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Web 2.0 Technologies Within a Higher Education Online Database Practicum Supporting a New Collaborated Methodology

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WEB 2.0 TECHNOLOGIES WITHIN A HIGHER EDUCATION ONLINE DATABASE
PRACTICUM SUPPORTING A NEW COLLABORATED METHODOLOGY

A THESIS
SUBMITTED ON 8 OF AUGUST, 2010
TO THE DEPARTMENT OF INFORMATION SYSTEMS
OF THE SCHOOL OF COMPUTER & INFORMATION SCIENCES
OF REGIS UNIVERSITY
IN PARTIAL FULFILLMENT OF THE REQUIREMENTS OF MASTER OF SCIENCE IN
DATABASE TECHNOLOGIES
BY

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Abstract

Since the introduction of Web 2.0 technologies in 2004, computer based communication has evolved adding a new dimension to formal and informal knowledge sharing. Focusing on Web 2.0 technologies Facebook and Twitter, this case study researches the use of these tools to enhance a higher education online database practicum environment. This paper presents practical methodologies that can be used to incorporate Web 2.0 technologies to support knowledge sharing in a distance learning database practicum.
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Chapter 1 – Introduction

The internet has revolutionized long distance learning. It is an ideal platform enabling a wider audience to pursue undergraduate and graduate degrees from colleges and universities they would not otherwise have access to. Web applications have made the internet a powerful tool for online courses from simple classes to complex practicum environments. As web technology continues to evolve, online learning should benefit from new applications that can be applied to enhance the student’s learning environment. Web 2.0 technologies have created an environment that allows collaborative knowledge sharing by making it possible for people to communicate freely via the web. These easily accessible tools are used worldwide for personal and business communication but is there a place for them in the academic environment? The problem then is whether a practical methodology can be developed to support improved collaboration within a higher education online database practicum using Web 2.0 technologies.

The interaction among faculty and students required for online learning varies depending on the type of course offered. Some courses require minimal interaction but an online database practicum demands communication among many participants on several levels. The faculty and students not only interact among themselves but with technical personnel supporting the database and other technology and the users of the database. This hands-on work environment requires real time interaction among all participants. Web 2.0 technologies have made reliable tools available that provide various forms of communication consisting of short messages to in-depth knowledge sharing.

The Web 2.0 applications focused on for this research provided alternative forms of communication from the conventional tools used in the practicum. These social networking sites addressed both formal and informal communication within this online academic environment.
This research addressed the value of formal knowledge sharing dealing with official academic tasks as well as the value of informal communication among an organization’s participants. Distance learning has informal knowledge sharing challenges that a classroom environment does not have to address such as the lack of face to face communication.

The goal of this research was to examine whether the use of Web 2.0 technologies could be used to improve collaboration, increasing the learning experience for graduate students in an online database research practicum. This goal was achieved by utilizing a case study that used various sources of evidence with the 2009B, 2009C, and 2010A Regis University Database Practicum groups. The current practicum participants were invited to use two specific Web 2.0 technologies in their daily activities: Facebook and Twitter. Direct observation and participant-observation by the author contributed to the results of this research. A survey with open ended questions was conducted with the faculty and students responding to their use and views on the practicum’s forms of communication. A review of literature provides the history of distance learning and Web 2.0 technology. Formal and informal knowledge sharing were researched to provide documentation on the necessity of a variety of communication formats in the academic online environment.

The objective of this research was to determine if Web 2.0 technologies are viable to practicum research, are they a useful aid in higher education, and are online graduate students viewing these tools as an asset to the learning experience. The ease and availability of these applications were researched to see whether or not they could work in the academic environment. Focus was placed not only on could they work but would they be useful to the participants in the practicum. Interviewing the participating students provided data of their views as to the value of these tools for their overall learning experience. Data analysis from the various
sources of evidence utilized the objectives presented to answer the questions are Web 2.0 technologies viable, useful, and viewed as an asset by the users in an academic environment.

The research provided conclusive results for the use of Web 2.0 technologies in a higher education online database practicum. Recommendations and areas for future research were provided for this every changing academic environment.
Chapter 2 – Review of Literature and Research

Distance Learning

Background

Literary evidence suggests that for over 150 years distance learning has been available as a way for students to acquire formalized education (Unit 6 Media Ltd, 2009). In the early years, correspondences between student and faculty involved time lapses as mail was the most prevalent means of communication. It required the students to basically teach themselves from books since contact with the instructor was limited (Unit 6 Media Ltd, 2009). Over the years telephone, television, taped media, email, and more has added to the long distance learning experience. The use of the telephone enabled the student and instructor to communicate in real time eliminating much of the time waiting for correspondence through mailings. Email added another time saving factor to the communication between student and instructor by allowing written messaging to be delivered instantaneously.

Since the mid 1990’s, distance learning entered a new era with the success of the internet and WWW technologies (Li, La, Shih, & Li, 2008). The introduction of Web 2.0 technology in 2004 made the internet even more popular (O’Reilly, 2009). This has created a new environment that more people have access to and gives them the flexibility to continue their education. Many returning, older students can now work full time and raise families while pursuing a degree. A 2008 report by Allen and Seaman (2008) states that, “Online enrolments have continued to grow at rates far in excess of the total higher education student population, with the most recent data demonstrating no signs of slowing”. As Allen and Seaman (2008) report:

- Over 3.9 million students were taking at least one online course during the fall 2007 term; a 12 percent increase over the number reported the previous year.
- The 12.9 percent growth rate for online enrollments far exceeds the 1.2 percent growth of the overall higher education student population.
- Over twenty percent of all U.S. higher education students were taking at least one online course in the fall of 2007.

As distance learning has become more accessible and easier to use it has become a valid choice for students pursuing their higher education.

**Regis University Database Practicum**

The Regis University Database Practicum is a distance learning program designed to give practical experience along with related course work to graduate students who are completing a Master of Science in Database Technologies. It also allows students to have an environment where research can be conducted for thesis work. The faculty team consists of a Database Practicum Faculty Lead, Technical/Operational Lead, Thesis Lead, and Support/Development Lab Lead along with three other members in specific technical areas. Seven students are in the practicum with one of them acting as the Team Lead. Currently the practicum is a six month program, increased from four months, allowing students more time to experience this practical hands-on work environment.

A portion of the practicum program consists of an eight week credited course with the following description taken from the Regis University Course Descriptions, Core (MSCC), Database (MSCD) (Regis University):

MSCD 692 DATABASE PRACTICUM (3.00) Simulates a real-world information technology organization where students enhance skills learned in previous database courses. Provides a research platform that can be used towards the collection of data to fulfill the thesis requirement.
Another eight weeks are assigned to the thesis course for the student’s preparation for the degree requirement.

For the practicum to be successful the students need to work together as a team which requires knowledge sharing and management. The author selected the practicum as the research platform to conduct a case study since the practicum participants understand the research environment and are familiar with Web 2.0 technologies.

**Challenges and enabling conditions**

Challenges are a constant component of distance learning. As Lyons, Legg, Morrow, and Bannister (1999) states “Successful integration of technology into the curriculum takes place through partnerships on many levels”. They suggest teamwork, tools, and talent to be key elements in obtaining success. Lyons et al. found that “a successful instructional project often demands a variety of skills not usually found in one person, and we will cross organizational boundaries to bring the appropriate staff and resources to work on a project”.

Together, many departments and individuals in an academic environment are needed to make distant learning effective. The teamwork of the faculty, library services, information technology services, and administration departments along with having access to the campus network and other instructional material must all work together to make distance learning a feasible way for students to learn (Lyons, Legg, Morrow, and Bannister, 1999). The collaboration between the various departments, staff, faculty, and support personnel are critical to making distance learning a positive experience.

Tools required for a distance learning program include both hardware and software for transmitting data from the academic environment to the student’s distant environment. Changes are inevitable to a distance learning program as new technologies are introduced. Many factors
affect this constantly changing environment including knowing what tools are best suited to the mission and the design of the tools used, which can greatly influence how well the students adapt to the program. Lyons et al. (1999) state that, “On one hand, the tools need to be sophisticated enough to handle the diverse nature of course offerings, but on the other hand, they must be simple and convenient enough for faculty and students to use regularly and effectively”. Having tools that require the student to focus on how to use them and not the course content can have negative affects on the intent of the course and its outcome. Brinkman, Payne, Patel, Griffin, and Underwood (2007) found that, “Much of the success of these educational technologies depends on their ease of use, ability to engage the learner and to adapt to their needs, for example to be accessible at the right time and in the right place, to match the learners’ existing knowledge of the material, learning style, culture, etc”. In a workshop for the design and use of e-learning systems, Brinkman et al. stated:

Badly designed educational technologies can even become an obstacle to learning when they are hard to use. Even if learners manage to operate such environments, boredom or frustration can prevent them from learning. Educational technology designers are left with difficult questions about how best to create systems that are usable and appealing whilst simultaneously engaging users in learning, which may itself be difficult and require effort.

A critical element in any operation is the individuals from various departments in the organization sharing their knowledge and talents. Lyons et al. (1999) stated “The mainstream faculty who are using technology to deliver their classes, supplement the content, and generally improve the learning that takes place in their classes require a range of support services, and expect these to be delivered reliably to them, and to their students”. Lyons et al. emphasize that,
“One of the greatest resources any institution has is its collection of talented staff members.”

Through teamwork and collaboration staff and faculty in distant learning programs pool their knowledge and talents together to make distance learning a successful option for students of all ages.

