Web 2.0 Technologies Promote Interaction

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Abstract

Interaction plays a crucial role in education. Three types of interaction identified by Moore and Kearsley (2005) include interaction between learner and content, interaction between learners, and interaction between learners and instructor. Moore introduces the theory of transactional distance to explain how interaction or dialogue lessens the mental distance or isolation in distance education caused by spatial or geographic distance (Moore & Kearsley, 2005). According to Hyo-Jeong (2010), research over the past decade in distance learning shifted its focus from defining distance as a "physical proximity" to a "psychological construct" (p.256). With the introduction of Web 2.0 technologies, educators explore how these new tools enhance the interaction desired in online classrooms. This paper examines how these three types of interactions, learner interaction with content, learner interaction between learners, and learner interaction with the instructor, increase with the use of use Web 2.0 technologies. Some key observations include the benefits of using video streaming, virtual classrooms, virtual worlds, wikis, blogs, portfolios, reflective learning journals, and virtual office hours as they relate to online teaching and learning.

Keywords: distance education, interaction, Web 2.0, collaborative learning

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Can Web 2.0 technologies encourage interaction within the distance education community? Does a distance education course need advanced technologies to complete its objectives? Can the theory of transactional distance allow room for growth to include Web 2.0 technologies? Should educators be concerned about how technologies change education? Otto Peters at the 2004 EDEN Conference addresses the concerns of the future of distance education. He bluntly said, "we have no choice, but are compelled" to deal with [it] "whether we like it or not" (Peters, 2004, p.2). Later in his speech, Peters uses the analogy of putting old wine into new bottles (Peters, 2004). When educators simply put old materials into a new medium, they prevent themselves from "discovering, developing, and applying the marvelous, powerful approaches made possible by network computers" (Peters, 2004, p.6).

While the basic ideas of distance education in regards to presentation of materials and student interaction remain the same, the medium behind this communication have greatly changed. According to Hyo-Jeong (2010), research over the past decade in distance learning shifted its focus from defining distance as a "physical proximity" to a "psychological construct" (p.256). In his article, he notes an increase in the number of research studies to examine the role of interaction as a way to reduce this psychological distance. By incorporating Web 2.0 technologies into their online courses, instructors allow students to participate beyond usual textual responses by engaging them as interactive learners (Blaschke, Porto, & Kurtz, 2010). Moore and Kearsley (2005) identify three distinct types of interaction that occur in distance education: interaction between learner and content, interaction between learners, and interaction between learners and instructor. This paper examines how these three types of interactions in the distance education environment improve with the use of Web 2.0 technologies.

Brief Background

Even with new technologies available, a vital component of distance education still includes interaction. Moore introduces the theory of transactional distance to explain how interaction or dialogue lessens the mental distance or isolation in distance education caused by spatial or geographic distance. Moore explains that communication constitutes student interaction with the learning materials and with other people, such as student to student and student to teacher (Moore & Kearsley, 2005). When instructors increase dialogue, or two-way communication, the psychological distance shrinks between students and instructors. With the introduction of the World Wide Web, educators obtained a new avenue to present instructional materials. Web 1.0 launched a read only mode over the Internet. Encyclopedias and reference books became readily available to students. This technology allowed students to experience a new media of subject matter presentation, but it lacked the two-way communication desired in distance education. With the development of Web 2.0, sometimes called the social network, educators could facilitate interaction through collaboration on the World Wide Web, thereby lessening the psychological distance described above. Examples of Web 2.0 include social-networking sites, video-sharing sites, wikis, and blogs. While the phrase Web 2.0, coined in 2003 by O'Reilly Media (O'Reilly, 2005), refers to web-based interactions, applications, and communities on a large and complex scale, this paper defines Web 2.0 as a read-write or editable portion of the internet.

Learner Interaction with Content

By using Web 2.0 technologies, the instructor of the distance education class presents the subject materials in such a way as to engage the student. According to Moore and Kearsley (2005), the learner constructs "his or her own knowledge through a process of personally

accommodating information into previously existing cognitive structures" (p. 140). The ability to interact with this information causes learners to develop an understanding and obtain a personal perspective on the subject (Moore & Kearsley, 2005). By using Web 2.0 technologies, instructors offer new ways to present subject matter to encourage student participation. Increasing participation lessens the gap students may feel with distance education courses.

