UNDERSTANDING THE USE OF SOCIAL CONSTRUCTIVIST MOODLE

ACTIVITIES WITHIN THE NORTH DAKOTA UNIVERSITY SYSTEM

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Understanding The Use of Social Constructivist Moodle Activities
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ABSTRACT

Online learning is becoming an increasingly important aspect of higher education. Concerns about the effectiveness of online courses have prompted education administrators to look at how different learning theories can best be used to increase student learning. Learning Management Systems (LMS) have become one of the dominant technologies for delivering online education, and the North Dakota University System (NDUS) uses one of the most popular of these LMSs, Moodle. NDUS Moodle is designed and utilizes activities that are based on a learning theory called social constructivism. This research studies the usage of these activities, perceived instructor effectiveness, and the use of alternate tools outside the NDUS Moodle environment by surveying instructors of online-only NDUS Moodle courses for spring 2012.

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CHAPTER 1. INTRODUCTION

In the 2007-2008 academic year, according to the National Center for Educational Statistics (NCES), 20% of undergraduate students took at least one distance education course (Aud, S., Hussar, W., Kena, G., Bianco, K., Frohlich, L., Kemp, J., & Tahan, K., 2011). Reports by Allen and Seamon (2010) showed that 63.1% of Higher Education administrators believe online learning to be an important part of their institution's long term strategy. With the advancement of computer mediated learning in distance education, leaders in higher education need to understand which new ideas and advancements in learning technologies work best when combined with different theories of learning.

Harting and Erthal (2005) wrote that computer mediated learning can be traced back to the late 1970s and early 1980s, when early computers were slow and software was still in its infancy. The earliest forms of computer mediated learning involved computer punch cards for scoring tests and sending information to students on floppy disks. From the 1990s to the present, Internet learning has experienced enormous growth due to broadband Internet, digital video, and high powered computers.

Anderson (2007) stated that early websites were meant to connect people together. Often referred to as Web 1.0, these sites allowed users to share static materials. As data speeds increased, a new version of the web began to take shape. This faster version of the Internet is most often referred to as Web 2.0, a term which was coined by Dale Dougherty, a media company owner in 2004. Web 2.0 refers to a more robust web offering that is experienced most notably by social media, blogging, wikis, and stronger communication and collaboration.

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According to research by the Economist Intelligence Unit (2008), a mix of college professors and administrators stated that online collaboration tools could have the greatest impact on improving quality in education over the next five years. Respondents of that research also said that sophisticated Learning Management Systems, along with enhanced presentation tools, were top innovations that are likely to have a huge impact on improving distance learning in the future.

According to Dahlstrom, de Boor, Grunwald, and Vockley (2011), the technology most higher education institutions utilize for delivering online courses is the Learning Management System (LMS). LMSs are also referred to as Course Management Systems (CMS) or Virtual Learning Environments (VLE). According to Nantel (2009), there are currently over 100 different Learning Management Systems available, and the numbers are increasing. Although Blackboard continues to dominate the LMS market, the company lost subscribers in recent years to competitors such as Moodle, eCollege and Sakai.

One of these systems, Moodle, is a free open-source LMS currently being made available to all eleven of the institutions of the North Dakota University System (NDUS). Moodle is used to plan, assemble, and administer online or hybrid courses by giving instructors tools to organize and structure the delivery of course materials. Moodle was first released in 2002 and was primarily designed from its beginning to support learning through a set of tools incorporating a social constructivist learning approach (Dougiamas, 2007). These social constructivist tools include online social tools, activities, and modules, all contained within the Moodle programming. Instructors can choose to include a variety of activities such as internal email, wikis, forums, and web conferencing. Moodle also provides a controlled access environment for these social constructivist tools to be used to

promote collaboration among students, yet meet the needs of administrators to keep information private. This collaboration among students is an important aspect of social constructivist learning.

