

3D Virtual Environment Impact on Course Delivery

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ABSTRACT

This session will present and discuss the use of a 3D virtual online learning environment being used since 2002 to deliver and support courses in the Dept of Learning Technologies, College of Information, University of North Texas. The use of the 3D system provides significant increases to student satisfaction, course discussions, and increased rapport among students and with the instructor. This session will present research and discuss how the custom 3D system UNT is using provides more appropriate tools than commercially available environments for supporting course delivery. Research conducted between 2002 and 2007 examined user discourse, message flow, and exchange frequency in Web-only courses, blended courses, and then the same types of courses extended with a 3D online learning environment. The purpose of the study was to examine the impact that a 3D online learning environment has on discourse with Web-only and blended courses. Findings from the study suggest that the addition of a 3D online learning environment to both Web-only and blended courses demonstrates the ability to more rapidly create rapport among users, which translates into accelerated discourse that occurs earlier in and sustains itself longer and throughout the semester.

SESSION QUESTIONS

The discussion will center on questions of interest to those attending the session. Common question we expect to discuss include 1) pedagogical tools available, 2) impact on discussion and rapport, 3) implementation and technology integration.

DISCUSSION LEADERS

Dr. Jones's primary research interest is in 3D virtual environments and its impact on learning. He is the chair of ISTE's Games and Simulations SIG and is program co-chair of AERA ARVEL SIG.

Dr. Warren's research focus is on existing and emerging technologies to improve student literacy, motivation to learn, achievement, and positive experiences with school.

TOPIC OVERVIEW

3D environments provide users with educational resources that are stimulating, appealing, easy-to-use, and educationally sound, without the need to develop highly elaborate technical skills [1]. Proponents suggest that such technology is well-suited to appeal to future user populations when applied in a presentation and learning context [2-4]. A 3D online learning environment (OLE) is a specific combination of tools, interactions, and 3D multi-

user environments [5]. While the 3D interface and multi-user interactions can be compared to Second Life [6], World of Warcraft [7, 8], Active Worlds [9], or the AET Zone [10], a 3D OLE provides an integrated set of unique tools, all of which are intended to make the learning experience to the student seamless. The differences between a 3D chat space or social game (MMOSG) like Second Life and a 3D OLE is the presence of tools beyond the 3D immersion and social interaction that directly support learning affordances. These in-space interfaces directly support formal learning in the environment.

Each system facilitates the creation of context developed to act as cognitive scaffolding. This acts as a means to foster engaging, immersive user interaction [11, 12]. In a shared 3D environment such as a school building, park, or museum, users assume control of an avatar, or virtual-self. Communication occurs via text, full-duplex audio, overheads, whiteboard, and other collaborative tools. 3D OLEs provide highly collaborative, immersive 3D spaces that promote learner-centered interactions.

Furthermore, by providing a number of communication tool choices, students and instructors can use different tools depending on the set of tasks or personal preferences. This can increase the likelihood that all students, regardless of learning style, will receive an equal opportunity to generate constructive rapport. Students and teachers frequently comment that they feel more engaged when interacting with one another within 3D systems [13]. Research suggests that students using 3D environments maintain higher levels of motivation, increased interactions, and improved academic efficacy [15].

The research [16], that will be discussed in full at the session, indicates that a 3D OLE being used to extend Web-only and blended courses can have a positive effect on the creation of effective discourse within learning communities. When employed to extend communications in either the blended or Web-only approaches, this technology positively increased both the quantity and overall quality of discourse. From the learner-centered perspective, this is the result of student-initiated discussion that is ultimately more in-depth and focused. When comparing the type and frequency of discourse between course delivery methods, the key emergent element is the speed with which rapport generation occurs and does it reach a critical mass of online discussion that is consequently self-sustaining. If the online learning community does not reach critical communicative mass within the first five weeks, self-sustaining generation of

rapport is more difficult and may never occur in that course.

While the face-to-face component is meaningful, it is important to note that the data supports using the 3D OLE to generate rapport because it has comparable effects to face-to-face meetings, but allows learners to remain at that physical distance, which is so important to distributed learning. We find support for the idea that 3D technology allows users to communicate in a more naturalistic sense comparable to face-to-face settings, which ultimately lessens the cognitive workload often associated with text-based solutions [17]. We believe that this data supports Picciano's [18] idea that other types of highly-interactive forms of online communications (i.e. video, teleconference, etc) can be used to extend LMS or blended courses and should produce similar results. However, the main benefit of employing 3D online learning environments is that they better address bandwidth considerations than other higher bandwidth-intensive delivery systems [19]. This form of environment is scalable to most homes with Internet connectivity and a reasonably modern computing system.

As processing performance on PCs increases, these systems offer institutions the ability to provide unique online learning opportunities [20, 21]. The 3D OLE used in this study cost less than \$5,000 to implement. A relatively small investment can produce significant outcomes in improving overall student discourse. Schools utilizing Web-based course delivery methods can provide 3D online learning environments with little impact on their current course delivery structure while creating better online learning communities that meet the needs of students and teachers.

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