In a traditional face-to-face classroom, lectures balance the textbook readings. However, in most online courses, typing answers follows the reading of the text. Student interaction is minimal and passive. Web 2.0 offers synchronous and asynchronous classroom technologies such as Elluminate Live (www.elluminate.com) to present materials interactively. While students still work from their individual computers at different locations, Elluminate Live uses social networking solutions to enhance the effectiveness of education for the 21st century student. For example, this technology allows instructors to upload power point presentation slides with a lecture into the classroom, giving students a new form of textbook reading. Students see the slides as the bold headings of the text and hear the instructor's voice as if it were the text itself. By using this technology, an instructor begins to develop a relationship with the students, which can lessen isolation and promote dialogue.

Modern students, called "digital natives" by Prensky (2001, p. 1), learn and absorb information differently. The term draws an analogy of between a native, who grow up understanding and using technologies, and an immigrant who is born without technology and learns to use it later. The digital natives understand and expect the use of modern technologies in educational settings. By incorporating video recordings in the online classroom, students engage in the learning process. Moreover, with the ability to stream multimedia, students can receive large files over modem connections in small units (McGreal & Elliott, 2008). YouTube

(www.youtube.com), for example, provides templates and free space where teachers can create and store class lectures (Merchant, 2009). According to McCrory, Putnam, and Jansen (2008), text-based interactions do not support nonverbal clues portrayed in body language and gestures. However, by viewing the instructor these visual clues portrayed in body language aid in communication and comprehension. Video recordings can also play an important role in laboratory experiments. Seeing the experiment unfold in a logical manner benefits a student more than just reading about it. Watching the handling of the scalpel would aid a medical student. Witnessing the chemical reaction of certain elements would enhance learning over merely visualizing the results in the mind's eye. According to McGreal and Elliott (2008), a wisely implemented video alleviates the boredom of page turning. This benefit of streaming video or audio promotes interaction between student and subject content and lessens the psychological divide often felt in distance education.

Subject matter offered in virtual worlds, such as Whyville (www.whyville.net) and Second Life (www.secondlife.com), create an interactive learning environment. Virtual worlds for education started as early as 1999 when Numendeon, Inc., launched Whyville, a virtual city that engages middle school students in constructive educational activities (Numedeon, Inc., 2010). Through an interactive game, students explore subjects such as art history, science, journalism, civics, and economics while developing social skills (Numedeon, Inc, 2010). By incorporating the technologies of virtual worlds into online classrooms, instructors introduce students to current technologies and social experiences that promote education and innovation (Blaschke et al., 2010). Second Life, a newer virtual world, promotes exploration of a subject. Students go beyond the typical readings and venture into deeper understanding. For example, a treasure hunt can incorporate geography, history, archeology, and art history by looking at a

single artifact. Referring again to Prensky (2001), modern students learn and absorb information simultaneously from multiple sources. By incorporating virtual worlds as a way to present subject matter, students engage and connect with their learning environment.

Learner Interaction with Other Learners

Moore addresses dialogue, or two-way communications, as the first and most important of three constitutive concepts of distance education (Moore & Kearsley, 2005). Increased dialogue equals increased interaction, which lessens the transactional distance between students. Collaborative learning in a classroom increases dialogue and therefore, a sense of community (Brindley, Blaschke, Walti, 2009). With a sense of community, students feel a relation with other learners, which reduces the isolation and increases interaction. According to Blaschke, et al. (2010), the use of Web 2.0 technologies promotes interaction as it emphasizes content sharing and collaborative work, which adds value to learning.

The use of blogs promoted interaction in a mathematics course and moved the class away from just a sterile environment of equations (Glass & Spiegelman, 2007). By incorporating a blog, students became actively involved in the learning process and connected with each other (Glass & Spiegelman, 2007). For example, students share not only their individual answers, but discuss the various approaches to the problem becoming "subject-matter specialists" feeling more connected to the learning process because of their active involvement (Glass & Spiegelman, 2007, p. 149). McGreal and Elliott (2008) confer the educational importance of blogs for their knowledge sharing capabilities while providing experience in "real-world digital knowledge management" (p. 154).

