

## Research Review

Dickey, M. D. (2003). Teaching in 3D: Pedagogical affordances and constraints of 3D virtual worlds for synchronous distance learning. *Distance Education*, 24(1), 105-121.

Deborah L. Wise

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Three-dimensional (3D) virtual worlds are a new technology that holds some promise as constructivist learning environments for distance education. This investigation presents an evaluative case study of the pedagogical implications of using one 3D virtual world, Active Worlds, for synchronous distance education. The research design for this qualitative study focuses on the pedagogical affordances and constraints. Methods employed in the data collection include participatory observations, class logs, and formal and informal interviews with the instructor of a synchronous distance learning course offered through Active Worlds University. Findings reveal that although Active Worlds provides tools that support constructivist learning environments, the affordances and constraints of the tools (discourse, experiential, and resource) may, to varying degrees, impact the pragmatic use of this medium. While this initial investigation reveals that this technology supports constructivist learning environments, more research needs to be conducted to fully explore the potential of 3D virtual worlds as both distance and traditional classroom learning environments.

While the study was very useful from a tools perspective in support of a constructivist learning process, it appeared that using only one 3D virtual environment as opposed to several narrowed the focus sufficiently to be questionable as to its usefulness. Even in 2003, when this article was published, there were several 3D virtual worlds that could have been used to compare and contrast resources (three such environments were mentioned in the article). In researching one the author's newer publications on the same topic (published in 2005) the same environment was used, despite the emergence of other 3D virtual worlds such as Second Life, which has become a virtual home for dozens of educational institutions.

In this study, research questions revolved around the tools that enable an instructor to communicate to avatar-students the basic manipulation of objects. Class logs and dialogues were encoded and instructor interviews were given, in order to provide a “thick description” of the data. Given the constructivist nature of the environment, where learners play an active role in the process, it is important to note the absence of interview data from the people who this type of learning environment is supposed to benefit – the learners. Additional research questions from a constructivist perspective could have included whether or not the course objectives were met and how learners felt they engaged with the tools and subject matter (Freebody & Freiberg, 2006).

To the author’s credit, she is researching learning using the newest of media in an environment that is dynamic. Since the publication of the 2005 article, many environments including Second Life have become so user friendly and graphically sophisticated as to make learning immersive and engaging for anyone who uses it. Teaching in virtual worlds is a research topic that is constantly in motion; she is a truly a research pioneer in this discipline.

### Critical Review

Positivists would argue that qualitative researchers write fiction (Denzin, Lincoln, and Giardina, 2006). The absence of numerical data in this study gives preference to the process of how data is collected and used to produce knowledge about learning. In this study, weight was given primarily to interviews with instructors who used the platform to teach basic avatar skills, not the students themselves.

### *Problem and Conceptual Orientation*

The title of the article gives a clear indication of the author’s research interest. This is a study of the affordances and constraints of the tools used in one 3D virtual world, as opposed to how effective the environment is in supporting a constructivist learning. The author has made her

bias clear in stating that more research needs to be done in this area but initial research indicates virtual environments may be useful for collaboration among groups of students, particularly those who are geographically disbursed (Dickey, 2005). The research questions the author successfully answered were clearly stated: an examination of the pedagogical affordances and constraints of discursive, experiential, and resource tools. A substantial explanation of what defines a 3D virtual world is given, along with definitions of how an individual creates a unique identity within the environment. The author included screen shots to better communicate what the browser view of the research environment looked like.

### *Related Literature*

As research concerning education in virtual world becomes more published, there will be more related literature to consult. The author's later publication (Dickey, 2005) cites several journal articles regarding virtual environments. The article under review cites more articles that support constructivist learning, as it assumes the reader must move from an objectivist to a constructivist perspective in order to find learning in virtual world useful (Beldarrain, 2006). The author used 26 related citations, building a solid foundation with seminal researchers such as Vygotsky (1978) to more recent works in constructivist perspective by Jonassen (1999). The bibliography represents a careful comprehensive review of the research focus, given the recent emergence of the medium.

### *Sampling Decisions*

The author makes an argument for an evaluative case study to understand the pedagogical affordances and constraints of using virtual environments for learning but why Active Worlds was chosen as the only environment studied is not clear. Her desire to present a "thick description" led to the observance of one particular class offering, an object-modeling course

called *Intro to RWX Modeling*, which relied heavily on visual information in a synchronous environment. The number of instances this class was observed was not disclosed but date range for the study is mentioned (fall of 1998 through spring of 2001).

### *Data Collection*

According to the author, the data gathered in the case study included “participatory observation and notes, class logs, screen-captured images and formal interviews with the instructor.” This data was collected from the fall of 1998 through the winter and spring of 2000, with concluding instructor interviews in the winter and spring of 2001. Due to the text-only nature of virtual environments at that time, it was possible to record a chat log of the class that included not only what the instructor communicated but also the responses of the students. The instructor, Magine, was chosen for observation because of her experience as a programmer and Active World designer. Her experience with the medium enabled her to maneuver around some of the inherent constraints of the environment.