Vygotsky (1986) stated that a social constructivist approach to learning provides students ways of communicating and collaborating such that they will learn from each other by sharing their thoughts and allowing other students to develop new insights. These new insights allow students to construct new knowledge in a scaffold of learning. This scaffold is the construction of knowledge built upon the knowledge that others share. Learners take their knowledge, plus knowledge that is shared, and construct new knowledge through collaboration. Jonassen, Davidson, Collins, Campbell, and Haag (1995) added that social constructivists believe online learning happens best when there is collaboration and communication such that students learn not only from the instructor, but from their peers as well.

Through social interaction and collaboration students are able to construct knowledge in a variety of learning situations. Roschelle and Teasley (1995) defined collaborative learning as an activity that is coordinated, synchronous in nature, and results in an attempt to construct and maintain a shared concept of a problem. Anderson (2007) pointed out that with the advances of Web 2.0 starting in 2006, there have been fundamental changes in the way users approach the Internet bringing about the advancement of social software in education. Educational social software includes tools such as blogs, wikis, social bookmarking, and multimedia sharing. In the world of online learning, these tools are commonly divided into two groups, synchronous and asynchronous.

In asynchronous online learning content is provided in such a manner that students can access learning materials anytime through the Internet, such as text or media recordings. With synchronous online learning, instructors and students communicate and collaborate in real time. This interaction can be with audio, video or electronic whiteboards. Moodle offers a set of synchronous and asynchronous solutions within the LMS for social constructivist learning to take place. One way that communication takes place within Moodle is through another product offered by the North Dakota University System (NDUS) called Wimba Classroom. Wimba Classroom is a synchronous learning and gathering space tightly integrated within Moodle.

Other forms of communication available in Moodle include the ability to instant message other students through Blackboard Enterprise Instant Messaging (*Blackboard IM*), *text chat* through Moodle, or students can participate in conversations through Blackboard Collaborate *Voice Board*, which allows users to carry a threaded conversation using voice recordings. Moodle's *email*, *forums*, *wikis*, and *blogs* are used to inspire dialogue and promote collaboration. These activities found in Moodle lend themselves to support social constructivist ideas by empowering students to communicate and collaborate anytime and anywhere. The instructor doesn't need to be present for students to contact and communicate with each other, yet the activities provided by Moodle allows for instructor facilitation if needed.

Statement of the Problem

Within the NDUS Moodle LMS, there are certain communication and collaboration tools called activities. Moodle activities were designed to help students learn by

participating in a social constructivist environment and are both social and collaborative in nature such as wikis. Moodle activities can provide synchronous communication using the web conferencing activity, or asynchronous communication such as forum activities. Since Moodle was built to be most effective with strong communication and collaboration, this research examines if Moodle activities are being used within NDUS Moodle. This research also investigates which of these activities instructors find most useful by examining online-only courses from spring 2012.

Purpose of the Study

The purpose of this study was to find out if NDUS instructors intended to provide learning using social constructivist methods during spring 2012. The survey study also looked at whether instructors intended to utilize social constructivist Moodle activities to allow for social constructivist learning. This survey study included which activities are most widely used, and provide demographics of instructors using Moodle activities. In addition, this survey study explored if instructors were utilizing alternate tools outside of the Moodle LMS, and if the instructors intended to use the alternate tools to support social constructivist learning.

Research Questions

In the summer of 2008, the North Dakota University System began offering Moodle as an LMS solution for all higher education institutions in North Dakota. Four of these institutions currently use Moodle as their primary form of delivering courses over the Internet: Dakota College at Bottineau (DCB), Williston State College (WSC), Mayville State University (MSU), and Dickinson State University (DSU). Some of these Moodle

courses augment traditional face-to-face classes creating a situation often referred to as a blended learning environment. Blended learning environments offer part of the course, or elements of the course, though online delivery. However, many of the courses offered by NDUS institutions through Moodle are delivered strictly over the Internet to distance learners that never actually meet their peers or instructor in a traditional classroom environment. This study addressed the following questions about instructor use of Moodle in the online-only courses.