Instructors of distance learning courses have challenges that they do not face with in-class courses. As stated by Kleinman and Entin (2002), “From the instructor’s perspective, some of the issues involved in online teaching included the administrative overhead involved in collecting and returning work, the challenges of communication without the benefit of face-to-face interaction, and the critical need for readily available support mechanisms to help online students overcome difficulties with the technology”. Collecting homework electronically involves different organizational skills on the instructor’s part, writing out all instructions with documents or email takes more time than speaking to the students, and not having the face-to-face contact that allows an instructor to see how the students are reacting to the material presented are some of the unique challenges of distance learning courses.

In their research for in-class and distance learning teaching within an introductory computer class Kleinman and Entin (2002) stated, “Analysis of student data supports existing findings that there are no significant differences between the two groups in learning outcomes, although there were differences in other areas”. Differences they noted were that the in-class students were generally younger in age than the distance learning students, technology challenges caused some distance learning students to drop the course, and the reasons each took the class varied from a degree requirement for the in-class group to flexibility and content for the distance learning group (Kleinman & Entin, 2002). Though these differences are significant and should be noted they did not affect the effectiveness of the distance learning courses.
Young people today have grown up with computers and the internet. They have done online research starting with grade school projects and have grown academically along with web advancements that have introduced new ways to access information. They know how to multitask with a computer as they research and write papers while at the same time listen to music and communicate with friends all from their computer. As Carliner and Shank (2008) state:

They feel empowered to connect to anyone, learn about anything, at any time, and favor direct relationships and connections, not predigested information. As might be expected, these learners thrive on connected and dynamic learning environments far different from the static learning environments that their teachers encountered and now provide. They increasingly expect much more open and collaborative learning environments.

As the young people of today continue their formal education distance learning will be as normal to them as the classroom was to the generation before.

The challenges that face distance learning programs will be constantly changing as advancements in technology develop. Faculty and students working together will be the determining factor as to what will be effective in making these programs more efficient.

**Web 2.0 Technologies**

**Background and definition**

The term Web 2.0 technology evolved from a conference in 2004 where the success of the web was discussed and many saw, “The web was more important than ever, with exciting new applications and sites popping up with surprising regularity” (O’Reilly, 2009). This was quite a change from a few years earlier when there was a drastic change in the computing industry where “many people concluded that the web was overhyped” (O’Reilly, 2009). From
the first Web 2.0 Conference to today the web has become a major source of communication and data transfer for the entire world. Business, health, academics and other areas rely on the internet and web services to perform daily tasks and conduct their business. This growth is partly due to ease and availability that Web 2.0 technologies can offer.

Web 2.0 sites generally deal with vast amounts of data with the sites continually updating and adjusting to the users’ needs on how they can access this data more efficiently. O’Reilly (2009) states the major difference between earlier web applications and Web 2.0 technology is “the Web 2.0 lesson: leverage customer-self service and algorithmic data management to reach out to the entire web, to the edges and not just the center, to the long tail and not just the head”. Web 2.0 is a “Perpetual Beta” as stated by Ullich et al. (2008) with applications that “are no longer released in version-based software packages, one version at a time, but are constantly refined and improved”. Users may not realize how many changes actually are generated since they are a constant, gradual occurrence.

The companies that produce the newer technology have adapted to the environment. O’Reilly (2009) believes the core competencies of Web 2.0 companies contain some of the following items:

- Services, not packaged software, with cost-effective scalability
- Control over unique, hard-to-recreate data sources that get richer as more people use them
- Trusting users as co-developers
- Harnessing collective intelligence
- Leveraging the long tail through customer self-service
- Software above the level of a single device
- Lightweight user interfaces, development models, and business models

The features that make up Web 2.0 technologies are setting the direction that developers of these products need to use as a foundation to stay competitive in the business.

The Web continues to grow and advance. Most everything in our life today is connected in some way to the web. O’Reilly and Battelle (2009) state:

The Web is no longer a collection of static pages of HTML that describe something in the world. Increasingly, the Web is the world – everything and everyone in the world casts an "information shadow," an aura of data which, when captured and processed intelligently, offers extraordinary opportunity and mind bending implications.

As the web environment has evolved so have the users. More and more people have become computer “literate” partially due to the ease that most of the Web 2.0 applications offer. There are many web applications readily available to internet users with no fees. These web sites are powerful data gathering tools that are quick and user friendly. It is no longer necessary to physically go to locations such as a library, service organizations, or stores to do research, purchase books, or get general information when most of these can be accessed through the internet with Web 2.0 technology. With easier access to resources that allow people to gather the information they need or want everyday operations have changed socially, academically, and in the business world.

There are many Web 2.0 tools and applications that are available for free use for communication with individuals or groups with text or video, music management, photo management, and videos from around the world to name a few. Two popular social networking sites (SNS), Facebook and Twitter, were the focus of this research to examine whether they can
be used to improve collaboration, increasing the learning experience for graduate students in an online research practicum.

**Facebook**

Facebook is an internationally used Web 2.0 application that allows its members to share data, photos, videos, and other websites. A Palo Alto, California based company, Facebook is a social networking site that was created by Harvard student Mark Zuckerberg in February, 2004 along with co-founders Chris Hughes, Dustin Moskovitz, and Eduardo Saverin (Facebook Timeline, 2010). Initial access was limited to Harvard students but soon expanded to other colleges and universities in the Boston, Massachusetts area including Stanford, Columbia and Yale (Facebook Timeline, 2010). It later expanded to all college students and currently allows anyone aged 13 or over to sign up. Facebook is financed by advertisements that are displayed on the web pages the users view.

Facebook is considered by many to be a trusted environment but there is controversy concerning the security with the website. As with any internet postings the user must be responsible for what personal information they share. The content of postings, including photos, should be limited to what the user would not be opposed to having others view. Precaution must be taken since the networking system in Facebook may not fully be understood by the user so they do not realize who has access to their information or how it may be passed along by other users. This concept is no different for social verbal communication where caution should be taken so personal information does not get passed to people it was not intended for.

The company Facebook has grown to be a major organization supporting the web site which has become a significant part of many people’s lives. The following lists some of the statistics reported by Facebook Statistics (2010):
- More than 400 million active users
- More than 3 billion photos uploaded to the site each month
- Average user spends more than 55 minutes per day on Facebook
- About 70% of Facebook users are outside the United States
- There are more than 100 million active users currently accessing Facebook through their mobile devices.
- More than one million developers and entrepreneurs from more than 180 countries

Figure 1. Facebook Main Page

Figure 1. Facebook Main Page is the start of the Facebook session by signing up for an account or logging in with an exiting account.
To access Facebook the user goes to http://www.facebook.com/ with new users signing up by creating an account and current members logging in from the main page, Figure 1. Once in the Facebook environment the user can explore the site to search for people they know. There are many ways to communicate on Facebook. The “wall” feature allows general communication that can be seen by anyone. By becoming a “friend” of someone the user can have access to more information about that person. Groups can be created making it easy to find others with the same interests. Chatting is a feature that allows Facebook friends to respond immediately to each other in real time usually with a short “talking” communication style. The email feature allows personal one to one communication comparable to an informal letter format.

With Facebook’s large membership, people are finding friends, former classmates, and other associates that they have not had contact with in years. It is a communication tool that is influencing the world not only on a personal level but professionally as well.

Twitter

Twitter is another internationally used Web 2.0 SNS which “began as an experiment in 2006” and was “initially inspired by the concept of an 'away-message' merged with the freedom and mobility of SMS (Short Messaging Service)” (Twitter, n.d.). Twitter messages, or “tweets”, are limited to 140 characters allowing for mobile devices to work with this messaging system easily. Photos and videos can also be sent and viewed on Twitter with new features being developed all the time to enhance this growing website. Twitter, Inc was founded in 2007 to manage the website and is today a privately funded company in San Francisco, CA (Twitter, n.d.).
To access Twitter the user goes to http://twitter.com/ with new users signing up by creating an account and current members logging in from the main page, Figure 2. From there the user starts communicating with other members.

Figure 2. Twitter Main Page

Twitter is gaining popularity with business, celebrities, and many other organizations seeing the potential for sharing their information with others in the form of free advertising. Radio and television, including programs and advertising, state that their information can be viewed on Twitter creating a new media for people to access data quickly and conveniently.

Collaboration of Distance Learning and Web 2.0 Technologies

Knowledge sharing: formal and informal
Web 2.0 technologies allow not just data but knowledge to be shared easily which can enhance distance learning programs. Knowledge is more than knowing facts or having information. It is acquired over time. As Davenport and Prusak (1998) state “our definition expresses the characteristics that make knowledge valuable and the characteristics-often the same ones-that make it difficult to manage well”:

Knowledge is a fluid mix of framed experience, values, contextual information, and expert insight that provides a framework for evaluating and incorporating new experiences and information. It originates and is applied in the minds of knowers. In organizations, it often becomes embedded not only in documents or repositories but also in organizational routines, processes, practices, and norms. (p. 5)

Formal knowledge sharing is essential and pertinent to the mission of organizations. Written documents allow information to be referenced whether it is for an academic class or a work project. Information has been documented for centuries but, “The low cost of computers and networks has created a potential infra-structure for knowledge exchange and opened up important knowledge management opportunities” (Davenport and Prusak, 1998, p. 18). As Atwood (2009) reported “During the 1990s, many U.S. federal, state, and local government agencies were mandated to adopt electronic information systems intended to capture and use the knowledge the agencies held”. By utilizing new technology organizations entered a new era in formal knowledge sharing.

Formally recording knowledge provides benefits to organizations that include savings in time and money, reduced paper use, and improved customer satisfaction scores (Atwood, 2009). Atwood (2009) reports that companies have reported the following additional benefits of implementing knowledge management systems:
- Streamlined operations and reduced costs resulted from eliminating redundant processes.
- Reduced response time improved customer service and satisfaction.
- Increased revenues were generated by getting products and services to market faster and more efficiently.
- Employee retention rates improved when the value of employees’ knowledge was recognized and they were acknowledged or rewarded for it.
- New channels for the free flow of ideas nurtured creativity and promoted innovation.