### *Data Analysis*

As a qualitative study evaluating the usefulness of the tools available in one particular 3D environment, direct observation of not only the class in session, but the chat logs of each class as they occurred were particularly valuable for analysis. These chat logs were encoded twice; once for teaching methods and once to look for patterns of various tool use by the students. Magine was then consulted to address any pedagogical issues pertaining to the various tools.

The chat logs also gave insight into the historical and cultural context of a classroom environment, even one in a virtual world. The logs assumed that Magine, as the instructor, would direct the class and communicate what was acceptable and unacceptable behavior (Freebody & Freiberg, 2006). When one student-avatar crossed into what was determined to be unacceptable

behavior, Magine was able to “mute” the offender, so none of the chat from this person would be visible to her, and she encouraged all her remaining students to do the same. This effectively eliminated some of what might have been considered “outlier” material.

The use of screen shots and instructor interviews help to round out the picture of what it is like to teach and learn in a virtual environment but it would seem that post-session interviews with students would have also been helpful, even if to get a student’s perspective on using the various tools. In this study, much more weight was given to the instructor’s perspective, possibly because of her level of expertise within the environment.

### *Report and Findings*

It is important to remember that the findings in this study apply to 3D virtual environments as they existed in 1999-2001. There has been a radical evolution in virtual communities (a term first coined by Rheingold in 1993). Today, environments such as Second Life are used as global marketplaces for everything from education to pizza-delivery. Dominos Pizza has announced that avatars in Second Life will soon be able to order real-world pizzas delivered to their door from within the Second Life environment. The 3D virtual world of today bears little resemblance to the environment described in this study.

The Active Worlds environment described by the author had affordances and constraints that may or may not be true today. While it is still true that the choices of avatar styles in a virtual environment can make many avatars look alike (relying on names only as a form of distinction), there exists many opportunities for a person to customize the appearance of their avatar, creating a role-playing scenario that may not only cross racial or social boundaries, but also trans-gendering and even human-animal barriers. This assumption of a particular role can

have an impact on how the learner observes and participates in the learning process (Anderson, 2004).

Text-based chat is still the primary communication tool within 3D virtual worlds (clearly a disadvantage to those with a language or typing barrier), although some learning environments have made use of streaming media to bring sound into virtual classrooms. The author's use of actual chat log excerpts in the article helped the reader visualize the limiting nature of chat, especially with the 255-character limit that existed in Active Worlds. Second Life is about to release a voice option, in an effort to allow for its inhabitants to better communicate. This has been a topic of controversy in the Second Life community: While voice-enabling may be an asset to those who educate in Second Life, it will raise issues about age, gender and the very nature of anonymity within that environment.

Inventory systems are much more sophisticated in virtual environments than they were when this article was written. An individual now has access to their entire inventory of objects and project builds, with the ability to upload and download objects at will, assuming the correct permissions are in place.

Perhaps what is most consistent with the timeframe of the article is the process in which learning is executed in virtual environments. Classes are still held as traditional social gatherings, with an instructor leading the class and setting expectations. The learning is constructivist in nature, with some outcome as the goal of the class-usually a project that is designed to utilize a particular skill set in order to complete (Dickey, 2005). There is a natural peer mentoring system in place, with those who are more experienced quickly becoming resources for those who are newer to the environment. As learning in these environments become more sophisticated and the hardware and infrastructure necessary to support the evolution of learning is in place, more and

more streaming media is finding its way into the virtual world, allowing self-directed, on-demand delivery of learning materials to take place (Beldarrain, 2006).

Overall, the findings of the author with respect to 3D virtual environments still hold true: Synchronous learning in a virtual environment has barriers due to the natural constraints of the tools, but can produce a meaningful learning experience for those who are willing to participate in the learning process-particularly those who are geographically disbursed and may not have access to the same learning by other methods.

## References

- Andersen, C. (2004). Learning in “as-if” worlds: Cognition in drama and education. *Theory into Practice, 43*(4), 281-286.
- Beldarrian, Y. (2006). Distance education trends: Integrating new technologies to foster student interaction and collaboration. *Distance Education, 27*(2), 139-153.
- Denzin, N. K., Lincoln, Y. S., & Giardina, M. D. (2006). Disciplining qualitative research. *International Journal of Qualitative Studies in Education, 19*(6), 769-782.
- Dickey, M. D. (2005). Brave new (interactive) worlds: A review of the design affordances and constraints of two 3D virtual worlds as interactive learning environments. *Interactive Learning Environments, 13*(1/2), 121-137.
- Freebody, P., & Freiberg, J. (2006). Cultural science and qualitative educational research: Work ‘in the first place’ on the morality of classroom life. *International Journal of Qualitative Studies in Education, 19*(6), 709-722.