Used as an extension of the classroom, blogs create a gathering place for students. In a traditional classroom, the discussion must stop altogether, when class ends. The discussion

could continue during the next class, if time permits. By using a blog, students continue to participate by asking question, posting thoughts, and discussing the subject in more detail (de Almeida Soares, 2008). Instructors can post the syllabus or homework in a blog so students and parents can make connections outside the traditional classroom. Instructors can also post some final thoughts on a discussion, or reiterate an unclear point from class. Soares (2008) observes that blogs foster life-long learning skills as students explore further on their studies.

Blogs also promote reflective learning as it promotes critical thinking and reflection. This Web 2.0 activity combines solitary and group interaction (Duffy, 2008). Some students do not participate well in a fast-paced face-to-face group setting. A blog allows them to reflect on the information before responding, thus promoting critical thinking skills (Lee & McLoughlin, 2010). In her language class, Soares (2008) provided editorial privileges within the blog to students allowing a place for peer corrections and feedback. With the use of the internet, the class members participated from all over the world allowing interaction between different countries and cultures. In this classroom students practiced their foreign language skills, but also shared cultural knowledge (de Almeida Soares, 2008). According to Duffy (2008), many students develop critical thinking and analysis skills while interacting and commenting on another's blog without "formally realizing" (p. 123) they are doing so. Pullen (2007) notes that students develop writing styles while reflecting in a blog. In all the above examples, Web 2.0 asynchronous communications in online environments allow students to participate outside normal classroom hours in a rich learning environment.

Collaborative document development occurs when multiple people can make changes to the same document. When using a wiki or similar tool, the concept of document development can occur live. While no two people can edit the document at the same time, each person's

update occurs after saving the document. In an online classroom, this type of interaction promotes and builds group dynamics. In the past, students and instructors needed knowledge of hypertext markup language (HTML) formatting to use some web technologies. Web 2.0 technologies cater to students and instructors without expert knowledge in computer language usage, so everyone with basic computer skills can participate in wiki activities. Hazari, North, and Moreland (2009) discuss the advantages of participatory approaches where users become active in contributing and producing the content. For example, Blaschke, et al. (2010) uses the wiki technology for students to develop an ongoing annotated glossary of distance education terms. Each semester students choose a word not listed in the glossary to define as a group. In this activity, knowledge from past students and present students combines for a richer learning environment (Blaschke, et al. 2010). The wiki tracks individual student's work allowing instructor's to see exact participation towards the collaborative work (Hazari, et al., 2009). According to Blaschke, et al. (2010), students perceive the use of wikis as a positive impact on their educational experience.

Wiki technology also plays an important role in building online community and allows students to interact by providing feedback to each other. Using Web 2.0 wiki technologies, students develop interests while producing their own subject matter. Learning to give and receive feedback from this content moves students from an isolated computer screen to utilize vast resources through interaction and cultural production (Merchant, 2009). As a group, the wiki allows students to brainstorm and map contents. Participation allows ideas of sharing and collaborative experiences (Merchant, 2009). This online space for building documents also tracks specific personal history. By using tables in a wiki, students can easily see the contributions made by other students at a glance, where as in a traditional online classroom a

student must sort through discussion threads to understand what each student has discussed. According to Hyo-Jeong (2010), from the pedagogical perspective, sophisticated technology enhances collaborative learning because it allows students to have more "control, social interaction, and collaboration" (p. 260). By using wikis as a collaborative document development tool, educators introduce students to the new generation of technology while promoting interaction between students (Hazari, et al., 2009).

Learner Interaction with Instructor

Another crucial interaction in distance education occurs between the learner and the instructor. Once an instructor introduces a student to the subject content, the instructor must "assist the student in interacting with it" (Moore & Kearsley, 2005, p. 140). By stimulating student interest and motivating them to learn, instructors can extend various kinds of support (Moore & Kearsley, 2005). Incorporating Web 2.0 technologies in a distance education environment significantly affects the communication and interaction between learner and instructor (Li & Pitts, 2009).

