or add to the discussions.

Such a community represents a rich diversity of expertise, regional locations, backgrounds, school and district policies, resources and leadership. However, we have found that teachers are often outside their comfort zone as they begin working within this community. Many are not comfortable in taking responsibility for their learning, in being guided rather than being told, in learning for themselves rather than attempting to please the instructor. We find that we must assist our students in unlearning "the ways that they have learned" in the past as they explore a different paradigm of what it means to learn.

We have found that we must carefully plan ways to encourage students to converse and collaborate with each other and in small groups while also fostering serendipitous meeting that serve student needs. This involves constant modeling, participation and guidance from each instructor. Much time is spent in designing specific questions, issues and activities that will engage the students in the content of the course as well as with each other. For instance, we designed the first course "Computers in Educational Settings" around the concept of using computers as "mindtools" (Jonnasen, 2000). A virtual space for exploring these concepts resulted in the development of the "So What? Saloon" with several major questions and issues for class discussions and a "General Store" for an introduction to many computer tools currently available for various instructional purposes. A corral offers many additional resources for student exploration. (See Figure 1)



Figure 1

Note: Avatars interacting within the scene. Each may individually enter the saloon, the general Store or the corral, chat, and engage in communications with each other, small groups or engage in asynchronous discussions on the discussion board.

Communications in virtual worlds

Communication tools (both synchronous and asynchronous) provided in our virtual world are similar to those found in other web-based mediums. The virtual world used is itself is

a multi-user domain (MUD). This provides a synchronous chat room for dialogs among several folks within a specified distance from each other. Two forms of dialogues are provided. The first is a "broadcast" chat that includes a group of participants who wish to speak with each other within a certain "range" or distance. This works well for perhaps two to five persons at a time but is a "public" discussion that is not conducive to small group work. Another option is "whisper" that is useful for a dialogue between two people who do not wish to disturb or include others in the discussion but who may be in the world at the same time. To enhance small and large group communications we added access to chat software (ChatterBox) that enables users to create individual text-based chat rooms as needed. Thus, during web-based large group sessions an instructor may direct the participants to discuss an issue in small groups of three or four participants each within several of these chat rooms. This prevents the disturbance of others who may be in the virtual world at the same time. It also enables more in-depth dialogue between participants. Summaries of each small group discussion can then be presented to the larger group at the appropriate time in another chat room or even with a different medium. The instructor can also provide web-based input/output forms connected to databases in which each small group can submit and view the "nuggets" of the discussions.

We are currently exploring several promising options for adding audio chat to further enhance communication possibilities within our virtual world. Bandwidth has been a distinct barrier to IP audio. In our rural region, many students do not have access to broadband networks. Dial-up modem service is still the only option to the Internet, especially from home. Recent codec improvements have made Voice over IP very possible at low bandwidths used by dial-up services. Initial results with students and faculty have been very encouraging. We expect to incorporate audio chat next semester. We will not eliminate the text based chat but add another dimension to possible communications within and between groups.

Other communication tools include various forms of blogs (web logs) for journaling, collecting ideas and thoughts. While we are experimenting with different uses of blogs for the course, students are assisting us in exploring useful activities that they have designed.

Instant messaging tools are also available, but many peer-to-peer applications have been restricted by network concerns in our local school districts. So we are piloting some server-based applications for their usefulness in enhancing instruction.

However, no matter what the specific tool used might be, we have learned that as each student finds his or her "voice," powerful conversations emerge that share information, resources and creative efforts. We find that we as instructors participate in the many discussions taking place collectively and in small groups both synchronously as well as asynchronously throughout the virtual world. It is this sharing, distributing and building of knowledge that leads to new knowledge that leads to a different kind of learning and understanding than that often found in more traditional learning settings.

Vision forms the practice

It is possible to literally build a four wall virtual classroom for a course, with a lectern in front of the class and rows of seated students to represent a traditional model of classroom instruction. On the other hand, virtual worlds enable us to expand beyond this traditional notion of learning space to create other spaces that better “fit” with a vision of the content, experiences and interactions that we want students to have. As we began to consider teaching in a three dimensional virtual space, we asked questions about what the content and activities might represent. In addition, using the above six principles from the conceptual framework as a guide, we asked questions about what a course might look like that embraced such ideals.

A starting point has been to develop a metaphor for the course “space” or scene. A course “space” will become the 3 dimensional representation of how the instructor thinks about the course, its content and the kinds of social and content interactions envisioned. As a part of this construction, we try to consider how a student might move through this space and explore and learn from the metaphors and artifacts developed in the course. We were also concerned about ways students would communicate with others within and outside the course design. In sum, how can such course environments assist students in becoming engaged with the content and to collaborate with others in meaningful ways?

For instance, in developing a course to teach the integration of computer technology in instruction, educators often find themselves in a circular discussion between what our personal vision for technology integration into instruction may be and how technology integration is defined or applied in the literature. One appropriate metaphor might be to create a circular path upon which students (represented by avatars) walk back and forth between the two conflicting concepts. (See Figure 2)



Figure 2

Note: Students engage in a circular loop between personal visions for technology integration and the current literature in the Technology Integration Course.

