University of Northern Iowa

UNI ScholarWorks

2008

Using Web 2.0 technology to support collaborative learning in distance education

Sarah E. Ling

Using Web 2.0 technology to support collaborative learning in distance education

Abstract

Distance education continues to grow in popularity with higher education institutions across the country. A shift in pedagogy towards collaborative learning activities within the online learning environments is designed to bring students together as a group. This review of research investigates how Web 2.0 technology has proven to be useful in these collaborative activities. Various issues and obstacles are addressed which may arise in the use of this social software for collaborative learning within a distance education setting. The introduction of Web 2.0 software to distance education may hold the key to creating powerful collaborative learning experience for students who live across the state, nation, and possibly the world.

USING WEB 2.0 TECHNOLOGY TO SUPPORT COLLABORATIVE LEARNING

IN DISTANCE EDUCATION

A Graduate Review

Submitted to the

Division of Instructional Technology

Department of Curriculum and Instruction

In Partial Fulfillment

Of the Requirements for the Degree

Master of Arts

UNIVERSITY OF NORTHERN IOWA

By

Sarah E. Ling

October, 2008

This Review by: Sarah E. Ling

Titled: Using Web 2.0 Technology To Support Collaborative Learning In Distance
    Education

has been approved as meeting the research requirement for the

Degree of Master of Arts.

J. Ana Donaldson

10-14-08
Date Approved   Graduate Faculty Reader

Mary Herring

10-14-08
Date Approved   Graduate Faculty Reader

Jill Uhlenberg

10-14-08
Date Approved   Head, Department of Curriculum and Instruction

ABSTRACT

Distance education continues to grow in popularity with higher education institutions across the country. A shift in pedagogy towards collaborative learning activities within the online learning environments is designed to bring students together as a group. This review of research investigates how Web 2.0 technology has proven to be useful in these collaborative activities. Various issues and obstacles are addressed which may arise in the use of this social software for collaborative learning within a distance education setting. The introduction of Web 2.0 software to distance education may hold the key to creating powerful collaborative learning experience for students who live across the state, nation, and possibly the world.

TABLE OF CONTENTS

INTRODUCTION

As online learning gains popularity in colleges and universities around the world, student roles, instructor responsibilities, and course structures must evolve to meet the changing needs and demands of these courses. The development and implementation of distance education and online learning has caused a shift in the pedagogy of the learning environment where collaborative learning can now play a critical role in the educational process. As new technologies are introduced to this environment, it is important to investigate how they can be used to assist students and instructors in their active roles within this structure.

Collaborative learning is not a new concept to education but has found even greater use within online learning because it is viewed as being dynamic, student-centered, interactive, and for supporting knowledge-building (Hiltz, 1998). These are all key elements which have been found to work well in distance education and in place of the traditional face-to-face lecture format. One could question how students who may never share the same physical space are able to work collaboratively. Technology plays an important role in bridging the spatial gap between students, instructors, peers, and the learning material (Palloff & Pratt, 1999). It is thought perhaps a new evolution of Internet software, Web 2.0, may offer the greatest tools seen in the educational arena to date. Within this socially connected web, students are able to find collective cyberspaces which may open the door for a variety of collaborative activities within distance education (Boulos & Wheeler, 2007).

It is important to investigate the elements which define learning as being collaborative and how these instructional strategies might be affected by issues which

arise if used within an online learning environment. The instructor and student both have needs which must be met in order for them to move past the technology as the main focus and instead reconnect with the learning process (Palloff & Pratt, 1999). The development of new technology, particularly Web 2.0, is fast-paced and instructors need to have the ability to evaluate the software/hardware and make the decision if it will aid in the building of social interactions and learning effectiveness. When developing online courses, instructors may need assistance in deciding on the teaching methods and modes of communication which support a collaborative learning environment.

The review of literature will answer the following questions:

1. What is collaborative learning and how can it be used in distance education courses?

2. How can Web 2.0, social software, be used to create collaborative learning experiences within distance education courses?

3. What issues arise in the use of Web 2.0 within distance education courses?

METHODOLOGY

This paper is a review of literature which focuses on the topic of collaborative learning and distance education. The method for identifying and locating sources was completed by conducting a search utilizing the metasearch engine, the University of Northern Iowa Panther Prowler, to locate numerous online databases: ERIC (EBSCO), WilsonWeb Education Full Text, Academic Search Elite (EBSCO), Expanded Academic ASAP (Thomson Gale), Google Scholar, and PsychInfo (SilverPlatter). Interlibrary loan was used to locate scanned copies of articles not available through the University of Northern Iowa Rod Library. The descriptors/keywords used in the research of this topic included: On-line Learning, Distanced Education, Collaborative Learning, Social Interactions, Web 2.0, Social Software, Computer-Supported Collaborative Learning (CSCL), Computer-Mediated Communication, and Social Presence.

The resources were analyzed in relevance to the three research questions. This included a review of the article abstract, introduction, and conclusions before tagging an article for further evaluation. Review of literature articles were read for constructing general ideas and concepts based on past articles and research. The criteria for the selection of resources included: preference for articles written for peer-reviewed journals, investigation of author and purpose of writing the article, and were limited to sources published in the last ten years for the area of social software. Non peer-reviewed journal articles and websites were reviewed in order to generate search terms and possible topics related to research questions. Searches on the Internet were also completed to investigate definitions for terms, concepts, and further descriptions of programs discussed.

ANALYSIS AND DISCUSSION

Collaborative Learning

Defining Collaborative Learning

The term *collaborative learning* has many variations in the research literature and has been used to describe a wide range of educational methods. The academic field has not entirely agreed on a definition for a collaborative learning experience, but when describing the concept have tended to share common core elements. Dillenbourg (1999) felt the broadest definition is that of "a situation in which two or more people learn or attempt to learn something together" (p. 1). Smith and MacGregor (1992) believe collaborative learning is an umbrella term for a variety of approaches which include students (with or without teachers) together in a joint intellectual effort. In Resta and LaFerriere's (2007) attempt at further defining this term, in relationship to use in higher education, they acknowledged it is a complex and not clearly defined concept.

