Routledge
Taylor & Francis Group

Learning in the Zone: A social constructivist framework for distance education in a 3-dimensional virtual world

Stephen Bronack*, Richard Riedl, and John Tashner
Appalachian State University, NC, USA

Web-based technologies are the medium of choice for most universities as they move their offerings off campus and online. As we continue to move our own programs online we are challenged to consider what elements of our traditional experiences to preserve online, and which ones to modify, and to recognize the impact of the tools we use on our abilities to do so. The social constructivist conceptual framework that guides our college and the 3-dimensional virtual world we have constructed as our online campus for learning to manifest it are described. The result is a distance learning environment that is unlike traditional classroom- or web-based learning environments in important ways. A description of AET Zone is provided and the implications of using a social constructivist framework for designing and delivering an online learning environment are discussed.

Introduction

Postsecondary enrollments are rising, and it is clear the growth is online. Each year brings a new college enrollment record in the USA, with nearly 18 million enrolled in postsecondary education by the end of this decade (Waits and Lewis, 2003). Today, most colleges and universities offer some form of distance education (Jones, 2005). One in five institutions offers at least one completely distance-based degree and/or certification program and two-thirds offer at least some distance-based courses (Waits & Lewis, 2003). Public institutions are far more likely than private ones to offer distance education, and nearly one-third of those institutions that offer distance education have programs in education.

For the majority distance education means learning online through web pages and limited interaction. Most distance education courses today utilize Internet- and video-based technologies—nearly all use Internet-based, asynchronous technologies as the primary mode of instruction (Jones, 2005). Fewer than half utilize synchronous

---

*Corresponding author. 309-A Edwin Duncan Hall, Reich College of Education, Appalachian State University, Boone, NC 28608, USA. Email: bronacksc@appstate.edu

methods. Interestingly, while the usage rate of video-based technologies remained steady between 1995 – 1996 and 1997 – 1998, Internet-based learning technology usage tripled. By fall 2002, 7% of Internet users had taken a course online for college credits (Madden, 2003), 11% of higher education students in the USA were learning online and more than 550,000 college students were taking all of their classes online (Allen & Seaman, 2003).

Like those at other universities, our distance education courses rely heavily on Internet-based technologies for both content and interaction with off-campus students. However, our environments for online learning look very different from those in traditional distance education programs. The typical distance education student in our programs is a K – 12 educator working full-time and attending graduate school part-time. Most are teaching within a 100 mile radius of the university. Distance students are not required to come to campus. All required courses are offered to cohorts of students who meet face-to-face in designated locations near their homes and/or their workplace. Nearly all of our course content is online and most interaction between students and faculty occurs online. However, we do hold regular face-to-face meetings. As cohorts gain confidence and experience online the number of face-to-face meetings is adjusted accordingly. Most courses have a final class meeting to present projects, however, a handful of courses are entirely online.

Guided by our belief in learning communities and engaging students, we have looked toward non-traditional sources to help us construct the most effective spaces for learning. The emergence of online games and game play is one source. Some have noted the inherent learning value of game play itself, while others suggest applying lessons learned from game play as a guide to existing educational processes (Begg, Dewhurst, & Macleod, 2005). Games can provide an engaging medium within which learners may navigate complex challenges over an extended period of time (Gee, 2003). Online games often support the creation of communities that actively develop and maintain themselves (Rheingold, 1984). They become living, learning communities—much like the ones we strive to develop in online learning environments.

Whereas our online learning environment is not a game, it is a unique and immersive place for students to learn. We are using a 3-dimensional virtual world as the medium for both content and interactions in our distance education courses. 3-Dimensional virtual worlds offer an incomparable environment for creating spaces where teachers and learners separated by distance can engage in the social activity of learning. We believe virtual worlds support deep learning and can help learners make meaning in ways similar to those used outside virtual environments. Our experience suggests that virtual worlds offer participants a sense of presence, immediacy, movement, artifacts, and communications unavailable within traditional Internet-based learning environments.