Whether the customer is from the business world or academics, formal knowledge sharing is a key to success in any organization.

Informal knowledge communicated between associates is recognized as being a critical element in an organization’s operation. Kendrick (2004) stated “Informal communication is often as (or more) important on projects as formal communication”. Davenport and Prusak (1998) make a strong statement when they say, “Much of the work that goes on in firms gets done because people continually ask one another, through informal networks, who knows how to do things” (p. 36). As Webber (1993) points out creating conversations are the most important work and “are the way knowledge workers discover what they know, share it with their colleagues, and in the process create new knowledge for the organization” (p. 28).

Informal networks exist in all organizations where fellow students or employees interact giving them the potential to acquire knowledge from one another. According to Kendrick (2004), “Some of the most important project communication takes place through casual conversations at coffee machines, in corridors, and parking lots”. As Davenport and Prusak (1998) state:
Conversations at the water cooler or in the company cafeteria are often occasions for knowledge transfer. Influenced by outdated theories of the nature of work, management sometimes assumes that water cooler socializing is wasting time. Although some of the talk will be about sports and the weather, most water cooler conversation focuses on work: people ask each other about current projects; they bounce ideas off one another; they get advice on how to solve problems.

Informally referred to as water cooler conversations, colleagues discuss popular everyday subjects which often lead to useful knowledge (MSN Encarta, 2009).

A good manager understands the importance of informal communication and the benefits it can have on an organization. As Kendrick (2004) points out, “Successful project leaders make an effort to encourage frequent, unstructured conversations, both with and between team members” knowing that “‘soft data’ and valuable project information often surfaces during unplanned exchanges”.

**Challenges and enabling conditions of distance learning and Web 2.0 technologies**

Talk is real work according to Davenport and Prusak (1998), the driving force in a knowledge driven economy (p. 90). How that talk, the informal communication, can happen in a distance learning environment is a major challenge. As distance learning continues to evolve and adjust with new technologies that are developed, informal communication may become a larger part of this environment.

By incorporating Web 2.0 technologies into the distance learning curriculum a new approach to online learning can be researched to find what is advantageous to this learning environment. There are many challenges to effective learning with Carliner and Shank (2008) pointing out that, “A related and larger challenge is transforming most learning materials
(whether classroom courses, webcasts, online tutorials, or workbooks) from one-way presentations of content to two-way interactions that facilitate application and critical thinking”.

According to Dede (n. d.):

The issue is not using any particular technology, but beginning with an educational outcome for which particular pedagogies and content are required for deep mastery. In turn, one selects a technology that supports those pedagogies and that content. Typically, the most important aspect of this process is moving to an active form of learning: guided learning by doing, collaborative learning, apprenticeships and mentoring.

Learning techniques adapting to include the use of new tools that are available with Web 2.0 technologies can lead to a new collaborated methodology.

Encouraging distance learning students to communicate outside of the formal curriculum may enhance the learning experience. Davenport and Prusak (1998) report in the business world:

Transferring knowledge through personal conversations is being threatened not only by industrial-age managers but also by the move to "virtual offices." Many firms are adopting work arrangements in which workers—particularly those in such customer-oriented functions as sales and service—are encouraged to work at home or at a customer site. While these arrangements offer benefits such as greater employee flexibility and more time with customers, it also lowers the frequency of informal knowledge transfer.

The same idea is true in the academic world where students in distance learning programs do not always have the best tools to share knowledge in an informal setting.

Distance learning has many of the same challenges as the “virtual offices” that Davenport and Prusak (1998) discussed. The flexibility these virtual sites offer have the drawback of not offering the opportunity to have informal communication with co-workers and other students.
According to Davenport and Prusak (1998), “Firms that initiate virtual office programs should at least encourage workers to be in the office on the same days, identify ways to make up for lost interaction, and educate workers on effective knowledge transfer through computers and telephones” (p. 91). Distance learning students may not have the option of face to face communication but Web 2.0 technologies give the opportunity for informal communication thru the computer.

Web 2.0 technologies created a new way for both formal and informal knowledge to be shared with electronic storage that provides quick, easy assess and tools to communicate at no cost to the user. Davenport and Prusak (1998) point out that, “New information technology is only the pipeline and storage system for knowledge exchange” but, “does not create knowledge and cannot guarantee or even promote knowledge generation or knowledge sharing in a corporate culture that doesn’t favor those activities” (p. 18).

Organizations both in the business world and academic need to recognize that knowledge sharing starts with the people who possess the knowledge. They have to want to share their knowledge. As Davenport and Prusak (1998) state:

Many knowledge initiatives have been based on the utopian assumption that knowledge moves without friction or motivating force, that people will share knowledge with no concern for what they may gain or lose by doing so. Companies install e-mail or collaborative software and expect knowledge to flow freely through the electronic pipeline. When it doesn’t happen, they are more likely to blame the software or inadequate training than to face a fact of life: people rarely give away valuable possessions (including knowledge) without expecting something in return (p. 26).
Organizations need to recognize that new ways to communicate take time to be accepted by the users. It takes more than the tools and training to make a new concept work.

From the author’s experiences as a student in a higher education online program and as an instructor teaching computer classes to children and adults it was clear to the author that some methods of teaching are more effective than others. Readings and lectures are a good foundation for a topic, but hands on experience is invaluable whether it be in a lab environment or collaborating with fellow students for a firm understanding of the knowledge presented.

Knowlton (2001) states:

Knowledge construction is best accomplished through collaboration. In general, students learn through the give-and-take among classmates. That is, as students write contributions to discussions, they learn what it is that they are trying to say. The replies that they receive from their classmates further this learning.

With Web 2.0 technologies the informal communication that is a major contributor to knowledge sharing can be encouraged with benefits to the higher education online curriculum.

As the education environment changes to include distance learning care needs to be taken that the positive components of traditional learning are not ignored. Liccardi et al. (2007) recognized this when they state, “As learning has evolved from a practice taking place in the physical world to computer-supported learning systems that mediate interaction with the learning material, establishing a strong foundation for substituting the social part of learning has become crucial” (p. 233). The challenge is how can this best be accomplished.

To find the most effective and efficient way Web 2.0 technologies can be incorporated into an academic environment will take time and research. Studies conducted by Colete, de Villiers, and Roodt (2009) and Selwyn, N. (2007) report that Facebook is not an effective
interface for teaching academics. Colete, de Villiers, and Roodt (2009) researched Facebook as a tool for faculty to use and reported, “The reasons why Facebook would not be considered are that lecturers already have a dedicated ‘secure’ site to interact with students; course content is not conducive to online networking tools; security issues; and the lack of competence by lecturers in using Facebook”. From his research at the University of London Selwyn, N. (2007) reports:

Yet we would conclude that whilst social networking sites such as Facebook do not merit any particular laudation from educators, neither do they present any cause for moral panic. Rather than attempting to appropriate Facebook for educationally ‘appropriate’ or ‘valid’ uses, or else regulate students’ use through coercion or surveillance, university authorities and educators are perhaps best advised to allow these practices to continue unabated and firmly ‘backstage’.

This research does not find Facebook to be directly beneficial to the classroom academics and it does not explore the informal social communication that is shown to be so beneficial to a work project whether it be academic or in the business world.

New research is focusing on web based social networks and the impact they have not only on the immediate groups involved but the world. At Rensselaer Polytechnic Institute the $16.75M Social Cognitive Networks Academic Research Center (SCNARC) has been launched to harness the power that social networks have in the sources of information, advice, and ideas (Rensselaer Polytechnic Institute, 2010). Prof. Szymanski (n. d.), Center Director, stated, “The ARL Social Cognitive Network Academic Research Center (SCNARC) has been created and funded as a part of the US Army Network Science Collaborative Technology Alliance together with three other centers focusing on different kind of networks”. Research such as this shows the
impact that social networks have on our culture. Incorporating these tools into the academic environment to provide a communication network among students who do not have the benefits of the classroom interaction may open new avenues of knowledge sharing. As Web 2.0 technologies become more accepted in the academic environment research into the different areas where they can be beneficial should continue.

The author did not find conclusive evidence showing whether Web 2.0 technology was beneficial for higher education students as a tool for formal and informal coursework communication. Evidence has shown Facebook to be a social tool not a teaching tool used for classroom instruction (Selwyn, 2007). Research has shown the benefits of informal communication in organizations and how it is encouraged by effective project leaders who understand and appreciate the power of a strong team environment (Kendrick, 2004). The lack of available research with Web 2.0 technologies and higher education environments supports the validity of this project.
Chapter 3 – Research Methodology

Overview

The research methodology used for this study was single case study. Yin (2003) states, “In general, case studies are the preferred strategy when “how” or “why” questions are being posed, when the investigator has little control over events, and when the focus is on a contemporary phenomenon within some real-life context” (p. 1). The focus of this study is the contemporary phenomenon of Web 2.0 technologies within the real-life context of distance learning programs. The author had no control over whether these new technologies would be utilized within the study group. The author questioned “how” can Web 2.0 technologies best be used with distance learning and “why” should they be used. With all these factors in mind the author concluded case study methodology was suited to this study.

The case study is more than just qualitative research. As Simons (2009) states, “While my perspective stresses understanding the qualitative nature of experience, it is important to acknowledge that case study research need not use only qualitative methods” (p. 5). The strength of the case study is documented by Soy (1997) who states, “Case study research excels at bringing us to an understanding of a complex issue or object and can extend experience or add strength to what is already known through previous research”. Yin’s (2003) definition of the case study has two technical parts which emphasizes the depth of this research method:

1. A case study is an empirical inquiry that
   - investigates a contemporary phenomenon within its real-life context, especially when
     - the boundaries between phenomenon and context are not clearly evident”.