1. Are NDUS Moodle instructors using social constructivist tools in their online-only courses?

2. Which of the social constructivist Moodle tools are used most by instructors in their online-only courses?

3. Do NDUS Moodle instructors purposefully intend to incorporate a social constructivist style of learning in their online-only courses?

4. Which of the Moodle activities do instructors feel are most useful for incorporating social constructivist learning in their online-only courses?

5. Are NDUS Moodle instructors using tools found outside of the LMS to develop a social constructivist learning approach for their online-only courses?

Significance of the Study

Because the social constructivist activities provided in Moodle are an important part of Moodle's success as an LMS, it is important for administrators to know which social constructivist activities within NDUS Moodle are being used by instructors. This information can be useful in Moodle development as it will give administrators a better

understanding of how NDUS Moodle is used site-wide in the North Dakota University System. Understanding which activities instructors use can also help NDUS trainers identify, plan, and develop training for activities.

This research provides decision makers important information to help understand how instructors use Moodle in the NDUS system and provides necessary information as to which activities are used most frequently. Additional information gathered during the research may provide administrators further insight as to how demographics of the instructors, might influence the use of Moodle activities. The research also gives administrators insight as to alternative tools that are being used to augment Moodle online-only courses.

Currently, Moodle administrators can obtain reports that provide the number of courses in which each activity has a presence, but this study reports on activities, such as forums that are present in the course but never used. Instructors may include an activity in a course, but never actually use it. This research provides a more granular understanding of not only which tools are made available in courses, but which Moodle activities are actually being used and if they were intended to be used in a social constructivist way.

Data were collected from Moodle database reports that show which activities were present in courses. Also, an instructor survey was administered to find more specific information about the activities used along with information on whether the instructors intended to use Moodle activities to support social constructivist learning.

Social constructivist tools are not limited to only online courses, and can certainly be used in face-to-face courses that also utilize an online presence, often referred to as blended

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learning courses. To limit its scope, the sample for this study included NDUS Moodle data

from the four colleges and universities within the North Dakota University System that are

primary participants of NDUS Moodle: Dickinson State University (DSU), Mayville State

University (MSU), Dakota College at Bottineau (DCB), and Williston State College

(WSC). The online-only courses were identified by campus administrators and combined

with Moodle reports from each of the institutions for the spring 2012 semester.

Definition of Terms

Definitions of the following terms found within the study are provided in order to

ensure uniformity and to help with understanding. Definitions not accompanied by a

citation were developed by the researcher.

Distance Education: Distance education is defined as a formal education process in

which the student and instructor are not in the same place. Thus, instruction may be

synchronous (requires students and instructors to be online at the same time) or

asynchronous (does not require students and instructors to be online at the same time), and

it may involve communication through the use of video, audio, or computer technologies,

or by correspondence (which may include both written correspondence and the use of

technology such as CD-ROM). (National Center for Educational Statistics, 2008)

Instructor Presence: Instructor presence is the design, facilitation, and direction of

cognitive and social processes for the purpose of realizing personally meaningful and

educationally worthwhile learning outcomes (Anderson, Rourke, Garrison, & Archer,

2001).

Social Constructivist Learning: A belief that learning builds on itself, is a result of

a collection of prior experiences, and students can learn even better by sharing their

experiences. Students will inevitably learn differently according to their life experiences. Social constructivists believe that learning is a social and collaborative activity on which an individual learns through his or her involvement with other people. Social constructivists believe that people can obtain knowledge they normally would not be able to understand through engaging with other people (Vygotsky, 1978).

Learning Management System (LMS): Digital tools designed to develop, implement and deliver online and blended instruction (Nantel, 2009).

Moodle: A Learning Management System created in Australia by Martin Dugiamis utilizing tools for a social constructivist approach to learning. NDUS Moodle defines the specific instance of Moodle used by the North Dakota University System.