Our experience planning for, designing, and delivering our distance education courses within the 3-dimensional virtual world described below has reaffirmed our reliance on our conceptual framework as an important guide. Watkins and Kaufman

(2003) provided a useful framework for analyzing traditional classroom-based instruction, distance education, current distance education, and what distance education might be in the future (Table 1). They suggested that current distance education has more in common with traditional classroom-based instruction than it does with what distance education can become. We relied heavily on our social constructivist conceptual framework to help us focus on the important questions. As we developed our online courses we were challenged to look past the models and methods of today and to consider what our program could become. Guided by these frameworks, we developed AET Zone, our 3-dimensional virtual world for learning.

Social Constructivist Framework for Distance Education

Some believe learning is a directly observable change in behavior; others believe it is an internal process where learners either build new or modify existing schemata. Social constructivists view learning as neither solely intrinsic nor purely extrinsic, but, rather, as a contiguous process that exists each time people willfully interact with each other in the world around them. Learning is manifest in the intellectual aptitude, cognitive strategies, motor skills, and dispositions people develop while working toward a goal within a community of others. Effective learning environments of all kinds must support participants as each becomes part of a community of practice through communication and co-construction.

Learning occurs first on the social level and next on the individual one (Vygotsky, 1978). Like real spaces, virtual worlds in distance education must account for the social nature of learning. Distance education environments that support deep learning and high levels of engagement do so by fostering interaction among the people who use them (Palloff & Pratt, 1999). Effective virtual worlds for learning support multiple means for students and instructors to interact with one another as both creators and consumers of the collective knowledge that emerges. Learners are compelled through action as members of a community of practice. Their growth and development lies at the confluence of effort and reflection, within the context of meaningful activity and performance, as individual learners become increasingly central participants within the community (Lave & Wenger, 1991).

These principles of social constructivism are central to our conceptual framework (Reich College of Education, 2004). This framework, in turn, informs our thinking as we construct our teaching and learning environments. The conceptual framework is an evolving construct, but the underlying basis remains firmly girded in the following assumptions:

- learning is participatory;
- knowledge is social;
- learning leads development through predictable stages via shared activity;
- a useful knowledge base emerges through meaningful activity with others;
- learners develop dispositions relative to the communities in which they practice.

Table 1. An analysis of distance education delivery systems

	Conventional instruction	Classic/historic distance education	Current distance education	Future distance learning
Is it learner, teacher, organization, or society focused?	Teacher and organization focused	Learner focused	Learner and organization focused	Society, organization, and learner focused
Is it content driven or driven by the usefulness of what is learned?	Content driven	Content driven	Content delivery driven	Usefulness driven
Are needs identified?	Needs assumed	Needs assumed	Needs assumed	Needs determined
Are the courses/programs linked to external usefulness?	Usefulness assumed	Usefulness assumed	Usefulness assumed	Usefulness linked to external value added
Location of course/program delivery	Institution	Remote site or home	Remote site or home	All sites possible
Course/program delivery mechanisms	Conventional means with some audio-visual support	Video, telephone, correspondence materials/books and workbooks	Computer, web, some video	All means possible
Frequency of interaction between learner and instructor and between learners	Some of the time	Rarely	Some of the time	Often
Is return on investment evaluated?	Return on investment assumed	Return on investment assumed	Evaluation of return on investment for learners and sometimes the institution	Evaluation of return on investment for all

Adapted from Moore and Anderson (2003).

Learning is Participatory

Communities of practice—loose collections of individuals with shared goals and both implicit and explicit ways of being, engaged in continuous collaborative activity—provide an important medium for learning because of their participatory nature. Participation within a community of practice prompts both more and less experienced members to engage in reflective thinking and complex problem-solving. Learning environments are most effective when they engage learners in meaningful activity within a community of practice.