2. The case study inquiry
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- copes with the technically distinctive situation in which there will be many more variables of interest than data points, and as one result
- relies on multiple sources of evidence, with data needing to converge in a triangulating fashion, and as another result
- benefits from the prior development of theoretical propositions to guide data collection and analysis (p. 13).

Case Study Research Components

Soy (1997) states, “Many well-known case study researchers such as Robert E. Stake, Helen Simons, and Robert K. Yin have written about case study research and suggested techniques for organizing and conducting the research successfully”. From their works, Soy proposes six steps to use for effective, organized case study research:

- Determine and define the research questions
- Select the cases and determine data gathering techniques
- Prepare to collect the data
- Collect data in the field
- Evaluate and analyze the data
- Prepare the report

The research conducted for this study used these six steps as a guideline.

Determine and define the research questions

The goal of this research was to examine whether the use of Web 2.0 technologies could be used to improve collaboration increasing the learning experience for graduate students in an online database research practicum. The research was focused on the following questions:

- Are Web 2.0 technologies viable to practicum research?
Are Web 2.0 technologies a useful aid in higher education?

Are online graduate students viewing these Web 2.0 technologies as an asset to the learning experience?

**Select the cases and determine data gathering techniques**

Several of the most commonly used sources of evidence were used in this case study research including documentation, interviews, direct observation, and participant-observation (Yin, 2003, p. 85). As Soy (1997) states, “The researcher investigates the object of the case study in depth using a variety of data gathering methods to produce evidence that leads to understanding of the case and answers the research questions”. Through these multiple sources the author was able to observe and understand the research topic from different perspectives.

The case study group for this research was the 2010A Regis University Database Practicum. The author was a member of the 2009C Regis University Database Practicum so felt this would be an ideal platform to conduct research with higher education distance learning and Web 2.0 technologies. The author’s access to the database practicum provided an opportunity to use participant-observation by working with the past and current practicum groups. Direct observation was conducted with the current practicum group throughout their six months of participation.

The database practicum was presented with the opportunity to utilize Facebook and Twitter in their regular coursework. Instructed on the use of Facebook and Twitter, the study group was encouraged to use the tools on a voluntary basis. They were informed the author would be monitoring the use of the Facebook and Twitter accounts.
Interview questions were presented to the current database practicum participants as well as faculty members and previous database students. They were given the choice of answering by email or by phone conversation.

**Prepare to collect the data**

A case study repository was created to collect the data from observation and the interview questions. A spreadsheet for the interview questions was utilized that would allow comparison of participants’ responses. Observations were recorded over a period of time as the author closely monitored the use of the Web 2.0 technologies presented to the database practicum. The interview questions were prepared for email response or phone conference whichever the participant decided.

**Collect data in the field**

Permission was granted to the author to utilize the participant-observer data collection technique with the current database practicum group. The author addressed the practicum participants during a weekly database practicum meeting to invite them to participate in the study. They were instructed on the use of Facebook and Twitter and invited to use other Web 2.0 technology they felt would benefit the group.

After a period of time the current faculty and student participants along with former practicum students were contacted by email to participate in a voluntary interview to answer questions on Web 2.0 technologies in the database practicum environment.

All of the Regis 2010A Database Practicum faculty team members were asked to provide substantive answers to the following five open-ended interview questions:

1. Do you feel the collaboration of Web 2.0 technology applications such as Facebook or Twitter to be an asset to the practicum?
2. Would a communication tool that could create a “water cooler” atmosphere such as Facebook be beneficial to the practicum students?

3. Do you feel collaboration with social networking sites for informal knowledge sharing among graduate students could lead to a richer learning environment?

4. Should the faculty participate in communication exchanges the practicum students have on social networking sites?

5. What are some Web 2.0 technologies that you feel could be used in the practicum?

Appendix A contains a copy of the email sent to the faculty team inviting them to participate in the survey. These questions were answered by email or direct phone conference.

Current and former database practicum students were asked to provide substantive answers to the following seventeen open-ended interview questions:

1. Would you be considered an older returning student (e.g., over 30 years old, taking graduate courses several years after completing undergraduate degree, etc.)?

2. How often do you use social networking sites such as Facebook or Twitter and for what purpose?

3. Do you feel the current ways of communicating in the Database Practicum (email, Worldclass forum, sharepoint, and TrackIT) are sufficient?

4. Do you feel multiple styles of knowledge sharing tools allows for better communication within the practicum?

5. Do you believe the use of Web 2.0 technologies should be encouraged in a distance learning program?

6. Do you feel social networking sites are an effective way to communicate within an academic environment?
7. What are the main reasons you would or would not use social networking sites as a tool for communication within an academic environment?

8. Do you feel a “water cooler” type atmosphere that Web 2.0 technologies can offer can benefit participants in the practicum?

9. Do you feel collaboration with social networking sites for informal knowledge sharing among graduate students could lead to a richer learning environment?

10. Do you feel the use of social networking sites can replace the lack of face to face communication in the practicum by providing a less formal atmosphere?

11. Do you feel exchanging social, less formal information would add to team building among the practicum students?

12. Do you feel informal communication among the team members would create a relaxed atmosphere allowing more knowledge to be exchanged?

13. Do you feel complete trust in Web 2.0 application security is essential to be able to use these in the academic environment?

14. Do you feel there should be an advocate for knowledge sharing within distance learning programs?

15. Do you feel the faculty should have access to the social networking site accounts the students are using?

16. Would you hesitate to discuss some topics or ideas if the faculty had access to the social networking site accounts the practicum students were using?

17. What are some Web 2.0 technologies that you feel could be used in the practicum?

Appendix B contains a copy of the email sent to the student participants inviting them to participate in the survey. These questions were answered by email or direct phone conference.
All interview questions were submitted to the Regis University IRB Board for approval. Upon approval the survey questions along with the Consent Form were emailed to the participants. Appendix C contains a copy of the IRB approval letter.

The author recorded observations during the course of the study. Data was collected from the author’s time as a database participant and throughout the research time frame.

**Evaluate and analyze the data**

The author used theoretical propositions to analyze the case study evidence. As Yin (2003) states, “The most preferred strategy is to follow the theoretical propositions that lead to your case study” (p. 111). The proposition that higher education online curriculums need to provide a quality educational environment where students are exposed to the newest tools available that will enhance the learning experience was the main focus of this research. Theoretical propositions guided the analysis of the multiple sources of evidence and data along with the correlation of the review of literature in the research area.

**Prepare the report**

The final step in case study research is reporting the findings. Yin (2003) stated, “Reporting a case study means bringing its results and findings to closure” (p.141). The author used the research questions as the basis of the final report connecting the results of the interview questions, direct observation, and participant-observation along with the review of literature findings. Analyzing the data with the theoretical proposition strategy was the basis of reporting the findings on the research questions. The results are reported in Chapter 4 – Data Analysis and Results.
Chapter 4 – Data Analysis and Results

Overview

The goal of this research was to examine whether the use of Web 2.0 technologies could be used to improve collaboration increasing the learning experience for graduate students in an online database research practicum. The theoretical proposition that Web 2.0 technologies could expose the students to the newest tools available that would enhance the learning experience guided the researcher in this case study. With this proposition as the basis of the research investigation, the structure of this case study developed by exposing students to the use of Web 2.0 technologies then developing and administering interview questions.

Multiple sources of evidence were used in this case study to provide diverse data that was incorporated in the final analysis. The data was provided by a review of literature, document analysis, participant-observation, direct observation, and interviews with the database practicum faculty as well as students from previous and current practicum groups. Perspectives from the various sources of knowledge provided insight into how Web 2.0 technologies could be used in the higher education environment.

Analysis and Results

The analysis of the data was based on three research questions. Data from multiple sources including documentation, interviews, direct observation, and participant-observation was directed to each research question for the study’s results:

1. Are Web 2.0 technologies viable to practicum research?
2. Are Web 2.0 technologies a useful aid in higher education?
3. Are online graduate students viewing these Web 2.0 technologies as an asset to the learning experience?
Figure 3. Facebook Home Page for the Regis Practicum

Figure 3. Facebook Home Page for the Regis University Database Practicum.

Figure 4. Twitter Home Page for the Regis Practicum

Figure 4. Twitter Home Page for the Regis University Database Practicum.
The 2010A Regis University Database Practicum, including students and faculty, were invited by the author to join a Facebook account and to follow a Twitter account that were set up for their practicum course use. The homepage for these accounts is shown in Figure 3 and Figure 4 respectively. The author was invited to discuss the use of these accounts at the practicum’s weekly conference call which was followed up with email for faculty and students as seen in Appendix A and B. The participants were instructed that this was voluntary and the results would be used in a thesis research project. They were informed they could use these accounts as they found to be most beneficial to their work within the practicum with the emphasis on informal communication.

Figure 5. Twitter Regis DBA Help Desk Account

Figure 5. Twitter Regis DBA Help Desk Account created by the database practicum to report the daily system status.
The students and faculty did not utilize these accounts. The Facebook account had one faculty member and three out of seven students join with no further participation. The Twitter account was not followed by any of the practicum participants.

During the 2010A Regis University Database Practicum session there was technical difficulties that prevented the participants from communicating as they normally did. A Twitter account, separate from the one mentioned above, was created and utilized by the practicum participants to report the system’s status to all participants. This proved to be a reliable source of communication for the group. The home page for the Regis DBA Help Desk Twitter account can be seen in Figure 5.

The interview questions were directed to both the faculty and students who have participated in the Regis University Database Practicum. The students who responded were from three database practicum groups consisting of the current group and two previous groups, Regis University Database Practicum 2010A, 2009C, and 2009B.