Social Presence: The ability of learners to project their personal characteristics into the community of inquiry, thereby presenting themselves as 'real people' (Rourke, Anderson, Garrison & Archer, 2001).

Traditional Courses: Courses that are taught by an instructor in a traditional face-to-face classroom and have no online presence.

<center>Limitations</center>

This study is intended to give insights into how instructors from the four NDUS campuses generally use Moodle as a whole, but results will also give individual campus administrators insight as to how Moodle is being used among the individual institutions for which the data were extracted. Due to the vast amount of data that is contained within Moodle and the large number of courses that are found in NDUS Moodle, the research was limited to online-only courses from Dickinson State University, Mayville State University, Dakota College at Bottineau, and Williston State College. Other institutions within the

NDUS use Moodle but do not use Moodle as their primary LMS, so these institutions and their faculty are omitted from the study. The study has the assumption that instructors using Moodle should or want to be using social constructivist tools. Moodle is designed to use a social constructivist approach to learning, but that does not mean instructors must use this approach or that the approach is appropriate for their content or style of instruction. This study is not meant to assess the efficacy of Moodle, but only to give a description of the use of Moodle.

<div align="center">Organization of the Remainder of the Study</div>

Contained in the rest of this study, Chapter 2 will review relevant literature and research related to computer mediated instruction, Moodle, and the social constructivist learning style. Chapter 3 will explore the survey and methodology used to collect the data. Chapter 4 will present and interpret the data that were collected from the research. Chapter 5 will summarize the data, provide conclusions, and provide recommendations for further research.

CHAPTER 2. LITERATURE REVIEW

The offering of distance education programming is growing for both public and private higher education institutions. According to the National Center for Education Statistics (2011), students are participating in distance education in increasing numbers. From 2000 to 2008, the percentage of undergraduates that enrolled in a distance education course grew from 8% to 20%. Likewise, during the same time period, the percent of students enrolled in a degree program delivered solely through distance education increased from 2% to 4%. According to Allen and Seaman (2010), online course enrollment rose by almost one million students during the 2008-2009 academic year. After surveying over 2,500 colleges and universities throughout the United States in 2009, Allen and Seaman found that approximately 5.6 million students enrolled in at least one course offered online.

The National Center for Education Statistics (2008) defined distance education as a formal process in which students and instructors are not physically in the same place, and includes instruction that is either synchronous or asynchronous. In addition, for the 2006-2007 academic year, 66 % of the 4,160 degree-granting Title IV postsecondary institutions offered college-level courses at a distance. The National Center for Education Statistics (NCES) also includes courses that are blended or hybrid in nature when identifying these statistics. During this period, there were 12.2 million enrollments in approximately 11,200 programs identifying themselves as being delivered entirely online.

While institutions of higher education are gearing up for additional course offerings in distance education programming, distance education projections show even more students will be looking to take these online courses in future years. Hussar and Bailey

(2011) projected enrollment in higher education institutions will increase 17%, to 22.4 million students by the year 2019. Of this 17%, the biggest increases are expected to be students over 25 years of age. Distance education will play a significant part in these growing enrollments.

As distance education expands in higher education, there have been concerns from some educational leaders that distance education courses are not providing the same level of student learning as traditional courses. Allen and Seaman (2010) found that nearly two-thirds of the leaders in public higher education institutions believe online education learning outcomes are as good as or better than face-to-face courses. This is a large stride from 2003 when the numbers were closer to 57%. But there are still just over one-third of these public institution instructors who feel there is need for improvement when it comes to providing effective distance education.

<div align="center">Learning Theories</div>

To improve online learning, it is advantageous to know what kinds of learning theories and strategies work best. The psychology of learning is informed by three different views: behaviorism, cognitivism, and constructivism.

Graham (2010) concluded that behaviorism, pioneered in the early 1900s by Watson, and later by Skinner, Pavlov, Thorndike and Gagne, proposed that all actions are behavior responses. Behaviorists downplay the cognitive thought processes when explaining how students learn; instead they explain actions through response to earlier external stimulation. The behaviorist lens looks at behavior as manifested through two schools of thought: classical and operant conditioning.