Knowledge is Social

Knowledge is meaning created with others. What we know is "situated" (Brown, Collins, & Duguid, 1989) within the interactions and shared understandings among the peers that helped us craft it. What we know is the product of both psychological and sociological processes that cannot be considered apart (Dewey, 1897). As individuals think through the world around them, they do so among others with both more and less experience. The kind of problem-solving that results in information worth relating never occurs in a vacuum, but always in activity. Learning environments help learners gain knowledge by fostering interaction among experts, peers, content, and activities in formal, informal, and serendipitous ways.

Learning Leads Development via Shared Activity

Learners develop in predictable stages and as a result of the activities in which they engage with others. Learners begin as externally driven reactors—appropriating the behaviors and strategies of those they believe to be more knowledgeable. Guided by meaningful interactions and driven by the explicit expectation to engage in something useful, learners over time begin to modify their own behaviors and create unique strategies. The more experienced learners become, the more adroit each becomes at organizing knowledge and calling upon theoretical constructs to solve contemporary problems. Effective learning environments allow learners to engage in meaningful activity with others—peripherally, at first, but at increasing levels of complexity as the learner develops into a more experienced participant.

Knowledge Emerges from Meaningful Activity with Others

As each community of practice evolves, their ways of being produce an identifiable knowledge base that is both general to the greater community and also specific to the domains that define the community. This knowledge base encompasses the shared beliefs, assumptions, and values that help shape and define the communities in which activity occurs. The knowledge base frames both the public and tacit principles that guide interactivity within the environment, and also documents the development of the community of practice over time. Effective learning environments provide

participants seamless ways to turn interactions into artifacts and ways of knowing into expertise.

Learning Dispositions

Each community of practice is defined by more than simply what they know or what they do. They are defined in part by their dispositions, i.e. the subtle and explicit attitudes, beliefs, and values that are shared by each member of the community. Dispositions provide the backdrop for interaction and communication between and among all members of the community. Therefore, dispositions are embedded in the knowledge that emerges from the community. Learners appropriate the dispositions of the community, and they also contribute to them. Learning environments are most effective when they reflect the nature of the community in which they occur, allow new members to contribute to them, and encourage all participants to think critically about the interaction between dispositions and what is known.

This conceptual framework describes a belief in the social construction of knowledge and the need to develop a community of practice. The framework has served as an effective guide for developing our distance education efforts. As we reflected on how to create a distance education environment that matches our framework (Table 2) we realized that traditional web-based tools would be insufficient environments for offering social constructivist distance education courses.

Traditional tools make it difficult to sense each other's presence and to work collaboratively, and they do not account for the serendipitous, informal contact typical of the college campus as effectively as virtual worlds. Virtual worlds extend users' abilities to communicate with each other. The 3-dimensional virtual world described next is designed to serve our distance-based graduate education students and reflect the social constructivist principles of our conceptual framework.

AET Zone: A virtual world for learning

AET Zone is a 3-dimensional virtual world designed to support a community of practice among distance-based students, faculty, graduates, and support staff. AET Zone offers users perceptions of space, movement, and the presence of others. It also offers text- and audio-based conversational tools, interactive elements, and metaphors not found in traditional web-based instructional environments. AET Zone ''citizens'' select avatars to represent themselves. Each moves between courses and common spaces, interacting with other avatars and the objects that comprise the world itself. Some objects are hyperlinked to web pages, synchronous and asynchronous tools, or other resources. Both text- and audio-based chat is available for large group, small group, and individual discourse.

AET Zone was created using an Activeworlds Inc. (Mauz, 2001) universe server and is hosted by the university's technology services team. Citizens download a 3 Mb

Table 2. Analysis of the principles of the RCOE conceptual framework

	Conventional instruction[a]	Current distance education[b]	AET Zone[c]
Knowledge is socially constructed and learning is social in nature	Usually only within the context of each individual class	Rarely and if so within the context of an individual class	Within the entire virtual world community
Learning occurs through participation in a community of practice	Usually only within the context of each individual class	Rarely and if so within the context of an individual class	Regularly throughout the entire virtual world community
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	Rarely; contact with mentors usually limited to the course instructor	Rarely; contact with mentors usually limited to the course instructor	Exposure to and interaction with a wide range of mentors throughout the virtual world community
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	Limited by lack of exposure to the broader community of practice	Limited by lack of exposure to the broader community of practice	Regular contact with the broader community of practice develops a full and shared knowledge base

[a]Typical context is one teacher with many students meeting in a classroom for a finite amount of time and in a class that is not necessarily connected with other classes or other experiences.