The first obstacle in creating a universally accepted definition for collaborative learning is to distinguish it from cooperative learning and determine if this distinction is necessary. The terms are often used interchangeably to describe a variety of active group learning events. Panitz (1996) reduced both concepts to their simplest forms with the following definitions:

Collaboration is a philosophy of interaction and personal lifestyle where individuals are responsible for their actions, including learning and respect the abilities and contributions of their peers. Cooperation is a structure of interaction designed to facilitate the accomplishment of a specific end product or goal through people working together in groups. (p. 1)

He states the underlying premise for both types of learning has foundations in the constructivist theory where knowledge is discovered, transformed into concepts, and expanded through new learning experiences.

Resta and LaFerriere (2007) found researchers tended to agree that both collaborative and cooperative learning involve the instructional use of groups where students work together to maximize the entire group's learning. Cooperative learning is often viewed as a division of labor while collaborative learning involves a coordinated effort to contribute to the students' knowledge building. Panitz (1996) suggests the main difference is the freedom the two approaches allow the participants in the interactive learning process. Frequently in a cooperative learning experience the teacher maintains closer control of the group with specific structures to help facilitate the group interactions. Collaborative learning encourages the students to assume almost total responsibility for the activities while the teacher would assess the progress of the group offering assistance as requested. Dillenbourg and Schneider (1995) describe a collaborative learning situation as one where two or more students build synchronously and interactively a joint solution to a problem. The key word is *interactively* as opposed to cooperative learning where students may work in parallel scenarios in search of a specific goal or task as assigned.

The interaction between students during task engagement is one of the cognitive benefits of collaborative learning and is mediated through various types of conversations. Curtis and Lawson (2001) indicate with these shared tasks, there is an element of student interdependence as in cooperative learning but also an increase in student autonomy. Interdependence is the perception by students that they need each other to be able to

complete the task and is often less formally structured than collaborative learning. Dillenbourg (1999) states that "collaborative learning describes a situation in which particular forms of interaction among people are expected to occur, which would trigger learning mechanisms, but there is no guarantee that the expected interactions will actually occur" (p. 5). He feels that even in collaborative learning, there must be an emphasis placed on developing ways for these interactions to occur in order to reach the desired outcome.

Elements of Collaborative Learning

While the term collaborative learning can represent a variety of academic experiences across a number of disciplinary backgrounds, Smith and McGregor (1992) feel "the field is tied together by a number of important assumptions about learners and the learning process" (p. 9). These assumptions include: learning is an active, constructive process; learning depends on rich contexts; learners are diverse; and learning is inherently social. Dillenbourg (1999) states there are four aspects of learning that should be analyzed when attempting to define the term collaboration:

- The *situation* in relationship to the students having a close symmetry in actions, knowledge, and status.

- The *interactions* must involve interactivity, synchronicity, and negotiability.

- Learning *mechanisms* should be similar to those that operate in individual cognitions and expanded towards those which develop within a group.

- The *effects* must be reviewed beyond individual task performance measures while being specific enough for the group interactions and productivity to be meaningful.

Collaborative learning is not simply a classroom technique but rather a personal philosophy according to Panitz (1996). This philosophy suggests "a way of dealing with people which respects and highlights individual group members' abilities and contributions" (Panitz, 1996, p. 3). The learning is based upon consensus building through cooperation by group members and not on individualized goals or competition between members.

Dillenbourg and Schneider (1995) indicate there are three key conditions for effective collaborative learning: group composition, task features, and communication media. The variables that affect group composition are the size of the groups, the age and skill levels of participants, and the differences between group members. The tasks featured with a collaborative learning experience can either support or suppress the interactions of the group members. The medium used for communication must be adequate in order to allow learners to share ideas and converse freely. In regards to group activities, Smith and MacGregor (1992) state "collaborative activities can range from classroom discussions interspersed with short lectures, through entire class periods, to study on research teams that last a whole term or year" (p. 11). The processes and goals for collaborative activities can vary widely, but the instructional objective is to participate in an interaction of responding and engaging in each other's work.

There are certain conditions under which collaborative learning can be more productive and encourage healthy relationships. Johnson and Johnson (1994) support five such conditions: (a) clearly perceived positive interdependence, (b) considerable promotive (face-to-face) interaction, (c) clearly perceived individual accountability and personal responsibility to achieve the group's goal, (d) frequent use of the relevant

interpersonal and small-group skills, and (e) frequent and regular group processing of

current functioning to improve the group's future effectiveness. These conditions are

what distinguish collaborative learning from students simply working in groups or

sharing a physical space while completing their tasks. Collaborative learning is based on

the idea that learning is a social act and through these communications, learning occurs.

Types of Collaborative Learning Experiences

While collaborative learning tends to be less formal than cooperative learning,

they both can share similar structures in group activities. The group work can range from

spontaneous interactions to clearly delineated activities with set agendas and task

completions. Smith and MacGregor (1992) describe a more structured type of

collaborative learning as problem-centered instruction which encourages direct

experiential encounters with real-world problems. Examples include: guided design, case

studies, and simulations. The goal is to "immerse students in complex problems that they

must analyze and work through together" (p. 12). Through these activities, students will

develop the abilities to problem solve, understand complex relationships, and make

decisions even in uncertain circumstances.

Davis (1993) states there are three general types of group work found in

collaborative learning: informal learning groups, formal learning groups, and study

teams. Informal learning groups are temporary clustering of students for a short period of

time with simple tasks or for checking of understanding. Formal learning groups are

established to complete a task cooperatively over a longer period of time. Study teams are

"long term groups with stable membership whose primary responsibilities is to provide

members with support, encouragement, and assistance in completing course requirements

and assignments" (p. 1). She suggests four general strategies for implementing these types of work groups in higher education: (a) plan for each stage of group work, (b) provide explanations on how groups will operate and be evaluated, (c) give students the skills needed to succeed, and (d) consider the use of written group contracts.

With the integration of technology into the academic environment, a new type of collaborative learning has emerged and is referred to in a number of ways including: computer-supported collaborative learning (CSCL), technology assisted collaborative learning (TACL), computer–mediated distance education, and online collaborative learning. These terms represent the use of technology to facilitate interactions and communication between students who may not be sharing the same physical space. The definitions for these terms are similar and the most commonly found is for CSCL. Resta and LaFerriere (2007) define CSCL as a field of research "focused on how technology can facilitate the sharing and creation of knowledge and expertise through peer interactions and group learning processes" (p. 67). The primary goal of CSCL is to provide an environment that supports collaboration to facilitate collective learning, group cognition, and enhance the learning process.