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The second view of learning to be addressed here is cognitive learning theory. Sincero (2011) wrote that cognitive learning theory puts emphasis on explaining and analyzing mental processes as they are affected by intrinsic and extrinsic factors. Cognitive learning theory is divided into two schools of thought: social cognitive theory and cognitive behavioral theory. Social cognitive learning looks at three variables: behavior factors, environmental factors, and personal factors. As these three variables interrelate with each other, learning occurs. Cognitive behavioral theory looks at how learning takes place through life experiences. It's the sharing of these life experiences that brings about the third style of learning, constructivism.

Von Glasersfeld (1989) argued that constructivism in education has become a dominant theory for learning over the past decades. Pioneered by Piaget, Vygotsky and Bruner, constructivists argue that learning builds on itself, is a result of a collection of our prior experiences, and sharing these prior experiences results in deeper learning (Nanjappa & Grant, 2003). Knowledge is not passive, but active and built up actively by the cognizing subject. Further, the function of cognition is adaptive. Students will inevitably learn differently according to their life experiences. According to Vygotsky (1978), constructivists believe that learning is active and social. Knowledge is constructed in a social context as individuals find meaning that is appropriate to their experiences. Learners develop a scaffolding of knowledge, each interaction helping to build on the last. While the behaviorist and the cognitivist may approach learning with focus on the individual, social constructivism encourages formation of knowledge through relying on others to share prior experiences. Riegler (2005) offered that "constructivism shifts the focus of attention from the propositional "knowing that" to the pragmatic "knowing how" (p. 4).

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Garrison (1993) proposed that Piaget's understanding of learning is often referred to as cognitive constructivism and focuses on mental processes rather than what can be observed through behavior. The cognitive constructivist is concerned with meaningful learning and argues that knowledge is actively constructed and is derived from previous experiences. With cognitive constructivism, learner motivation is intrinsic, and constructivist teaching methods strive to assimilate newly gathered knowledge into existing knowledge.

Kanuka and Anderson (1999) proposed that while constructivist theories can differ in some respects, certain aspects hold true throughout:

- new knowledge is built upon the foundation of previous learning

- learning is an active rather than passive process

- language is an important element in the learning process

- learning environments should be learner-centered

With the constructivist ideas in tow, instructors find themselves as a partner or facilitator of learning, seeking out different ways for students to communicate, collaborate, and learn from each other.

With new advancements in the delivery of distance education through computer mediated instruction, educational leaders are hoping to capitalize on increases in enrollments and bolster numbers by offering more online courses while maintaining sound pedagogical practices. The development of course offerings through Learning Management Systems (LMS) is one way of delivering computer mediated education, and recent advances in LMS tools due to Web 2.0 technologies are allowing instructors more opportunities to connect and utilize a constructivist learning theory.

Web 2.0 Technology

The Internet has grown and evolved since it began in the mid-1980s. Current statistics show there are just over 2 billion Internet users worldwide (Miniwatts Marketing Group, 2011). While the numbers of Internet users has grown drastically, how the Internet is used is undergoing its own change, most often referred to as Web 2.0. While the phrase Web 2.0 may sound like an update, much like one would find in the next version of favorite software, Web 2.0 is best thought of as a seemingly never ending series of new social technologies. These new social technologies offer a very different experience than the static web pages found in the earliest websites, and are changing the way people utilize the Internet.

Anderson (2007) suggested that Web 2.0 technology is social in nature and can be both synchronous and asynchronous. Because of the social presence it offers, Web 2.0 often involves advanced online programs like multimedia sharing, blogs, wikis, or podcasts. O'Reilly (2005) listed seven guiding principles of Web 2.0: (a) the web as platform, (b) collective intelligence, (c) data is the next 'Intel inside', (d) end of the software release cycle, (e) lightweight program models, (f) software above the level of a single device, and (g) rich user experience. The second principle, collective intelligence, has the potential to make a huge impact on education. Anderson (2007) added that the collective intelligence principle of Web 2.0 could also be called harnessing the power of the crowd.