[b]Typical context is one teacher with many students who are in many different locations and in a class that is not necessarily connected with other classes or experiences.

[c]Students and instructors of many classes intermingle at many different times and locations. Alumni and other experts are available throughout the virtual world and at many different times.

browser (Windows only) that connects each directly to the server. The browser has four distinct areas (Figure 1):

1. a first or third person 3-dimensional view of the world;
2. a text-based chat for ''whispering'' or chatting to all who are online;
3. a browser that links user interactions with objects in the world to web-based content;
4. a utilities tab for accessing support, notes from other users, teleports (similar to bookmarks), and contacts (similar to buddies).

All students on AET Zone courses are provided with a username, a password, and a link to the browser. Whereas broadband access is useful, it is not necessary. Once logged on, students see the avatars of those who are logged on at the same time. Students interact with each other as well as with students in other courses, graduates of the program, and the instructors of various courses.

There are several areas within AET Zone (Figure 2). These include a library, an alumni center, a student services building, and a teleport for transiting to and from course areas. The AET Zone Library interfaces directly with the distance-based services of the physical library on campus. Available services include: full text articles from the university databases; book check-outs; and synchronous chats with university research librarians. The alumni center links to the Appalachian State University alumni resources, designed specifically for graduates of the Instructional Technology program. On the opposite side of the park is the teleport. Each gate within the teleport leads to a different course area.
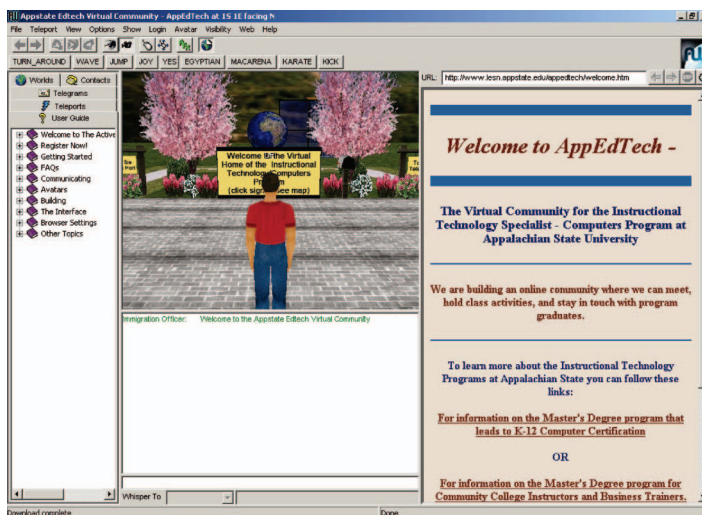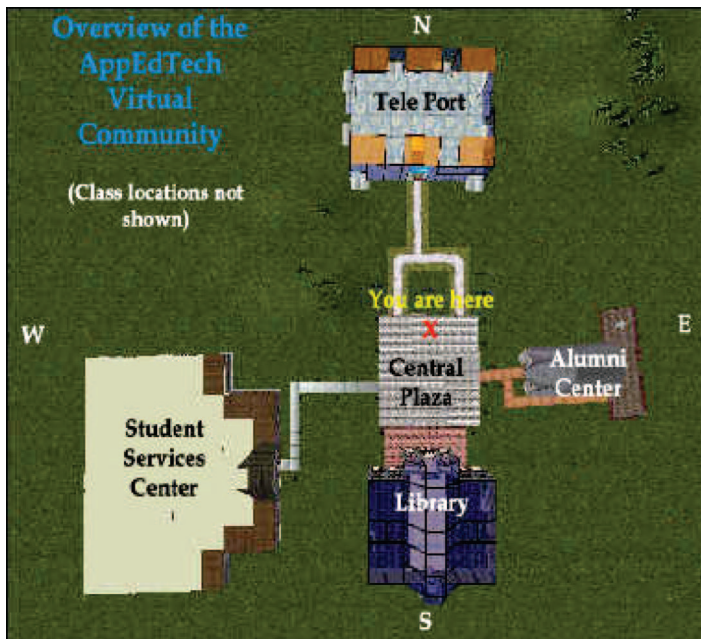