Palloff and Pratt (1999) state that the collaborative element in computer-mediated distance learning sets it apart from the lecture format found in traditional classroom settings. "The key to the learning process are the interactions among students themselves, the interactions between faculty and students, and the collaboration in learning that results from these interactions" (p. 5). Successful learning outcomes are shaped by the formation of learning communities where knowledge is imparted and meaning is co-created. "Students learn to work with and depend on each other to reach their learning

objectives and enhance the outcome of the process" (p. 125). With the introduction of technology into the collaborative learning experience, new approaches and new skills must be shaped in order to create an empowered learner and learning process.

<center>Collaborative Learning in Distance Education</center>

The evolution of distance education over the past hundred years can be seen in the current educational materials, technological mediums, and instructional processes. Herring and Smaldino (2005) state, "The present-day distance learning practices can be visualized as parallel continua which flow from print to multimedia formats, mail service to fiber optic and satellite delivery, from knowledge centered to student-center learning" (p. 1). Particularly in online learning experiences there has been a progression towards educational environments which encourage collaboration. Individual classrooms have expanded to include distant sites where technology is utilized to allow for effective collaborative learning (Treadwell & Aschcraft, 2005).

The appeal for many students in taking a distance education course is that proximity to the higher education institutions was not the primary deciding factor in starting a program. According to Palloff and Pratt, "No longer is there a necessity for courses to be place- or time-based" (1999, p. 5). Distance learning interactions can be categorized into two types: *synchronous* and *asynchronous*. Synchronous learning occurs when the students and teachers are in the same place at the same time whether it is a physical location or within cyberspace. This includes real-time interactions between all members of the learning environment where access to the same information is available. Asynchronous learning can be broadly defined as any learning event delayed over time.

Hiltz and Goldman (2005) define an asynchronous learning network as students and teachers working together via a text-based medium which is spread over space and time.

Either type of distance learning can be a collaborative learning experience if it has the same key elements of active student learning based on interactions and cooperative knowledge-building. Often a distance education program will use a combination of both synchronous and asynchronous learning activities. "The most basic premise from which all online teaching should begin is that the goal is to build a learning community and to facilitate the exchange of ideas, information and feelings among the members of the community" (Hiltz, 1998, p. 7). In order to begin to reach this goal, one must evaluate the conditions that influence the effectiveness and student satisfaction with this type of collaborative learning experience within a distance education setting.

Characteristics of the Group

Distance education has the ability to bring students together who might not normally meet within a traditional classroom or even within their daily lives. The members of the group can differ widely in age, ethnicity, academic background, technical ability, and previous experience in collaborative learning environments. Dillenbourg, Baker, Blaye, and O'Malley (1996) found the common element of group heterogeneity within the context of collaborative learning groups. This addresses the diversity of the group and that of the individual members including social, cultural, and biological aspects. Smith and Dirkx (2007) do not see the differences as a negative but rather a positive in the formation and composition of the group. "Diversity is desired because of the need for the group to make use of as many ideas and perspectives as possible in framing and addressing the problem" (p. 28). The students do not learn in a vacuum but

in the rich context of their everyday lives so instructors should draw on these experiences and to encourage the students to capitalize on what they know (Conrad & Donaldson, 2004).

Group heterogeneity includes not only the tangible differences within the group but also the perceived differences by the individual students. Dillenbourg and Schneider (1995) feels there is an optimal heterogeneity where "some difference of viewpoints is required to trigger interactions, but within the boundaries of mutual interest and intelligibility" (p. 1). Too many differences among students can generate high levels of frustration leaving students feeling overwhelmed and attempting to avoid engagement (Smith & Dirkx, 2007). Palloff and Pratt (1999) feel that in order for collaborative learning to be successful in online environments there needs to be an equal playing field where there is equality between interactions and participants.

Another characteristic of the group which plays an important role is that of size and determining the appropriate number of students within the group. Distance education which is primarily instructor-driven for the purpose of distributing knowledge is limited only by the teacher's ability to monitor and grade the students. Within a collaborative learning environment, the students must be able to feel connected to each member of the group and have a manageable number of participants in order to respond effectively. Dewiyanti, Brand-Gruwel, Jochems, and Broers (2007) indicate that group size influences student participations and often small groups make it easier to ensure activity from all participants. Small groups tend to function better when the desired outcome is to have no learner left out of the collaboration (Dillenbourg & Schneider, 1995). While there is not a magical number for forming the groups, it can be better determined if the

instructor takes into account the students' learning needs, past collaborative experiences, and level of task and activities to be performed.

Quality of Student Participation

When collaborative learning is brought to the distance education arena, new challenges arise in promoting quality interactions between the participants, the instructor, and the learning materials. The shift from face-to-face instruction to online learning requires a change in the type of communication and interactions that take place. Silvers, O'Connell, and Fewell (2007) highlight three common themes found in this review of literature on social and psychological aspects involved with student participation within distance education. These include a student's comfort with the technical components of the course, community-building activities, and individual needs of the learner. An additional area to be discussed is Conrad and Donaldson's (2004) Phases of Engagement which is a model to facilitate the student transition from being a new learner to being a member of the learning community.

Technical Comfort

The first aspect to address is the students' technical abilities and comfort level with using online software and hardware. Falvo and Solloway (2004) found students to have high levels of anxiety due to inexperience with instructional technology. "If a learner cannot negotiate required technical skills or identify appropriate technical or content support when a problem arises, learning becomes impossible" (p. 59). Often valuable time and energy is spent on technical tasks instead of the actual specific learning objectives and activities (Osman, 2005). Waltonen-Moore, Stuart, Newton, Oswald, and Varonis (2006) states that the majority of concerns in starting an online course are based

upon "anxiety over taking a web-based course or fear of technology failure" (p.298). This

takes a primary role over worries regarding the subject matter, requirements for the

coursework, and collaborative activities. "The students need to understand the

instructor's format and assignments, recognize and accept the course structure and

expectations for participation and behavior, and be comfortable with the technological

aspects of moving about the course site" (Silvers et al., 2007, p.82). Conrad and

Donaldson (2004) state that frustration with technology can be especially high when

dealing with synchronous activities where technology failure could mean the missing of a

class or opportunity to participate.