**General Questions**

The first four student interview questions were designed to gather background information concerning the age group of the participants, their use of Web 2.0 technologies, and initial response to the communication and knowledge sharing used in the database practicum. These questions were relevant to the research with literature suggesting that since the mid 1990’s distance learning has entered a new era with the success of the internet and WWW technologies (Li, La, Shih, & Li, 2008). Many older students find multitasking with new technologies more challenging than the younger students (Kleinman & Entin, 2002). The tools for distance education have changed drastically for older students who are adapting to this new way of learning that is familiar to the younger student.
The student participants of the database practicum verified that they were all older, returning students by answering yes to the following question:

Q1 - Would you be considered an older returning student (e.g., over 30 years old, taking graduate courses several years after completing undergraduate degree, etc.)?

Literature suggests that younger students thrive in a different learning environment which is connected and dynamic compared to the traditional static learning environment of the past (Carliner and Shank, 2008). This question was pertinent to the research results since younger students are accustomed to multi-tasking with many computer-based tools including Web 2.0 technologies. The author’s direct observation of younger college students confirmed this to be the norm. A senior at Rensselaer Polytechnic Institute, K. Blackman stated, “Though we use Facebook mostly for social communication, we do use it regularly outside of the classroom to discuss topics covered in class and assignments” (personal communication, May 8, 2010).

All of the student participants responded to the following question that they had used Facebook or Twitter but the degree of use varied from daily use of the social networking sites for social communication to using the sites rarely for practicum use only:

Q2 - How often do you use social networking sites such as Facebook or Twitter and for what purpose?

The responses included using Facebook not only to keep in touch with family and friends but to connect to professional groups that provide information that can be valuable to the responder’s work.

The student participant’s responses were split when answering the following question as to whether they felt the current ways of communicating in the practicum are sufficient:
Q3 - Do you feel the current ways of communicating in the Database Practicum (email, Worldclass forum, sharepoint, and TrackIT) are sufficient?

More than 50% responded that they felt the current forms of communication were not sufficient stating that some forms were more reliable while others had room for improvement. Responses noted lag time in email responses, some applications not being accessible, too many forms of communication to check, and various applications not managing knowledge efficiently. Figure 6 shows the Angel Learning Communicate Page that was previously known as Worldclass. When the author was an active practicum participant the email portion was seldom used and the Live Chat never utilized. This is where formal course work was conducted.

Figure 6. Angel Learning Communicate Page currently used by the practicum for course activity and other communications.
Sharepoint, shown in Figure 7, acts as a repository where current students post documents. This has been developed more with each new practicum group. A 2009B database student stated that it did not capture knowledge from previous practicum groups very well (personal communication, April 19, 2010). The author’s participation in practicum group 2009C included emphasis on Sharepoint where documents were generated to incorporate previous knowledge and have it more accessible. Responses indicated that email is unreliable with lag time between the correspondences and misdirection to the primary email address the student uses.

Figure 7. Sharepoint

Figure 7. Sharepoint is the web site where documents are stored in the repository.
The majority of the students responded negatively to the following question that multiple styles of knowledge sharing allows for better communication:

Q4 - Do you feel multiple styles of knowledge sharing tools allows for better communication within the practicum?

The general consensus was to have one tool for all communication due to the time it takes to access several sources, information getting lost to the users, and data not being synchronized. There was a 14% response rate indicating that different sources are acceptable to present the different formats of knowledge being shared.

Research Question 1 - Are Web 2.0 technologies viable to practicum research?

As new tools are developed the way distance learning performs its mission adjusts. As Lyons et al. (1999) stated, “On one hand, the tools need to be sophisticated enough to handle the diverse nature of course offerings, but on the other hand, they must be simple and convenient enough for faculty and students to use regularly and effectively”. Elements of the classroom learning environment that were taken for granted are not part of distance learning such as the social interaction among the students and faculty. Liccardi et al. (2007) recognized this when they stated, “As learning has evolved from a practice taking place in the physical world to computer-supported learning systems that mediate interaction with the learning material, establishing a strong foundation for substituting the social part of learning has become crucial” (p. 233). Davenport and Prusak (1998) point out that, “new information technology is only the pipeline and storage system for knowledge exchange”, but “does not create knowledge and cannot guarantee or even promote knowledge generation or knowledge sharing in a corporate culture that doesn't favor those activities” (p. 18).
The faculty responses were varied as to whether a communication tool such as Facebook could create a “water cooler” atmosphere that would be a benefit to the practicum students. 60% responded they did not feel this would be a benefit since the weekly conference calls involved some socialization and doubted if the “water cooler” atmosphere would be beneficial, along with concerns about security issues. Another response stated, “A blog of some sort would be better, where somebody could post issues that come up, and then anybody who had experience could post back or ask questions” (personal communications, April 21, 2010). 40% of the responses were in favor noting the benefits of getting to know fellow participants on another level.

Responses included that the faculty should not be included with the student socialization since this may influence what the students discuss. The idea of a student knowledge engineer (KE) was introduced where information could be filtered and passed onto others outside of the group.

The student participant’s responded with over 50% to the following question stating that a “water cooler” atmosphere could be a benefit to the practicum students:

Q8 - Do you feel a “water cooler” type atmosphere that Web 2.0 technologies can offer can benefit participants in the practicum?

The 57% who responded favorably to the benefits of a “water cooler” atmosphere felt it is an area where the practicum needs improvements to create a sense of community and to improve the sense of disconnect that the practicum members felt. They felt this could be a more collaborative experience that would “create an environment that will help get people prepared for work outside of academia” (personal communication, April 19, 2010). 47% responded that personal interaction should be fostered around the task at hand with the “water cooler” atmosphere not necessary or helpful. They did not see this atmosphere working in the practicum.
Responses noted that social communication should not be forced on the students along with their academic requirements and felt the students would not participate unless it was required.

There were 86% of the responses agreeing to the following question that exchanging social, less formal information adds to team building:

Q11 - Do you feel exchanging social, less formal information would add to team building among the practicum students?

The responses varied as to whether this was accomplished already with the tools currently used in the practicum to the need for more social interaction. It was noted that this is a difficult task with the participants in remote locations.

The following question was related to Q11 and also received 86% response rate that informal communication among the team members would create a relaxed atmosphere allowing more knowledge to be exchanged:

Q12 - Do you feel informal communication among the team members would create a relaxed atmosphere allowing more knowledge to be exchanged?

Most responded that informal communication could create more team spirit. They indicated that this is lacking in the practicum but did not indicate whether a new Web 2.0 technology would be beneficial. One response indicated that informal knowledge sharing could become a burden due to the limited time that most of the practicum students have. Another response commented on trust being important to any informal communication. The 14% felt there was no issue of knowledge exchange in the current practicum.

**Research Question 2 - Are Web 2.0 technologies a useful aid in higher education?**

With Web 2.0 technologies available to all with internet access the question is can they be utilized in the distance learning environment. Evidence has shown Facebook to be a social
tool, not a teaching tool used for classroom instruction (Selwyn, 2007). Finding where the Web 2.0 technologies can best be utilized, if at all, was the focus of this research question.

The majority of the faculty responded that they felt collaboration with social networking sites for informal knowledge sharing among graduate students could lead to a richer learning environment. The responses were clear that it was a possibility, and not a given, that the social networking sites could be beneficial depending on if students had used the sites for personal use making them comfortable with this type of technology. One response stated, “I think that when you have the informal networking, like on Facebook, then that just helps you to get to know people better and when you know them better, then (hopefully) that means you'll be able to work as a team better, and if that is happening, then hopefully everyone is learning more, and being more productive, which to me is a ‘richer learning environment’” (personal communication, June 18, 2010). There was a 20% response that socializing should be done outside of the practicum.

There was unanimous consensus from the faculty that they would not participate in communication exchanges with the practicum students on social networking sites unless it was required or there were clear boundaries on what would be communicated. The lack of time to check the social networking sites was noted in the responses along with the lack of interest.

Most of the students agreed that Web 2.0 technologies in a distance learning program should be carefully encouraged with the student’s best interest in mind when they answered the following question:

Q5 - Do you believe the use of Web 2.0 technologies should be encouraged in a distance learning program?

They all expressed concerns as to what tools would be used and that the users would need to feel comfortable with those tools. Some noted that other forms of centralized communication instead
of using email as the main tool would be beneficial. 14% did not feel Web 2.0 technologies should be encouraged.

The answers the students gave to the question concerning the effectiveness of social networking sites to communicate within an academic environment showed stronger agreement but only by a small margin:

Q6 - Do you feel social networking sites are an effective way to communicate within an academic environment?
Responses from 43% of the students felt that social networking sites could definitely help create a team environment which “helps to enable the concept of ‘collective intelligence’ for issues or questions” (personal communication, April 19, 2010). It was noted that a time should be set aside where everyone is meeting on real time and not just reading and posting as is usually done with email. 14% of the responses were not as strong but felt the social networking sites could be beneficial and noted how Twitter was being used effectively by the current practicum group to communicate the status of the database environment. 43% of the responses were not in agreement stating they were interested in sites that dealt with the academic tasks at hand only. Since their time is valuable they felt dealing with a site that did not deal directly with the task at hand was not profitable.

The student participants gave responses for and against the use of social networking sites when they answered the following question:

Q7 - What are the main reasons you would or would not use social networking sites as a tool for communication within an academic environment?
The pro responses consisted of easier access to people and information, more personal communication that, “helps to form stronger bonds within the team”, can “help others and learn
from other peoples experiences”, and “better social interaction if you have some idea of who you are dealing with on a more personal level” (personal communication, April 19, 2010 & May 10, 2010). The reasons against the use of social networking sites were focused on time issues, security issues, “additional fragmenting of resources”, and “not wanting to receive other information about what people are doing other than what is relevant to my interaction with them” (personal communication, April 20, 2010 & May 10, 2010).