Figure 1. The AET Zone interface (third person view)

Figure 2. An overhead view of the entry area for the AET Zone

Each course area within AET Zone is unique and reflects the nature of the content and the form of interaction the faculty wish to foster as students strive to meet course goals. For instance, ''hypermazes'' dot the landscape in a course on hypermedia. Students learn about hypermedia by experiencing it as they choose their own paths through information and resources. Students in the telecommunications course learn components of a network by walking through one. Each level of the web design course represents a set of skills upon which ensuing levels build. As students progress through the physical levels of the course they gain an increasingly complex set of skills that is dependent upon the skills developed within the previous level. For a course on integration students are asked to address key questions and issues associated with the process of instructional technology integration as they follow a path around the Forest of Intentions. In the forest students are asked to demonstrate their own learning by building a campsite in glades set aside for that purpose. Finally, a case-based course on issues in learning with computers (Figure 3) is set in a fictitious school building in which characters present their point of view on a realistic dilemma (Figure 4).

Planning a course often starts with a discussion of what metaphor might best represent a class. This discussion facilitates our further consideration of what the class is really about and what we hope our students will gain from taking it. Sometimes the metaphor may be implemented in the design of the class, as is the case of the class on issues (using an open Roman forum as the meeting place) or in the case of the class on planning (using a street down which the students progress with side streets representing further exploration and/or a place to introduce further skills). Students
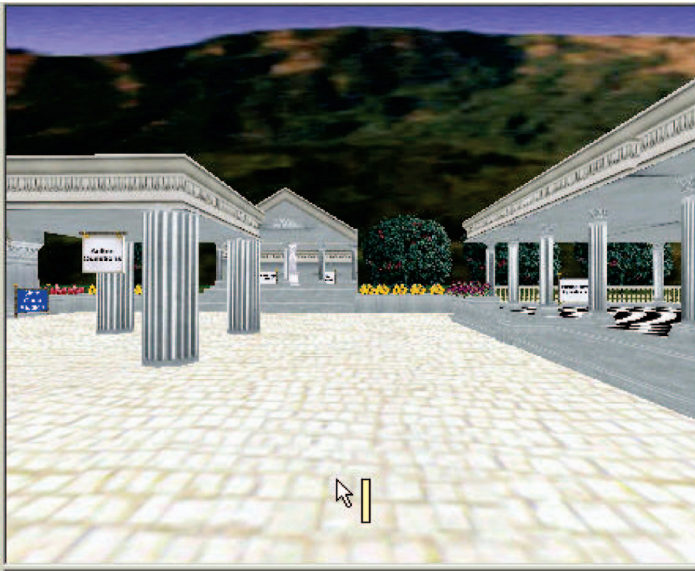
Figure 3. The ''forum'' in the issues class

Figure 4. Getting the perspective of a group of teachers in the issues class

move freely between and among course areas according to their needs and interests and guided by timelines for projects, sharing (discussion, brainstorming entries, etc.), and other prompts that dictate the flow of the class. All classes use discussion boards and interactive web forms for sharing with classmates, and resource and reading links and audio chat rooms for large or small group meetings.