Students must be provided with sources of support when problems are

encountered. Ideally "trained technicians monitoring toll free, 24-hour help lines" (Falvo

& Solloway, 2004, p. 59) would be available to students, but this is not considered a cost-

effective solution by most administrators. A valuable resource, at the fingertips of

students, is their peers who are often quick to respond and provide quality support.

Online learners bring to the group knowledge, skills, and acceptance of the technology

(Garrison et al., 2004). Ouzts (2006) states that "student orientation needs to include an

evaluation of their readiness to learn online, an orientation to typical course expectations,

and necessary technology skills" (p. 293). Students benefit by coming to the course with

the right tools and expectations for technological demands and knowing where to seek

assistance when needed.

Sense of Community

While many students seek web-based distance learning courses as an opportunity

to work independently and at their own pace, most students benefit from a sense of

community within their course. "A connection to both the teacher and to each other led to an enjoyable, meaningful, and perceived high level of learning" (Ouzts, 2006, p. 292). Low levels of learning were characterized by assignments completed in isolation with little interaction with teacher or fellow students. Nevgi, Virtanen, and Niemi (2006), felt web-based environments provided a valuable forum for "joint problem solving, knowledge building and the sharing of ideas," (p.928) but often found students to lack skills to maximize this beneficial learning opportunity.

Students frequently discover the text-based environment difficult to navigate due to the lack of a physical presence. "Online students must learn to communicate and become familiar with other members of the community through a medium without visual cues afforded in a face-to-face setting" (Garrison et al., 2004, p. 65.). Stodel, Thompson, and MacDonald (2006) found there to be recurrent themes which learners felt were missing from their online learning experiences: "robustness of online dialogue, spontaneity and improvisation, perceiving and being perceived by others, and getting to know others, and learning to be an online learner" (p. 5). Students must feel comfortable in the environment in order to feel free to share knowledge, concerns, goals and communications so vital to the collaborative learning process (Everett & Drapeau, 2001).

Waltonen–Moore et al. (2006) discovered that online groups go through five stages of development: (a) introduction, (b) identification, (c) interaction, (d) involvement, and (e) inquiry. In their research on use of discussion boards in online group development, they found "with effective planning and skillful facilitation techniques this venue for posting messages can be used as a resource to engage learners in becoming an interactive and cohesive learning community" (p. 287). Social

connectedness can reduce the feelings of isolation which is one of the most frequent reasons for students to not complete distance education courses. As the group moves through the stages of development; feelings of anxiety, trepidation, and fear of lacking technology skills decrease and are replaced with feelings of commonality, comfort, trust, reliance, involvement, value, and respect.

Both students and instructors play a role in the creation of a social community within an online learning environment. Students would benefit if in the "development of web-based learning, more attention [was] paid to learners' characteristics and helping learners become more aware of their learning processes" (Nevgi et al., 2006, pp. 938-9). Garrison et al. (2004) indicate that there is a difference in a student's perception of traditional learning and online learning. "A face-to-face learning experience is viewed as more externally oriented, while online learning is viewed as more cognitive or internally oriented" (p. 70). As the instructor and students come together to provide mutual support for learning and performance, an effective support system for a learning community is created (Everett & Drapeau, 2001). This places more of an emphasis on individual responsibility to play an active role in the learning process, as opposed to traditional learning where the student is viewed as a receptor of knowledge.

Conrad and Donaldson (2004) have developed the Phases of Engagement which "manage the level of online communication and focus learners and instructors on performing their new roles in the online environment (p. 10). The phases transition the learner through the roles of (a) Newcomer, (b) Cooperator, (c) Collaborator, and (d) Initiator/partner. The framework assists the instructor in developing the appropriate activities and placing them in an effective sequence.

Learner Needs

Beyond technical comfort and an overall need for a sense of community within the online environment, the learner can have further needs which can affect their satisfaction and success with the learning experience. The learner needs to feel a connection with the instructor regardless of which pedagogical model is being implemented. The instructor plays an important role in the development of a collaborative learning environment and the overall atmosphere of an online course. Students described a teacher who was viewed as a positive force in the class with phases such as "interactive, present, guided instruction, spent time, open, honest, and human" (Ouzts, 2006, p. 291). Garrison and Cleveland-Innes (2005) view teacher presence as the critical component that takes social interactions to the next level of learning.

Although the natural and appropriate inclination is to first direct interaction efforts to establishing social presence and creating interrelationships, this is only a precondition for a purposeful and worthwhile learning experience. Teaching presence is important for the creation and sustainability of a community of inquiry focused on exploration, integration, and testing of concepts and solutions. (p. 135)

The learner must be instructed on how to become an active member of the collaborative learning experience and the teacher is key in facilitating this learning process.

Stodel et al. (2006) questioned whether online students have higher expectations of their teachers and place more importance on their availability and level of support. "It became apparent in this course that the learners wanted the professor to be more visible by the way of more frequent postings" (p. 16). While the teachers in the study had never

spent as much time or effort on traditional courses in the way of providing feedback and responding to questions, students felt it was lacking. The learners did not link these contributions as representing an instructor's sharing of their expertise. Teachers must understand that "the way we define our roles as teachers and learners and our attitudes, practice, and expectations need to be fundamentally different in an online context compared to F2F" (p. 17).

In online courses, Osman (2005) felt that many students were overwhelmed by the amount of information provided, the loosely structured learning environment, and mental influx. To enhance the collaborative learning experience, specific methods are required that provide adequate balance between choice and control, and between instruction, construction, and inadvertent distraction to learning. The Phases of Engagement can support a shift in roles from a student being a passive knowledge-absorber to an active knowledge-generator while allowing the student to rely less on the instructor for direction (Conrad & Donaldson, 2004). "Providing adequate and timely feedback is extremely important in all types of learning environments" (p. 359). Students benefit from an ongoing process of evaluation with a component of self-evaluation activities.

Nevgi et al. (2006) found students benefited from assistance in self-evaluation of their social skills and reflection on their learning experience. The Finnish Virtual University developed the *IQ Team*, an interactive online assessment and support system, which provides students with information on a user's characteristics as a team member, student group work strategies, and self-regulative skills. While the instructor still plays a key role, "the IQ Team aims at advancing successful learning environments in which

group members can monitor and control their learning" (p. 945). Students must learn that they play an active role, have an impact on their own learning, and that knowledge acquisition is not completely dependent on the instructor.