Instructors can evaluate a student's understanding of a subject by incorporating reflective learning in the classroom. Hain and Back (2008) note that some researchers argue that reflection is the highest level of learning and that a trend toward reflective learning is rising in higher education. Lee and McLoughlin (2010) argue that the focus of learning is shifting away from evaluating basic knowledge towards a wider range of skills. By systemically providing activities, instructors determine a student's comprehension of the subject. Web 2.0 technologies increase connectivity between student and instructor, allowing instructors to evaluate student's work in a timelier manner. In a traditional setting, students submit work and wait for feedback. Assignments due at the end of a course or semester may never receive feedback. With social

networking technologies, instructors can immediately access the student's work and provide prompt evaluation and feedback. Instructors can identify misunderstanding and confusion and correct it before an assignment is due. In a previous example of the mathematics class, Dr. Glass used Web 2.0 technologies to allow students to revise their work until correct (Glass & Spiegelman, 2007). Glass and Speigelman (2007) state that, "Working for mastery was more important than getting a one-time grade" (p. 151). In this way, instructors become co-explorers in the learning process and not mere spectators waiting for the course to finish and grades dispensed.

Reflective learning journals also benefit from Web 2.0 technologies. Instructors encourage students to engage, either individually or in groups, in critical thinking (Lee and McLoughlin, 2010). By using a group blog or wiki, instructors can give feedback to specific students or the entire group. This prompt interaction of feedback allows students to know they are progressing correctly, removing doubts. It also allows instructors to engage with students in the learning process to guide them as needed. Web 2.0 tools track the collection of information and documentation of learning providing valuable references of contributions to a project (Lee and McLoughlin, 2010). By building in collaboration, instructors give students stores of knowledge they can refer back to and build upon (Hain and Back, 2008).

Portfolios display the work and thoughts of individuals. More recently, electronic portfolios (ePortfolios) used in educational settings contain a student's work to reflect personal learning and growth. Zhang, Olfman, and Ractham (2007) declare that traditional ePortfolios lack the benefits of social learning by not allowing peer review and group collaboration. Combining ePortfolio with Web 2.0 technologies allows a "community-wide annotation, interaction, and collaboration, with the goal of enhancing the learning experience" (Zhang, et al.,

2007, p. 203). According to Zhang, et al. (2007) ePortfolios must contain documentation, reflection, and collaboration. By integrating Web 2.0 technologies into the ePortfolio, interaction between the student and the instructor occurs. Through this feedback and evaluation, instructors can guide students through a misunderstanding and suggest additional readings (Moore & Kearsley 2005). By incorporating interaction, instructors can determine if students application of new materials are correct, and quickly help them apply the new materials correctly, if needed (Moore & Kearsley, 2005). Zhang, et al., (2007) imagine "enhanced users' learning" (p.212) when ePortfolios combine with Web 2.0 technologies.

Interaction between student and teacher also occurs with virtual office hours using Web 2.0 technologies. According to Li and Pitts (2009) students that communicated with instructors through virtual office hours with Facebook's (www.facebook.com) instant messaging (IM) client reported higher levels of satisfaction over regular face-to-face office hours. These students felt more valued, which contributes to academic performance and overall satisfaction with their college experience (Li & Pitts, 2009). Instructors recognize the value of office hours as a means of relationship building with students; however, most students do not take advantage of these office hours (Li & Pitts, 2009). By introducing virtual office hours, with Web 2.0 technologies, students can obtain the more regular and instant communication with instructors that they desire (Li & Pitt, 2009). While citing greater student satisfaction with convenience and accessibility to virtual office hours, Li and Pitt (2009) declared more research would give a better understanding to the factors that contribute to student choices with different communication technologies.

Conclusion

Educators must be concerned with emerging technologies, as technologies help facilitate learning (Hazari, et al., 2009). Instructors that incorporate Web 2.0 technologies into their online

classrooms engage students by presenting subject matter in new ways. Synchronous and asynchronous classroom products, such as Elluminate Live, offer interactive communications between students and content. The use of video streaming allows students to identify nonverbal clues in lectures and virtual worlds, such as Second Life, cater to the multimedia student. Learner interaction occurs through blogs and wikis as students work collaboratively on projects with Web 2.0 technologies aiding in increased interaction. By sharing content, students can reflect on materials and evaluate the work of their peers. Lastly, increased and swift instructor evaluation and feedback of student's work increase with the use of Web 2.0 technologies. According to Blaschke, et al, 2010, Web 2.0 technologies are "here to stay" and thankfully provide a "rich learning environment" (p. 10) to improve interaction for learners and instructors.

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