Multiple sections of the same course are often conducted at the same time within the same virtual world. Although sections may meet on different days, at different times, and are led by different instructors, all explore the same content in the same world and use the same threaded discussion board to discuss the same issues across sections. Faculty from each section engage in the discussions, projects, and efforts of the entire group. Cross-section and even cross-course groups form to work collaboratively on projects, assignments, discussions, and other activities. Former students return occasionally to AET Zone to both explore new resources and also to add to the rich discussions. Citizens have many and frequent opportunities to interact with not only their own classmates, but also with others who are in different sections of the course, with instructors from other sections of the course they are on, and with students who are at different stages of their program of study, creating a natural and rich community in which to learn.

Student Feedback

Feedback from our students seems to support the idea that AET Zone is a rich learning community. Comments such as the following are common.

> I was stimulated and challenged by other's comments and suggestions. I probably have experienced more professional growth during these last two semesters than I have at any other time in my 16 year teaching career. The opportunity to interact with other professionals is so rewarding and enriching . . . . For the first time in 16 years, I have really questioned my entire philosophy of education.

And further, students see AET Zone as a rich environment in which to explore and to learn.

> Littky stresses the philosophy of "one child at a time" and "treating everyone alike differently." My question, as I read the book, was how do I do this with 3 classes of 25 or more each semester? He mentioned in this last chapter that you don't. Schools must be smaller.

> Then, it struck me! Isn't that what our IT program is accomplishing? The Virtual World allows us to learn at our own pace guided by our own interests. Just as the Met's internships allow students to develop projects that are applicable to their world, we create projects that we want to do and that have relevance for us in our jobs. Like the students at the Met, we are intrinsically motivated to complete tasks because they have meaning for us because the work is "real" . . . . Also, at the Met, "they trust kids enough to allow them to direct their own learning." . . . Likewise, we all learn the meaning of hypermedia, but we develop that meaning in our own way. We are also allowed to choose an internship project to improve skills that we know we need, rather than what the instructors think we need.

They are also learning to use the tools provided and to use them to enhance their learning:

> [Our team] has had two great experiences with audio chat. It takes longer than we originally thought it might, in part because we are getting to know one another. It is also more difficult to

stay ''on the task'' of answering the question. We have had luck with round robin discussion and one person typing the main thought of all the commentary. Then using a cut and paste to formulate the answer. I am interested to see how others ''take notes.''

I agree a lot with Amy and Beth—the audio chat is a great feature for distance learning classes or any class for that matter. It is useful to have a form of ''face to face'' communication for virtual world. With many of us at different locations this is an easy way to communication and hear each other. Sometimes it is so hard to type what you really mean to say. I like the idea of having an agenda for us that lose focus so easily.

Conclusion

As we continue to examine our experiences in our 3-dimensional world one thing remains clear: we are thinking about our classes very differently now. In the past we considered our classes as a series of sessions held on certain days. Even our web-supported classes followed this pattern. But the 3-dimensional world has helped us to interact with our students in more fluid and natural ways. We remain ever-tempted to jump in and to provide resources and activities for our students at the drop of a hat. However, the explicitly social nature of our virtual world prompts us more often to leave more opportunities for the students to take their own paths through those resources and activities together. They learn better when they do and, though it often feels paradoxical, we are better teachers for it. This is not to say that all structure and guidance is abandoned. Indeed, when the content warrants it, a class within the virtual world may be as linear and as structured as any. However, we are more open to providing more choices for the students within the 3-dimensional world, and the ability to help students construct individual paths through the virtual world is an essential element in that process.

We have also found ourselves thinking very differently about the way we interact with each other and our students. We encourage cross-class collaboration. Each of us has stopped thinking of students in one section of a class as ''my'' students but instead we interact with all students across sections and across classes. The ''flattening'' of our thinking is trickling down to our students as well. Our students are meeting other students who work in different parts of North Carolina (and with the addition of our students in Puebla, Mexico, to one of our cohorts, also in Mexico) and learning what they have in common and how they differ. We have students just beginning the program interacting with students who are nearing graduation. We have students in school administration or reading programs who are taking a class from us as an elective interacting with each other and with instructional technology majors. Guided by our social constructivist conceptual framework, AET Zone has become a focal point for a learning community that reaches far beyond what our normal classroom settings have been able to accomplish and which, we believe, is moving our distance education effort toward what distance learning might become.