<div style="text-align:center">The Use of Web 2.0 Technology in Collaborative Learning</div>

<div style="text-align:center">*Defining Web 2.0*</div>

The term Web 2.0 is a relatively new concept and nearly as difficult to define as collaborative learning. The term originated in the business community to describe the future evolution of the Internet and its capabilities. Over time, the term has come to be used to describe a group of technologies "which facilitate a more socially connected web where everyone is able to add to and edit the information space" (Anderson, 2007, p. 5). Web 2.0 applications can be categorized into communicative, collaborative, documentative, generative, and interactive (McGee & Diaz, 2007). Technologies commonly found under the umbrella of Web 2.0 are blogs, wikis, podcasts, media sharing, social tagging, virtual learning environments, data mashups, and social networks. In the research literature, Web 2.0 is often used synonymously with the terms social software, user-created content, and user-generated content.

"Social software refers to the scope of applications which enables social connections, group interactions, shared web spaces for collaboration and information exchange in web based environments" (Kesim & Agaoglu, 2007, p. 68). Dron (2007) distinguishes social software from earlier forms of mediated communication by its scale which gains strengths from large numbers of participants. Boulos and Wheeler (2007) see Web 2.0 social software not as a sharp break from the traditional but rather "a gradual emergence of a new type of practice that is evolution rather than revolution" (p. 16).

Before the introduction of social software, the Internet was viewed as a solitary and passive environment which was limited and lacked social exchange. The new social software has become embedded in a typical Internet user's life represented by the results on a search engine, reviewer's feedback on purchases, and posting on community discussion boards to name a few. These activities represent the key distinction from previous technology because they provide the users with the power to work together in creating content which has open accessibility to all involved (Moore, 2007).

Types of Web 2.0 Software

The list of Web 2.0 software and applications are evolving at a fast pace making it difficult for the literature and research articles to stay current. Rather than providing a list of various software, it would be beneficial to discuss the types of software in generalized categories. At the 2008 EDUCAUSE Learning Initiative Annual Meeting, Sarah Robbins-Bell spoke of three areas of Web 2.0 in her speech, "Virtual Worlds as Web 2.0 Learning Spaces." These areas included social networking, contributed content, and multi user virtual environments.

Social Networking

Social networking has been described as "an approach to generating and distributing web content in an open, decentralized, and conversational fashion by and for end users" (Huang & Behara, 2007, p. 330). It is not a new concept for the Internet but only recently has reached a new level of connecting individuals with common interests within cyber communities. A social networking site collects user profiles and allows the members to create webpages which can be linked to those of friends (Barksy & Purdon, 2006). The user webpages can be filled with content of their choice and may include

journaling, photos, audio/video clips, and links to favorite websites. The site may provide

tools which allow personalized interactions between members and the ability to restrict

access to their information. The most used social networking websites in the United

States are MySpace, Facebook, and Friendster.

Contributed Content

Boulos and Wheeler (2007) believe Web 2.0 shifts the user from a mode of

content consumption to one of content creation. The consumers of content are no longer

satisfied with passive tasks (searching, reading, watching and listening) and instead want

the ability of producing, commenting, and classifying the content (The Horizon Report,

2007). Web 2.0 allows the user "to create, assemble, organize (tag), locate and share

content to meet their own needs or the needs of clients" (p. 3). This engagement with the

content promotes in the users a sense of community, empowerment, and ownership. It

would be impossible to provide a list of all types of user generated content, but the most

common ones include: blogs, wikis, podcasts, tagging/social bookmarking, syndication,

nings, and multimedia sharing (video, images, and audio). The goal of most of these is

the sharing and easy distribution of resources (Boulos & Wheeler, 2007).

A more recent development in user generated content is that of mashups which

are "web applications that combine data from more than one source via a single, unified

tool" (The Horizon Report, 2008, p. 20). Mashups can create new relationships between

different sources for various purposes and might include mapping, video/photo, news,

and educational resources. Lackie and Terrio (2007) state that users have the ability to

"intermingle web sites that never had any business functioning together in one all-

encompassing location" (p. 13). Examples of mashups are Google Earth, Yahoo! Pipes,

and Geotagging.

Multi-User Virtual Environments

Robbins-Bell (2008) feels Multi-User Virtual Environments (MUVE) bring

together the best parts of Web 2.0 into one place. According to Dieterle and Clarke (in

press), all MUVE regardless of content and user group have the following characteristics:

Enable multiple simultaneous participants to (a) access virtual contexts, (b)

interact with digital artifacts, (c) represent themselves through "avatars" (in some

cases graphical and in others, text-based), (d) communicate with other participants

(in some cases also with computer-based agents), and (e) take part in experiences

incorporating modeling and mentoring about problems similar to those in real

world contexts. (p. 2)

Within this category are the more simple types of interactions including instant

messaging and virtual meetings. These are real-time interactions between two or more

networking users via computer or mobile devices (Boulos & Wheeler, 2007). One of the

most popular MUVEs, Second Life (http://secondlife.com), incorporates instant

messaging and Voice-over Internet Protocol (VoIP) as tools for users in order to have a

private conversation within this multi-user environment.

While MUVEs have their foundation in the gaming community this term has

come to include virtual worlds which have computer-based, simulated multi-media

environments which operate over the Internet (Boulos, Hetherington, & Wheeler, 2007).

Second Life is considered a three-dimensional social networking world which allows

users to "collaboratively create and edit objects in the virtual world, besides meeting each other and interacting with existing objects" (p. 233).

Uses in Collaborative Learning

The use of Web 2.0 within the educational setting is as new and evolving as the social software itself, particularly in the specific area of collaborative learning. The Joint Information Systems Committee Technology and Standards Watch (2007) indicates there is little reliable, original pedagogic research and evaluation evidence on the use of Web 2.0 in mainstream education. "Research on the educational uses of these emerging technologies is limited, yet the information available demonstrates their versatility" (Beldarrain, p. 150). For the most part, literature on the use of Web 2.0 is positive and hopeful in what it could contribute to the active learning communities. McGee and Diaz (2007) feel Web 2.0 components "hold the most promise because they are strictly web-based and typically free, support collaboration and interaction, and are responsive to the user" (p. 32). There is the potential for it to be learner-centered, affordable and accessible for purposes in learning and teaching. This section will focus on areas where Web 2.0 has been discussed within the research literature as related to distance education and collaborative learning. The majority of research has been found to focus mainly on the use of virtual worlds.