The responses from the student participants for the following question concerning collaboration with social networking site for informal knowledge sharing among graduate students leading to a richer environment were split ranging from agreeing to not necessarily making a difference:

Q9 - Do you feel collaboration with social networking sites for informal knowledge sharing among graduate students could lead to a richer learning environment?

There was only 29% positive response stating knowledge sharing would increase along with, “having a comfortable environment in which you can share ideas and experiences can foster a more meaningful learning experience” (personal communication, April 20, 2010). Concerns were mentioned about the time factor involved with accessing the social networking sites. The remaining 71% responses had concerns that the return on the investment seems low plus “to get full effective use, it would need to be integrated (in some form) with our other communication sources” (personal communication, April 20, 2010). Other responses noted other sites such as a Wiki would be more beneficial. The continuing theme of the time involved was also mentioned.

Most of the students did not feel social networking sites could replace face to face communication:
Q10 - Do you feel the use of social networking sites can replace the lack of face to face communication in the practicum by providing a less formal atmosphere?

Only 14% of the responses felt social networking sites could replace the lack of face to face communication by providing more real time with another 14% stating that it could help but not replace face to face interaction. It was noted that social networking sites are a very successful way for people to communicate and may provide a more uninhibited form of communication. 72% responded it would not replace the lack of face to face communication. They noted that many people do not like to participate in larger groups so they may not use these sites preferring smaller group contact and “it may be part of a solution, but it is not ‘the’ solution” (personal communication, April 20, 2010). One response noted that the social networking sites can enhance web based classes, but “having your peers in the same room and interacting with each other, building friendship cannot be replaced by a web page where one is typing a response and then waiting minutes if not hours for response” (personal communication, June 14, 2010).

Students responded more favorably to how they felt about the faculty having access to the social networking site when asked the following question:

Q15 - Do you feel the faculty should have access to the social networking site accounts the students are using?

86% responded the faculty should be included in the social networking sites with some stipulations. Most felt the faculty is part of the team with some indicating their input and feedback were important. Others indicated concerns, noting only if the faculty were invited should they participate, what are the goals of the communication within the social networking site, and everyone participating would have to be aware of the social risks of posting
information. Only 14% stated the faculty should not be involved in this form of communication with the students.

The students’ responses were split when asked if they would hesitate to discuss some topics or ideas if the faculty had access to the social networking site the students were using:

Q16 - Would you hesitate to discuss some topics or ideas if the faculty had access to the social networking site accounts the practicum students were using?

Response from 57% of the students felt they would not hesitate to discuss topics if the faculty had access to the social networking site that the students did. They stated they would not post information if it was private or controversial. Of the 43% who said they would hesitate they noted there are topics that students would not want to discuss, such as dissatisfaction with a faculty member or how the practicum was progressing.

**Research Question 3 - Are online graduate students viewing these Web 2.0 technologies as an asset to the learning experience?**

Participant-observation was utilized by the author when the 2010A Regis University Database Practicum was invited to use Facebook and Twitter to communicate among the current members. The author suggested where the Web 2.0 technologies could be used, such as informal communication in a “water cooler” atmosphere or discussions concerning questions that arose pertaining to assignments and practicum missions. How the group chose to use these technologies was left to them. Though the account established by the author was not utilized, they found the use of another Twitter account to be a reliable source of communication accessible to all.

The faculty response to how they felt about the collaboration of Web 2.0 technology applications such as Facebook or Twitter to be an asset to the practicum varied going from
definite “yes” it would be beneficial to absolutely “no”. There was a response of not knowing if the new technologies could be an asset. One response pointed out that Twitter was currently being used to communicate the daily system status while Facebook was viewed as extra overhead that was not beneficial, while another response said the use of Twitter was a waste of time and Facebook is difficult to use with the management of an account not worth it.

When asked what Web 2.0 technologies the faculty members felt could be used in the practicum they responded with Wikis, Twitter, and YouTube. In the responses the faculty reported that Twitter was being used successfully to report daily the system status when other communication systems became unreliable. YouTube is being used by one faculty member who reports, “What I’ve started doing is posting YouTube videos on various aspects of classes (lectures, intros, special issues)” with the students giving positive feedback on this approach (personal communication, April 21, 2010). One faculty member stated a Wiki could be used for the document repository such as one that is currently being successfully used by the Regis University Systems Engineers and Application Development (SEAD) team and “In my opinion, it would be SO much easier for everyone, if there was just one central Wiki for the DBA Practicum, with all relevant documents, and everyone could work together to keep things updated” (personal communication, June 18, 2010).

Student’s responses to the following question about trust in the security of Web 2.0 applications was split with less than half having complete trust with the others having various levels of trust:

Q13 - Do you feel complete trust in Web 2.0 application security is essential to be able to use these in the academic environment?
43% stated they trusted the social networking sites security where system passwords were enforced. The remaining 57% of the responses stated they did not completely trust the security on the Web 2.0 sites. They went on to explain that using these applications in an academic environment would be suitable as sensitive information should not be shared here. It was pointed out that the users would have to have “a clear understanding of how the environment should be used and what privacy controls were in use” (personal communication, April 19, 2010). One response noted that, “Informal communication rarely goes beyond polite interchanges in web 2.0 student communications---no different actually than a face to face mixer with an on-site team” (personal communication, May 10, 2010).

The majority of the responses from the students were in agreement to the following question concerning having an advocate for knowledge sharing within distance learning programs:

Q14 - Do you feel there should be an advocate for knowledge sharing within distance learning programs?

86% of the students responded favorably to having an advocate for knowledge sharing along with various points concerning this topic. It was noted that in the practicum knowledge sharing is critical to the success of the mission as it is essentially a production environment. One response stated, “Someone reminding people to make knowledge capture and sharing a priority is important, otherwise it is likely to slide in priority, especially when people are busy with other tasks” (personal communication, April 20, 2010). A key point addressed was having someone available to let the students know there are other tools that can be used but that this must be done in the interest of the students so they don’t feel it is just additional work without benefits.
The students responded with several Web 2.0 technologies that could be used in the practicum when asked the following question:

Q17 - What are some Web 2.0 technologies that you feel could be used in the practicum?

The following are the Web 2.0 technologies that the students noted could be used in the practicum:

- Social Networking – web-based services that allow individuals to (1) construct a public or semi-public profile within a bounded system, (2) articulate a list of other users with whom they share a connection, and (3) view and traverse their list of connections and those made by others within the system (Boyd and Ellison, 2007).

- Instant Messaging – real time direct text-based communication between two or more people using personal computers or other devices, along with shared software clients (Instant Messaging, 2010).

- Wiki – a web site where users can add, remove, and edit every page using a web browser (Stafford and Webb, 2010).

- Blogs (faculty and student) – a web site where information is written on an ongoing basis with new data showing up at the top so visitors can read what's new, others can then comment on it or link to it (Blogger, 2010).

- Podcasts – an audio or video file that is made available on the Internet for download and playback using a computer or a mobile device such as an Ipod (Library and Information Technology Glossary, 2010).

- Shared Calendars – share calendar with others, have it available from any computer, synchronize with other desktop applications (Google Calendars, 2010).
- Team Rooms or Collaboration spaces - Internet-based collaborative tools that enable a team or network of people to communicate by posting messages and documents that can be accessed at any time from any place which host a whole suite of features, including threaded discussion, shared documents, chat, Web conferencing, calendars, whiteboards, application sharing, and project management tools. (Digenti, 2010)

- Video-sharing sites such as YouTube - a video hosting service that allow individuals to upload video clips to an Internet website where the video host will then store the video on its server, and show the individual different types of code to allow others to view this video (Video hosting service, 2010)

- Mashups - a term that's become popular to describe Web 2.0-ish sites that combine the features or functions of one website with another where a variety of techniques are used to create useful new services that are derived from existing ones with the most common involving maps, but there are also video mashups, photo mashups, search and shopping mashups, and news mashups (Rankin, 2010)

Further research was not conducted on the other Web 2.0 technologies mentioned above. The focus of this research was on the use of the social networking sites Facebook and Twitter.
Chapter 5 – Recommendations and Conclusions

The results of this research were clear that the use of Web 2.0 technologies in the Regis University Database Practicum would be an asset to this learning environment. Practical methodologies were developed that support the use of these tools. The analysis of the data gathered from various sources indicates the need for improved communication within the practicum where the formal and informal knowledge sharing can benefit from the Web 2.0 technologies.

A limitation in this research for the use of Web 2.0 technologies in distance learning academic environments is the age of the students in this case study. Kleinman & Entin (2002) noted distance learning students were generally older with technology challenges causing some of these students to drop a course. Younger students have been exposed to these new technologies which make them more open to collaborative learning environments (Carliner and Shank, 2008). They have been exposed to the online socializing with Web 2.0 technologies on a daily basis that is an adjustment for older students requiring a learning curve. 100% of the students responded to the research questions that they were older, returning students and though all the students responded they had used social networking sites there were varying degrees of use from daily to only for the practicum.

The tools used in distance learning programs need to be well received by the students to be beneficial to the mission at hand. They must be simple and convenient to use yet be able to handle what is needed in the course (Lyons et al., 1999). The tools must engage the learner and adapt to their needs or the user may get bored or frustrated, which can prevent them from learning (Brinkman, Payne, Patel, Griffin, and Underwood, 2007). The responses from the students indicated that most of the Web 2.0 technology tools were not difficult to use. The main
concern was the time factor involved in using an additional communication tool. When the standard forms of communication within the practicum became unreliable the practicum group responded by using Twitter to report the system’s status. Knowing that this Web 2.0 technology was available and how it could be used proved to be beneficial when an alternative form of communicate became necessary.