Virtual worlds such as AET Zone are uniquely situated to serve as rich environments for engaging students in meaningful communities of practice. But, like all instructional technologies, 3-dimensional virtual worlds for learning are only as

effective as the vision and the pedagogy that guide them. The development of community in online settings is critical to the success of distance education (Palloff & Pratt, 1999). Gibson (2003) also noted the growing interest in the development of learning communities in online settings and introduced several forms that a community may take. But the questions for designers of distance education remain: what kinds of interactions are necessary to develop a successful learning environment, and what does such an environment look like? Considering the factors that characterize innovative delivery systems for distance education helps us design environments that reflect the ethos of our on-campus programs yet allows students and teachers to interact in ways otherwise impossible. Taking the time to reflect on our conceptual framework has allowed us to provide graduate education courses in a distance education environment that matches our beliefs about the social nature of teaching and learning.

References

Allen, I. E., & Seaman, J. (2003). Sizing the opportunity: The quality and extent of online education in the United States, 2002 and 2003. Retrieved October 23, 2005, from http://www.sloan-c.org/resources/sizing_opportunity.pdf

Begg, M., Dewhurst, D., & Macleod, H. (2005). Game-informed learning: Applying computer game processes to higher education. *Innovate*, *1*(6). Retrieved April 15, 2006, from, http://www.innovateonline.info/index.php?view=article&id=176

Brown, J. S., Collins, A., & Duguid, S. (1989). Situated cognition and the culture of learning. *Educational Researcher*, *18*(1), 32–42.

Dewey, J. (1897). My pedagogic creed. *School Journal*, *54*(3), 80.

Gee, J. (2003). *What video games have to teach us about learning and literacy*. New York: Macmillan.

Gibson, C. (2003). Learners and learning: The need for theory. In M. G. Moore & W. G. Anderson (Eds.), *Handbook of distance learning* (pp. 147–160). Mahwah, NJ: Lawrence Erlbaum Associates.

Jones, J. G. (2005). Issues and concerns of directors of post-secondary distributed learning programs concerning online methods and technologies. In *Proceedings of the American Educational Research Association* (p. 184). Montreal, Canada: American Educational Research Association.

Lave, J., & Wenger, E. (1991). *Situated learning: Legitimate peripheral participation*. Cambridge UK: Cambridge University Press.

Madden, M. (2003). *America's online pursuits*. Retrieved October 24, 2005, from http://www.pewinternet.org/pdfs/PIP_Online_Pursuits_Final.PDF

Mauz. (2001). *Mauz's active worlds pages*. Retrieved October 23, 2005, from http://mauz.info/awhistory.html

Moore, M. G., & Anderson, W. G. (2003). *Handbook of distance learning* (p. 515). Mahwah, NJ: Lawrence Erlbaum Associates.

Palloff, R., & Pratt, K. (1999). *Building learning communities in cyberspace*. San Franciso, CA: Josey-Bass.

Reich College of Education. (2004). *RCOE conceptual framework*. Retrieved October 25, 2005, from http://www.ced.appstate.edu/Conceptual_Framework.htm

Rheingold, H. (1984). *The virtual community: Finding connection in a computerized world*. London: Minerva.

Vygotsky, L. S. (1978). *Mind in society: The development of higher psychological processes*. Cambridge, MA: Harvard University Press.

Waits, T., & Lewis, L. (2003). *Distance education at degree-granting postsecondary institutions: 2000 – 2001* (NCES 2003-017). Washington, DC: US Department of Education, National Center for Education Statistics.

Watkins, R., & Kaufman, R. (2003). Strategic planning for distance education. In M. G. Moore & W. G. Anderson (Eds.), *Handbook of distance learning* (pp. 507 – 517). Mahwah, NJ: Lawrence Erlbaum Associates.