Communication and Community

Redfern and Naughton (2002) investigated how collaborative virtual environments (CVE) could be used as a way to enhance communication and community in distance education. They state "CVE can provide the opportunities for planned and unplanned social encounters to take place, and provide tools for these encounters to enjoy

enriched communication and improved synchronous work practices" (p. 209). The 2007

Horizon Report from the New Media Consortium and EDUCAUSE states that "virtual

worlds offer an opportunity for people to interact in a way that conveys a sense of

presence lacking in other media" (p. 18). Bronack, Riedl, and Tashner (2006) found the

use of a 3-dimensional world became the focal point for their learning community and

served as a rich environment for engaging students in meaningful communities of

practice.

Caution was suggested by Delwiche (2006) in that context is still crucial in the

use of a MUVE within a classroom. He suggested experimenting with the medium, but it

did not need to be "the centerpiece of the course in order for learning to take place" (p.

169). One group of Canadian health librarians are also interested in social bookmarking

and social networking because their work is about communities and they want to

investigate how to share knowledge with their clients and each other (Barsky & Purdon,

2006). They have found social bookmarking to be valuable because capability is web-

based and searchable which leads to the development of communities based on expertise

and interests. While blogs and podcasts are asynchronous activities, they can allow the

student to feel connected to the learning community either by creating their own material

and sharing or evaluating what others have posted (Beldarrain, 2006).

Active Learning

As Robbins-Bell suggested, MUVE encapsulates many of the various types of

social software within one program and has the potential for creating an active learning

environment. Second Life allows the students to: (a) navigate multi-media content, (b)

browse information spaces and documentation collections, (c) visit new places and

cultures, (d) play multi-player games, (e) buy or sell virtual and real life goods and services, (f) develop social skills, (g) attend live events such as lectures and conferences, (h) and build communities (Boulos, Hetherington & Wheeler, 2007). Research indicates that placing the student within this type of environment does not guarantee an engaged level of activity. Hiltz and Benbunan-Fich (1997) cautions that in order for a group "to adapt a structure of interaction that is collaborative in nature, the instructor must mold, model, and encourage the desired behavior, and the students must be able and willing to participate regularly" (p. 9). Social software in general offers great potential pedagogic and practical benefits by allowing learners to choose whether they control or are controlled by the learning transactions (Dron, 2007).

The medical and health education institutions have been particularly interested in the use of Second Life as an active learning environment for students. Their educational opportunities include simulations, games, virtual labs, and libraries. "Second Life is proving to be ideal for those studying at a distance from their parent institution, and entry into the virtual world seems to be a great leveler, proving a very popular and equitable method of interactions" (Boulos et al., 2007, p. 239). The Horizon Report (2007) indicates librarians have been following suit in their development of an extensive and growing set of informational resources within Second Life. The interactive nature of this program lends itself to "role playing and scenario building, allowing learners to temporarily assume the responsibilities of an astronomer, chemist, or engineer without incurring real-world consequences" (p. 18).

A social software quickly gaining popularity in distance education courses which requires collaborative activities are wiki. "A wiki is a collection of Web pages that are

linked to each other, and reflect the collaborative works of many authors" (Beldarrain, 2006, p. 142). Each edit and added element is logged so group members and instructors are able to see the activity level of each person within the group project. Wikis are primarily text-based, but students are able to add links and additional audio and visual resources to the final project. The wiki environment is not bound by physical limitations, is more organic in nature, can have a high degree of interaction, and is easy to use for collaborative projects (Baird & Fisher, 2005). The students are acting as creators and consumers of the wiki by reading, writing, and evaluating the content.

Issues with using Web 2.0

While the literature surrounding the use of Web 2.0 for collaborative learning has been positive, there have also been concerns associated with the newest technology. These concerns include issues with privacy, copyright, access, cost, and training for students and instructors. The new social software not only creates exciting opportunities for educational institutions but also new challenges in their use and implementation.

The quality of the content found in the user-created webpages should be analyzed and questioned for source. First, whether the sources are creditable and second if the information is the intellectual property of another individual. There is a concern that the collective intelligence of the community may trump that of the experts and violation of copyright will become more predominant (Boulos &Wheeler, 2007). The students will need to be information evaluators and not merely passive learners. They will also have to be aware that the content they contribute to the web may be available to anyone with Internet access. Baird and Fisher (2005) state "student privacy remains a key obstacle to the integration of Weblog into many classrooms" (p. 16). While the openness of the

Internet is a vital element to the Web 2.0 software, it also raises a number of concerns for providing students with a safe learning environment.

With the introduction of emerging technologies into the distance education arena, once again the issue of technical support and comfort with the technology must be addressed. Some educators worry that the technology, which has the ability to bring people together, will further separate the instructors from their students due to technical and personal comfort with the medium. Moore (2007) questions whether the attention given to the new Web 2.0 software will take valuable time and money away from the basic design of the distance education courses and merely be a distraction. Ferdig (2007) feels social software can provide opportunities for students and instructors, both bad and good, so the educational community needs to understand how these tools can and are being used. There is not an option to simply ignore "the potential benefits or pitfalls social software represents" (p. 9).

CONCLUSIONS AND RECOMMENDATIONS

Many higher education institutions have invested time and money into offering distance education courses to meet the needs of an ever-changing group of learners. The transition to effective learning at a distance has meant a focus on pedagogy which allows students to take part in active, collaborative learning experiences. These activities which foster feelings of collaboration help build the sense of community so many students need in order to feel connected to their fellow students. The amount of structure offered by the course and instructor in the inclusion of collaborative activities can vary and depend on the task at hand.

The review of literature has attempted to answer the following three questions:

1. What is collaborative learning and how can it be used in distance education courses?

2. How can Web 2.0, social software, be used to create collaborative learning experiences within distance education courses?

3. What issues arise in the use of Web 2.0 within distance education courses?

The available literature provided adequate research and information when attempting to define the term *collaborative learning* as well as illustrating examples of its use within distance education courses. As a student within a graduate program offered at a distance, the reviewer was able to relate to many of the rewards and difficulties this type of collaborative learning opportunities can create. Areas for future research which were not adequately answered include: (a) exploring methods for ensuring equal contributions by all group members, (b) finding a balance between synchronous and asynchronous

activities, and (c) evaluating the various components of the individual student and group activities.