As students explore these ideas, individually and collectively, they make many modifications in their own notions concerning the meaning of technology integration. Various input/output forms allow them to share their own and their group's notions about these concepts. From such metaphors, instructors can explore ways for developing the desired social and professional interactions with content, other students, visiting experts and other “mentors.”

The Sense of Presence

As each student enters the course environment, he or she is represented by an avatar that moves through the three-dimensional space. Avatars move by the keystroke commands of the user. They may move close to each other, stand in front of objects, block doorways to buildings and so forth. Interestingly, we have found that folks often take their own personalities and predispositions into virtual worlds. As one becomes more used to working in a virtual world, one may carry expectations, and perhaps even feelings that enter into the interactions. Thus, folks, represented by their avatar, may be working on a discussion board accessed from the virtual world and be oblivious to others trying to communicate with them in the world. Those others may feel ignored or diminished. Thus, establishing social forms and helping others learn ways of communicating in the virtual environment becomes a part of the role of the instructor.

Linear versus non-linear

The ability of students (as avatars which represent themselves) to physically move through the instructional space provides a new dimension to the design of a learning environment. We begin the construction of a course by considering what major themes might identify the course. Such themes often guide us in the development of the space; that is the setting itself. Next we determine what course content students should be working with and if there is a necessary sequence to some or any of it. This provides some order for progress through the class but also allows students to discover and explore rich resources beyond those found in the course space. Thus, some courses may be designed so that participants may move through the space and the various aspects of the environment in a non-linear fashion. Content, assignments, activities and communications may be explored in a manner that meets the individual needs and interests of the students. This enables the direct possibility of “scaffolding” on an individual basis as suggested in constructivist theory. On the other hand, some course material may, indeed, require a structured, linear approach. Such virtual worlds may represent content in levels. (See Figure 3)

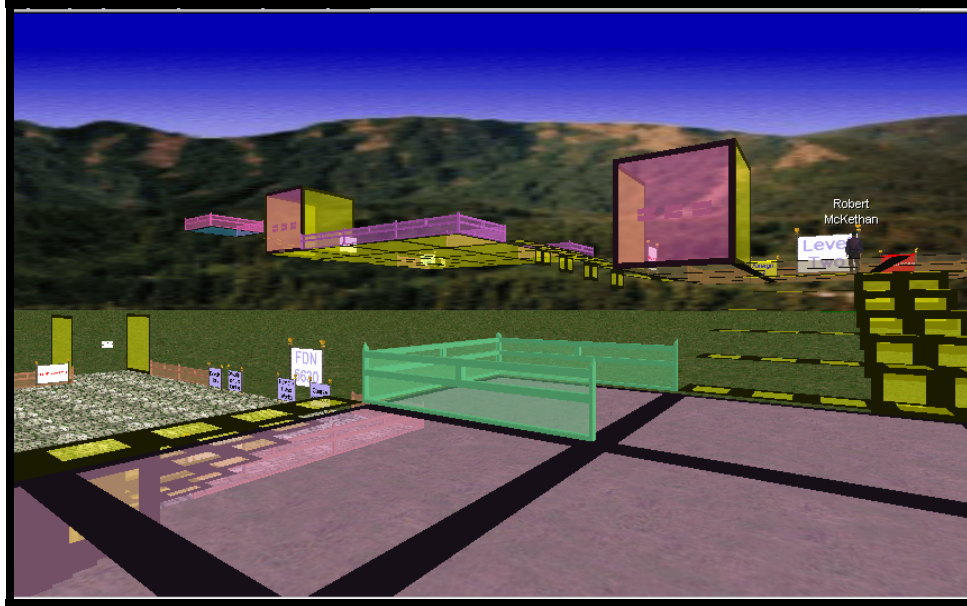


Figure 3

Note: A sequence of levels is provided for students to move through progressively higher levels of content.

Conclusions

Three dimensional virtual worlds offer an opportunity to develop Internet-based courses that provide students a sense of presence and movement within a space designed for exploration. While our vision of what constitutes learning forms the practice; artifacts, metaphors and themes can be developed to guide students in exploring course material. Designing such courses around a social constructivist framework is possible for linear as well as non-linear content. Learning communities can be encouraged and accommodated. Communication tools can be used in various ways to accommodate the needs of the course and learners.

As we continue to explore teaching and learning in virtual worlds, we find new questions to ask of ourselves as instructors. We are guided by our students' questions and experiences as much as by our own. What we have learned is that teaching in virtual worlds is not the same as teaching in web-based environment such as Web-CT and other course management tools. Virtual worlds require us to think differently about what constitutes teaching and learning and to change both what we do as teachers and what students do as students. It may challenge us to rethink our notions about distance education, web-based courses, and perhaps, even traditional classroom teaching.

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