The practicum is designed to give the students hands on experience as a team in a working database environment, which regular academic courses cannot provide. Literature strongly suggests that informal communication is often important on projects, if not more so, than formal communication with conversation at the water cooler or in the company cafeteria often occasions for knowledge transfer (Davenport and Prusak, 1998; Kendrick, 2004). 86% of the students recognize that informal communication can lead to team building through a relaxed atmosphere where more knowledge could be shared. There were 57% of the students who felt a water cooler atmosphere that the Web 2.0 technologies could provide would be beneficial to the practicum creating an atmosphere that would help people prepare for work outside of the academic environment. There was strong support of a method for informal communication within the practicum.

Literature suggests that talk is the real work, the driving force in a knowledge driven economy (Davenport and Prusak, 1998). With distance learning an acceptable alternative to the physical classroom, establishing a strong foundation for substituting the social part of learning has become crucial (Liccardi et al., 2007). Over 50% of the responses from the students were in favor of incorporating social networking sites into the database practicum as a way to communicate, supporting the social part of learning accomplished with alternative methods.
Knowlton (2001) stated that knowledge construction is best accomplished through collaboration with students learning through the give and take among classmates. Web 2.0 technologies are a way for students to give and receive information among each other. The faculty showed support for this statement with 80% of them agreeing when they responded collaboration with social networking sites for informal knowledge among graduate students could lead to a richer learning environment. There were only 29% of the students who agreed that social networking sites could lead to a richer environment with not ruling out the social networking sites completely. Reasons for the disagreement included feeling the return on investment was low, the time involved with accessing the social networking sites, and integration with the other communication sources would be required to get full effective use. It was noted that another type of Web 2.0 technology would be more beneficial such as a Wiki where data is updated by the participants for all in the group to view.

Literature suggests that new information technology is only a way to access knowledge with people rarely giving away valuable possessions, which includes knowledge, without expecting something in return (Davenport and Prusak, 1998). This was reinforced by some of the negative responses to the use of the social networking sites in the database practicum. One response stated that they did not want to receive any information that was not relevant to their own interest. Most of the faculty responded that they would not participate in the social networking sites with the students due to the time factor involved in accessing the social networking sites plus the lack of interest. Some responded that they would participate depending on what tools were being used while others stated there would need to be clear guidelines on what is and isn't appropriate as far as communication goes. These responses suggest the faculty
and students are not always willing to give away their possessions of time and knowledge without something in return.

People are resistant to change, they get comfortable in a situation and many fear changes. There are many reasons for this resistance one of which is the idea of learning something new. Even with new ideas proven and demonstrated to be more effective than the old there are problems with getting new methods and technology into widespread use (Lientz and Rea, 2004). Less than 50% of the students felt the current forms of communication in the practicum were sufficient while noting there was room for improvement. This response indicates more can be done to increase the efficiency of communication in the practicum. There was initial resistance when this research introduced Facebook and Twitter into the practicum environment, but when the situation presented itself that change was needed the practicum did respond with using Twitter for formal communication. With the need for change evident the students responded 86% in favor of having an advocate for knowledge sharing. Together these results support a method of encouraging new ways for knowledge sharing with encouragement to make changes successful.

As a participant-observer in the previous practicum and then a direct observer to the current practicum, the author found time constraints to be a significant factor for the students causing them to be resistant to any additional activities that were not required. Through personal conversations with practicum participants the author noted that most of the students had full time employment and other personal commitments, which indicated time was valuable and used for required tasks. Some students responded that unless it was required they would not use social networking sites to communicate even though they did recognize benefits of creating a stronger team environment. This was reinforced by the lack of voluntary participation by the current practicum students with the Facebook account, but when required all participated in using
Twitter for reporting the daily system status. There is support of a method for incorporating social networking sites without adding additional time to the curriculum.

This research involved a select group of older students where the need for better communication within the practicum was identified. The methodology for Web 2.0 technologies to be utilized for formal knowledge sharing was successful with the incorporation of Twitter. Though the need for informal knowledge was recognized it was not successfully implemented in the current database practicum. The first step has been taken by introducing Web 2.0 technologies to the database practicum. Incorporating new methodologies could prove to be beneficial to the distance learning practicum environment.
Chapter 6 – Areas for Further Research

The areas for further research concerning Web 2.0 technologies and distance learning are numerous including focusing on other age groups and other Web 2.0 technologies. As new technologies are developed and become readily available research should continue to branch out to these new frontiers. Research should focus on other Web 2.0 technologies, such as blogs, where some tools may prove to be more beneficial in an academic environment than others. As students become more familiar with Web 2.0 technologies research into the effectiveness and efficiency that these technologies can offer in the academic environment should continue.
References


Five questions with Dr. Chris Dede, Timothy E. Wirth Professor in Learning Technologies at Harvard University and the keynote speaker for this month's LITRE Expo 2009. (n. d.).


8(2).


Conference Committee (IW3C2).


Appendix A

Faculty Participant Survey Email

Hello,

You are invited to participate in a study that is an inquiry towards using Web 2.0 technology in the database practicum. The results of the study will be used to evaluate a practical methodology that can be used to incorporate Web 2.0 technologies to support knowledge sharing within a higher education online database practicum curriculum. In addition, this study is being conducted to fulfill the requirements of a Thesis Project.

Participation in this study should take less than 30 minutes of your time. Participation will involve responding with substantive answers to the 5 open-ended questions listed below about knowledge sharing and communications activities within the database practicum. Participation in this project is strictly voluntary.

At the end of this email is the INFORMED CONSENT FORM FOR FACULTY TEAM PARTICIPANTS that you are asked to read. Please return via email with your typed name that will be considered your signature.

The questions can be answered and returned via email or thru a phone conference. I can be contacted by email or at 845-642-4260 to set up an appointment for the phone conference.

Thank you for your time.

Sandra Blackman

Project Title: An Inquiry Towards the Use of Web 2.0 Technologies within a Higher Education Online Database Practicum Research Experience Supporting a New Collaborated Methodology: A Case Study at Regis University

1. Do you feel the collaboration of Web 2.0 technology applications such as Facebook or Twitter to be an asset to the practicum?
2. Would a communication tool that could create a “water cooler” atmosphere such as Facebook be beneficial to the practicum students?

3. Do you feel collaboration with social networking sites for informal knowledge sharing among graduate students could lead to a richer learning environment?

4. Should the faculty participate in communication exchanges the practicum students have on social networking sites?

5. What are some Web 2.0 technologies that you feel could be used in the practicum?

INFORMED CONSENT FORM FOR FACULTY TEAM PARTICIPANTS

RESEARCH PROJECT

Title of Research Project: An Inquiry Towards the Use of Web 2.0 Technologies within a Higher Education Online Database Practicum Research Experience Supporting a New Collaborated Methodology: A Case Study at Regis University

You are invited to participate in a study that is an inquiry towards using Web 2.0 technology in the database practicum. The results of the study will be used to evaluate a practical methodology that can be used to incorporate Web 2.0 technologies to support knowledge sharing within a higher education online database practicum curriculum. In addition, this study is being conducted to fulfill the requirements of a Thesis Project. The study is being conducted by Sandra Blackman. Sandra Blackman can be reached at (518) 729-4692 or e-mail sblackman2@nycap.rr.com. This project is supervised by the student’s Thesis Advisor, Charles Thies, Regis University, 3333 Regis Boulevard, Denver, Colorado 80221-1099, cthies@regis.edu, (228) 229-8626.

Participation in this study should take less than 30 minutes of your time. Participation will involve responding to 5 open-ended questions about knowledge sharing and communications activities within the database practicum. Participation in this project is strictly voluntary. The risks associated with this project are minimal. If, however, you experience discomfort you may discontinue the interview at any time. We respect your right to choose not to answer any questions that may make you feel uncomfortable. Refusal to participate or withdrawal from
participation will involve no penalty or loss of benefits to which you are otherwise entitled.

Your responses will be identified by code number only and will be kept separate from information that could identify you. This is done to protect the confidentiality of your responses. Only the researcher will have access to your individual data and any reports generated as a result of this study will use only group averages and paraphrased wording. However, should any information contained in this study be the subject of a court order or lawful subpoena, Regis University might not be able to avoid compliance with the order or subpoena. Although no questions in this interview address it, we are required by law to tell you that if information is revealed concerning suicide, homicide, or child abuse and neglect, it is required by law that this be reported to the proper authorities.

If you have any concerns or complaints about how you were treated during the interview, please contact Mr. Bud May, the director of the Regis University Institutional Review Board at (303) 458-4206. You may keep this page for your records. Please sign below if you understand and agree to the above. If you do not understand any part of the above statement, please ask the researcher any questions you have.

I have read and understood the foregoing descriptions of the study called An Inquiry Towards the Use of Web 2.0 Technologies within a Higher Education Online Database Practicum Research Experience Supporting a New Collaborated Methodology: A Case Study at Regis University. I have asked for and received a satisfactory explanation of any language that I did not fully understand. I agree to participate in this study, and I understand that I may withdraw my consent at any time. I have received a copy of this consent form.

Note: If this document is being sent electronically, your typed signature will be considered your signature.

Signature ________________________

Phone Number ____________________

Date ____________________________
Appendix B

Student Participant Survey Email

Hello,

You are invited to participate in a study that is an inquiry towards using Web 2.0 technology in the database practicum. The results of the study will be used to evaluate a practical methodology that can be used to incorporate Web 2.0 technologies to support knowledge sharing within a higher education online database practicum curriculum. In addition, this study is being conducted to fulfill the requirements of a Thesis Project.

Participation in this study should take less than 30 minutes of your time. Participation will involve responding with substantive answers to the 17 open-ended questions listed below about knowledge sharing and communications activities within the database practicum. Participation in this project is strictly voluntary.

At the end of this email is the **INFORMED CONSENT FORM FOR STUDENT PARTICIPANTS** that you are asked to read. Please return via email with your typed name that will be considered your signature.