The technology available to the students can play a large role in facilitating communications and providing a platform where interactions can occur. Web 2.0 can provide the location and medium for enabling students to work collaboratively when at a distance in ways past learning management systems were unable. The low cost and open availability of this social software makes it a plausible solution to introducing technology into the educational arena. An obstacle in implementing this idea is in the amount of time, effort, and support needed to assist in technical difficulties which often accompany the introduction of new technology. The fast pace of change and introduction of new social software can slow the learning curve of the isolated student who might have little technical skills or available resources.

As the reviewer reflects upon her first experience with Second Life as it was introduced in a distance education course, learning how to navigate through the virtual environment took a great deal of time and patience to master. After learning to walk, navigate, and communicate, only then could she focus on the world which surrounded her. Instructors will have to make allowances for this period of discovery or incorporate it into the overall learning experience. Introducing too many types of Web 2.0 software within one course may cause feelings of frustration for the students.

The second research question asked how Web 2.0 software could be used to create collaborative learning experiences within a distance education course. The reviewer was presented with more questions than answers due to the limited research literature available. While many institutions and instructors are quick to mention their use

of this social software in their classrooms; few have done formal research investigating the effectiveness, benefits, and issues involved. Further research is needed to determine which social software may be the most beneficial to the distance education arena and whether it is any different than current learning management systems. If social software is found to be useful, staff development will be needed for the educators to learn the software, as well as, how to determine the appropriate way to integrate the technology into the curriculum.

The final research question dealt with identifying issues which might arise with the use of Web 2.0 software within distance education courses. It was discovered that the use of social software presents many issues which are not specific only to the educational institutions but to society in general. These issues included: (a) privacy, (b) copyright, (c) factual information sharing, (d) safety, and (e) reliability when using any type of information or tool that is available to the entire Internet world. While higher education institutions may not be able to tackle these issues on their own, they will have to address how the students who use Web 2.0 social software are to deal with the problems as they might occur. Institutional technology plans will need to include guidelines for acceptable use of these various technologies being introduced to the online learning communities.

While the literature discussed many of the problems and challenges associated with the use of Web 2.0 software, little research exists on possible solutions and whether these issues will hinder the further exploration of their capabilities. Future research will be needed in order to identify the academic benefits from using software which is not regulated or under the direct control of the institution. Students will need guidance on how to navigate this new cyberworld which will be changing at an incredible pace.

Research should also be conducted on how students feel about the use of this social

software and if this resource is beneficial to a student's overall learning experience.

The introduction of Web 2.0 software to distance education may hold the key to

creating powerful collaborative learning experiences for students who live across the

state, nation, and possibly the world. As higher education institutions make the transition

in pedagogy to one of student-centered learning, this social software may allow for richer

and more involved collaborative learning opportunities. A great deal of further research is

needed on the use and integration of these new technologies within a classroom. While

the use of collaborative learning is based on solid pedagogical research and

foundations, the introduction of social software to implement these activities within a

distance education setting will need to be further explored.

REFERENCES

Anderson, P. (2007). What is Web 2.0? Ideas, technologies and implications for education. *JISC Technology and Standards Watch*. Retrieved 15th June, 2008, from http://www.jisc.ac.uk/media/documents/techwatch/tsw0701b.pdf

Baird, D.K., & Fisher, M. (2005). Neomillennial user experience design strategies: Utilizing social networking media to support "Always On" learning styles. *Journal of Educational Technology Systems, 34*(1), 5-32.

Barksy, E., & Purdon, M. (2006). Introducing web 2.0: Social networking and social bookmarking for health librarians. *Journal of Canadian Health Librarian Association, 27*(1), 65-75.

Beldarrain, Y. (2006). Distance education trends: Integrating new technologies to foster student interaction and collaboration. *Distance Education, 27*(2), 139-153.

Boulos, M., Hetherington, L., & Wheeler, S. (2007). Second Life: An overview of the potential of 3-d virtual worlds in medical and health education. *Health Information and Libraries Journal, 24*(4), 233-245.

Boulos, M., & Wheeler, S. (2007). The emerging web 2.0 social software: An enabling suite of sociable technologies in health and health care education. *Health Information and Libraries Journal, 24,* 2-23.

Bronack, S., Riedl, R., & Tashner, J. (2006). Learning in the zone: A social constructivist framework for distance education in a 3-dimensional virtual world. *Interactive Learning Environments, 14*(3), 219-232.

Conrad, R., & Donaldson, J.A (2004). *Developing learner-led knowledge generating online communities.* Proceedings from the 19th Annual Conference on Distance Teaching & Learning. Madison, WI.

Conrad, R., & Donaldson, J.A. (2004). *Engaging the online learner: Activities and resources for creative instruction*. San Francisco, CA: Jossey-Bass.

Curtis, D., & Lawson, M. (2001). Exploring collaborative online learning. *Journal of Asynchronous Learning Networks, 5*(1), 21-34.

Davis, B.G. (1993). Collaborative learning: Group work and study teams. In *Tools for Teaching*. San Francisco: Jossey-Bass Publishers.

Delwiche, A. (2006). Massively multiplayer online games in the new media classroom. *Educational Technology and Society, 9*(3), 160-172.

Dewiyanti, S., Brand-Gruwel, S., Jochems, W., & Broers, N. (2007). Students' experience with collaborative learning in asynchronous computer-supported collaborative learning environments. *Computers in Human Behavior, 23*(1), 496-514.

Dieterle, E., & Clarke, J. (in press). Multi-user virtual environments for teaching and learning. In M. Pagani (Ed.), *Encyclopedia of multimedia technology and networking (2nd ed)*. Hershey, PA: Idea Group, Inc.

Dillenbourg, P. (1999). What do you mean by 'collaborative learning'? In P. Dillenbourg (Ed.) *Collaborative-learning: Cognitive and Computational Approaches*. Oxford: Elsevier.

Dillenbourg, P., Baker, M., Blaye, A., & O'Malley, C. (1996). The evolution of research on collaborative learning. In E. Spada & P. Reiman (Eds.) *Learning in Humans and Machine: Towards an interdisciplinary learning science*. Oxford: Elsevier.

Dillenbourg, P., & Schneider, D. (1995). *Collaborative learning and the Internet.*

    Retrieved June 9, 2008, from http://tecfa.unige.ch/tecfa/research/CMC/

    colla/iccai95_1.html

Dron, J. (2007). Designing the undesignable: Social software and control. *Educational*

    Technology and Society, 10(3), 60-71.

EDUCAUSE (2007). The Horizon Report, 2007 Edition, Austin, Tx: The New Media

    Consortium and Boulder, Co: Educause Learning Initiative. Retrieved May 15,

    2008, from http://www.nmc.org/pdf/2007_Horizon_Report.pdf

EDUCAUSE (2008). The Horizon Report, 2008 Edition, Austin, Tx: The New Media

    Consortium and Boulder, Co: Educause Learning Initiative. Retrieved May 15,

    2008, from http://net.educause.edu/ir/library/pdf/CSD5320.pdf

Everett, D. R., & Drapeau, R. A. (2001, February). *Students' views of collaborative*

    learning in the distance learning environment. Paper presented at the

    Organizational Systems Research Association Conference, Cleveland, OH.

Falvo, D. A., & Solloway, S. (2004). Constructing community in a graduate course about

    teaching with technology. *Tech Trends, 48*(5), 56-85.

Ferdig, R.E. (2007). Editorial: Examining social software in teacher education. *Journal of*

    Technology and Teacher Education, 15(1), 5-10.

Garrison, D. R., & Cleveland-Innes, M. (2005). Facilitating cognitive presence in online

    learning: Interaction is not enough. *The American Journal of Distance Education,*

    19(3), 133-248.

Garrison, D. R., Cleveland-Innes, M., & Fung, T. (2004). Student role adjustment in online communities of inquiry: Model and instrument validation. *Journal of Asynchronous Learning Networks, 8*(2), 61-74.

Herring, M.C., & Smaldino, S. (2005). *Planning for interactive distance learning: A handbook.* Bloomington, IN: Association for Educational Communications and Technology.

Hiltz, S. R. (1998). *Collaborative learning in asynchronous learning networks: Building learning communities.* Paper presented at the WEB98, Orlando, FL.

Hiltz, M., & Benbunan-Fich, R. (1997). *Supporting collaborative learning in asynchronous learning networks.* Paper presented at the UNESCO/Open University Symposium on Virtual Learning Environments, Milton Keynes, England.

Hiltz, S. R., & Goldman, R. (Eds.). (2004). *Learning together online: Research on asynchronous learning networks.* Lawrence Erlbaum Associates: Mahwah, NJ.

Huang, C. D., & Behara, R. S. (2007). Outcome-driven experiential learning with web 2.0. *Journal of Information Systems Education, 18*(3), 329-336.

Johnson, R. T., & Johnson, D.W. (1994). An overview of cooperative learning. In J. Thousand, A. Villa and A. Nevin (Eds.), *Creativity and Collaborative Learning,* Brookes Press: Baltimore.

Kesim, E., & Agaoglu, E. (2007). A paradigm shift in distance education: Web 2.0 and social software. *Turkish Online Journal of Distance Education, 8*(3), 66-75.

Lackie, R., & Terrio, R. (2007). Mashups and other new or improved collaborative social software tools. *MultiMedia & Internet@Schools, 14*(4), 12-16.

McGee, P., & Diaz, V. (2007). Wikis and podcasts and blogs! Oh my! *EDUCAUSE Review, 42*(5), 28–41.

Moore, M.G. (2007). Web 2.0: Does it really matter? *The American Journal of Distance Education, 21*(4), 177-183.

Nevgi, A., Virtanen, P., & Niemi, H. (2006). Supporting students to develop collaborative learning skills in technology-based environments. *British Journal of Educational Technology, 37*(6), 937-47.

Osman, M. E. (2005). Students' reactions to WebCT: Implications for designing on-line learning environment. *International Journal of Instructional Media, 34*(2), 353-362.

Ouzts, K. (2006). Sense of community in online courses. *Quarterly Review of Distance Education, 7*(3), 285-296.

Palloff, R. M., & Pratt, K. (1999). *Building learning communities in cyberspace: Effective strategies for the online classroom.* San Francisco: Jossey-Bass Publishers.

Panitz, T. (1996). *Collaborative versus cooperative learning* [On-line]. Retrieved March 6, 2008, from http://home.capecod.net/~tpanitz/tedsarticles/coopdefinition.htm

Redfern, S., & Naughton, N. (2002). Collaborative virtual environments to support communication and community in Internet-based distance education. *Journal of Information Technology Education, 1*(3), 201-211.

Resta, P., & LaFerriere, T. (2007). Technology in support of collaborative learning. *Educational Psychology Review, 19*(1), 65-83.

Robbins-Bell, S. (2008). *Virtual worlds as web 2.0 learning spaces.* Presentation at

  EDUCAUSE Learning Initiative. San Antonio, TX.

Silvers, P., O'Connell, J., & Fewell, M. (2007). Strategies for creating community in a

  graduate education online program. *Journal of Computing in Teacher Education,*

  23(3), 81-87.

Smith, B. L., & MacGregor, J. T. (1992). "What is collaborative learning?" In Goodsell,

  A. S., Maher, M. R., and Tinto, V. (Eds.), *Collaborative Learning: A Sourcebook*

  for Higher Education (pp. 9-22). University Park, Pa.: National Center on

  Postsecondary Teaching, Learning, and Assessment.

Smith, R. O., & Dirkx, J. M. (2007). Using consensus groups in online learning. *New*

  Directions for Adult and Continuing Education, 113(1), 25-35.

Stodel, E. J., Thompson, T. L., & MacDonald, C. J. (2006). Learners' perspectives on

  what is missing from online learning: Interpretations through the community of

  inquiry framework. *International Review of Research in Open and Distance*

  Learning, 7(3), 1-24.

Treadwell, T., & Ashcraft, D. (2005). Pedagogy for collaborative online research and

  learning: The CORAL model. *National Society for Experiential Education*

  Quarterly, 30(1), 10-17.

Waltonen-Moore, S., Stuart, D., Newton, E., Oswald, R., & Varonis, E. (2006). From

  virtual strangers to a cohesive online learning community: The evolution of online

  group development in a professional development course. *Journal of Technology*

  in Teacher Education, 14(2), 287-311.