The questions can be answered and returned via email or thru a phone conference. I can be contacted by email or at 845-642-4260 to set up an appointment for the phone conference.

Thank you for your time.

Sandra Blackman

**Project Title:** An Inquiry Towards the Use of Web 2.0 Technologies within a Higher Education Online Database Practicum Research Experience Supporting a New Collaborated Methodology: A Case Study at Regis University
1. Would you be considered an older returning student (e.g., over 30 years old, taking graduate courses several years after completing undergraduate degree, etc.)?

2. How often do you use social networking sites such as Facebook or Twitter and for what purpose?

3. Do you feel the current ways of communicating in the Database Practicum (email, Worldclass forum, sharepoint, and TrackIT) are sufficient?

4. Do you feel multiple styles of knowledge sharing tools allows for better communication within the practicum?

5. Do you believe the use of Web 2.0 technologies should be encouraged in a distance learning program?

6. Do you feel social networking sites are an effective way to communicate within an academic environment?

7. What are the main reasons you would or would not use social networking sites as a tool for communication within an academic environment?

8. Do you feel a “water cooler” type atmosphere that Web 2.0 technologies can offer can benefit participants in the practicum?

9. Do you feel collaboration with social networking sites for informal knowledge sharing among graduate students could lead to a richer learning environment?

10. Do you feel the use of social networking sites can replace the lack of face to face communication in the practicum by providing a less formal atmosphere?

11. Do you feel exchanging social, less formal information would add to team building among the practicum students?
12. Do you feel informal communication among the team members would create a relaxed atmosphere allowing more knowledge to be exchanged?

13. Do you feel complete trust in Web 2.0 application security is essential to be able to use these in the academic environment?

14. Do you feel there should be an advocate for knowledge sharing within distance learning programs?

15. Do you feel the faculty should have access to the social networking site accounts the students are using?

16. Would you hesitate to discuss some topics or ideas if the faculty had access to the social networking site accounts the practicum students were using?

17. What are some Web 2.0 technologies that you feel could be used in the practicum?

INFORMED CONSENT FORM FOR STUDENT PARTICIPANTS

RESEARCH PROJECT

Title of Research Project: An Inquiry Towards the Use of Web 2.0 Technologies within a Higher Education Online Database Practicum Research Experience Supporting a New Collaborated Methodology: A Case Study at Regis University

You are invited to participate in a study that is an inquiry towards using Web 2.0 technology in the database practicum. The results of the study will be used to evaluate a practical methodology that can be used to incorporate Web 2.0 technologies to support knowledge sharing within a higher education online database practicum curriculum. In addition, this study is being conducted to fulfill the requirements of a Thesis Project. The study is being conducted by Sandra Blackman. Sandra Blackman can be reached at (518) 729-4692 or e-mail sblackman2@nycap.rr.com. This project is supervised by the student’s Thesis Advisor, Charles Thies, Regis University, 3333 Regis Boulevard, Denver, Colorado 80221-1099, cthies@regis.edu, (228) 229-8626.
Participation in this study should take less than 30 minutes of your time. Participation will involve responding to 17 open-ended questions about knowledge sharing and communications activities within the database practicum. Participation in this project is strictly voluntary. The risks associated with this project are minimal. If, however, you experience discomfort you may discontinue the interview at any time. We respect your right to choose not to answer any questions that may make you feel uncomfortable. Refusal to participate or withdrawal from participation will involve no penalty or loss of benefits to which you are otherwise entitled.

Your responses will be identified by code number only and will be kept separate from information that could identify you. This is done to protect the confidentiality of your responses. Only the researcher will have access to your individual data and any reports generated as a result of this study will use only group averages and paraphrased wording. However, should any information contained in this study be the subject of a court order or lawful subpoena, Regis University might not be able to avoid compliance with the order or subpoena. Although no questions in this interview address it, we are required by law to tell you that if information is revealed concerning suicide, homicide, or child abuse and neglect, it is required by law that this be reported to the proper authorities.

If you have any concerns or complaints about how you were treated during the interview, please contact Mr. Bud May, the director of the Regis University Institutional Review Board at (303) 458-4206. You may keep this page for your records. Please sign below if you understand and agree to the above. If you do not understand any part of the above statement, please ask the researcher any questions you have.

I have read and understood the foregoing descriptions of the study called An Inquiry Towards the Use of Web 2.0 Technologies within a Higher Education Online Database Practicum Research Experience Supporting a New Collaborated Methodology: A Case Study at Regis University. I have asked for and received a satisfactory explanation of any language that I did not fully understand. I agree to participate in this study, and I understand that I may withdraw my consent at any time. I have received a copy of this consent form.

Note: If this document is being sent electronically, your typed signature will be considered your signature.

Signature ________________________

Phone Number ____________________

Date ____________________________
Appendix C

Regis University IRB Approval Letter

April 16, 2010
Sandra Blackman
41 Plaza Ave.
Rensselaer, NY 12144

RE: IRB #: 069-10

Dear Sandra:

Your application to the Regis IRB for your project “An Inquiry Towards the Use of Web 2.0 Technologies Within a Higher Education Online Database Practicum Research Experience Supporting a New Collaborated Methodology: A Case Study at Regis,” was approved as exempt on April 14, 2010.

The designation of “exempt,” means no further IRB review of this project, as it is currently designed is needed.

If changes are made in the research plan that significantly alter the involvement of human subjects from that which was approved in the named application, the new research plan must be resubmitted to the Regis IRB for approval. It is the responsibility of the investigator to maintain signed consent documents for a period of three years after the conclusion of the research. The Office of Academic Grants does not retain copies of individual IRB documentation, including approval letters, past three years from approval date.

Sincerely,

Edwin May
Director
cc: Charles Thies

A JESUIT UNIVERSITY
Annotated Bibliography


In this book, the authors present data collected from surveys pertaining to higher education online courses. The graphs and charts provide data from enrolment numbers to why students and faculty participate in online courses.


In this book’s chapter, the author discusses what is knowledge management and how to go about using it. A review of the steps to implanting knowledge management is presented.


This article discusses social networking sites history from the beginning to their current success. The authors provide detailed definitions and descriptions of various social networking sites over the years.


In this paper, the authors discuss the focus of their one day workshop which is the importance of design in computer applications that are used for distance learning.

Carliner, S. & Shank, P. (2008). Web 2.0 and beyond-The changing needs of learners, new tools, and ways to learn. In S. Carliner & P. Shank (Eds.), The e-learning handbook-Past
promises, present challenges. San Francisco: Pfeiffer.

In this book’s chapter, the authors discuss how new ways of learning have been promoted by social Web 2.0 applications changing the nature of learners. They describe several of these technologies and some basic principles they are based on.


In this article, the authors discuss the use of Facebook in higher education by the faculty in Southern African Information Systems and Computer Science Departments. Their research involved surveying the lecturers and students as to the use of Facebook as an academic tool.


This book is about knowledge management in organizations. The authors start with defining knowledge and how critical it is to the organization. Knowledge markets and how knowledge is transferred are among the topics focused on.


This website provides statistical information about Facebook users and the company’s growth.

This website provides a timeline of when events happened for Facebook from creation to present day.


In this bulletin, five questions are answered by a prominent professor concerning technology use within higher education.


In this book’s chapter, the author discusses the significance of informal communication. Sharing ideas during informal conversations builds teamwork and motivation among team members.


In this paper, the authors compare in-class and on line teaching for both students and instructors. They note the attendance, learning outcomes, and student’s opinions after completing the course. The instructors noted the administrative challenges, communication differences, and support for the online students.

In this paper, the author focuses on practical advice for making online discussions educationally beneficial to the student. The author discusses how an instructor must meticulously design and facilitate the online discussion and how students learn through collaboration. Several models are presented along with evaluation criteria.


In this article, the authors examine many distance learning and collaborative learning issues from a technological perspective.


In this article, the authors investigate the role of social networks in computer science education by examining social networks and the impact they have on students.


In this book chapter, the focus is on science guiding and influencing policies and the conduct of work and resistance to change in industry. It captures how people react to change and how best to work with these reactions.

In this article, the authors discuss the support system that is required for mainstream faculty who are using technology in their classes.


In this article, the author clarifies the term Web 2.0 by exploring seven principles in depth. With many examples and comparisons with Web 1.0 technology he shows the expansion of software to the next level.


In this 2009 paper, the authors review the past 5 years of Web 2.0 technology. They start with the introduction of the term to how it has expanded. Focus is placed on the growth of Web 2.0 technology and possibilities of what may be coming next.


In this paper, the author presents research conducted on undergraduate students at a United Kingdom university and their use of Facebook. Examples of five main themes of communications are presented with the actual Facebook content.

In this book, the author discusses case study history and the significance it has as a research methodology. Conducting a case study from start to finish is the focus of this book with information pertaining to the preliminary planning, work in the field, making sense of the research, and telling the story through analysis and reporting.


In this article, the author explains how to use the case study methodology through an example case. Based on the works of several well-known case study researchers, the author proposes six steps that should be used when conducting a case study.


This website provides information concerning Twitter’s operations and creation.


In this article, the authors analyze the technological principles of Web 2.0 technologies and show that these technologies are well suited for teaching, learning and research on learning. They present two prototypes of technology supported learning applications that can be used to evaluate research hypotheses.

In the article, a brief history of distance learning is explained. It summarizes what distance learning is, when distance learning started to the present day application.


In this article, the author discusses the importance of conversation among people in an organization. Various businesses are used as examples to show how the most important work in an organization is conversation.


In this book, the author covers the distinctive characteristics of the case study research methodology. Presented in this book is designing the case study, preparing data collection, collecting the evidence, analyzing the evidence and reporting. The author provides many examples of case study research.