Anderson (2007) wrote that crowds, or Internet contributors working together, can identify correct answers to questions more frequently, and reliably, than a single individual.

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These crowds are also able to amass large amounts of media, information, and solutions, through online sites such as Flickr, iStockphoto and YouTube. Companies like Cambrian House have gone even further by using Internet crowds for research and development. Anderson (2007) proposed that a third way crowds are working together is by forming paths of information. Individuals mark, or tag, their information and it is shared by keywords to others. Through aggregation methods, these tags eventually pull together people with similar interests or beliefs.

This convergence marks the importance of Web 2.0 technologies and changes how people are using the Internet. Information is retrieved by searching the web, but when people are united through technologies, such as blogging, the information base becomes even larger. Alexander (2006) stated "Reading and searching the world is significantly different from searching the entire web world" (p. 33). The idea of collective intelligence is not new, but being able to collect that intelligence without actively inquiring, is part of Web 2.0. An example is the Digg web site where people submit news stories and then users vote for the stories they think are the most important. Stories with the most votes are allocated a more prominent place on the web site. The most prominent place is at the top of the page, and this is where the story with the most votes is located.

Another example of the Web 2.0 transformation can be identified with the addition of social bookmarking. With social bookmarking, users store their favorite bookmarks and then through the addition of tagging their bookmarks (adding additional words to describe their bookmark), they are shared across groups of people that are also interested in the same tags. For example, if an instructor tags a bookmark with the word Hamlet, then anyone with an interest in Hamlet, Shakespeare, or tragic literature, may be able to see the

bookmark. This can in turn improve the quality of ones work and lead to collaboration. Through social bookmarking, users can find new perspectives regarding research. Teams can use social bookmarking to upload new project information to other teams or allow individuals to connect to the rest of the team no matter where they are at. Social bookmarking sites allow instructors and students to connect, follow along, and track course progress (Alexander, 2006). This example holds true for other Web 2.0 technologies such as wikis, blogs and podcasts. The common theme of all these social software solutions is that they all allow people to connect, collaborate and learn from each other over the Internet (Sreebny, 2007). Sclater (2008) stated that many of these social Web 2.0 technologies are becoming common place in Learning Management Systems (LMS) to increase collaboration and participation, but some instructors and students would argue they are not as robust as freely available tools being used outside of the LMS.

Managing the Online Learning Environment

An LMS is online courseware designed to develop, implement and deliver online and blended instruction. Research shows there are currently over 100 Learning Management Systems on the market (Mallon, 2010). Dahlstrom, de Boor, Grunwald and Vockley (2011) reported LMSs are near the top of the list of technologies students wish their instructors would use more often. Only email ranked higher. With the increase in distance learning courses offered among higher education institutions, education administrators are adopting Learning Management Systems (LMS) in increasing numbers (Vovides, Sanches-Alonso, Mitropoulou & Nickmans, 2007). LMSs are also referred to as Course Management Systems (CMS), Virtual Learning Environments (VLE), and sometimes Learning Content Management Systems (LCMS).

Moodle, an LMS offered and supported by the North Dakota University System (NDUS), is open-source and free to all eleven state-run higher education institutions in North Dakota. Moodle has many of the typical elements offered in similar systems including controlled access, course development and organizational tools along with communication and collaboration tools. Currently four NDUS institutions use Moodle as their primary LMS: Dickinson State University (DSU), Williston State College (WSC), Dakota College at Bottineau (DCB) and Mayville State University (MSU).

Moodle was created by Martin Dougiamas in Australia as part of his graduate degree process (Dougiamas, 2009). The first version of Moodle was introduced to the public on August 20th, 2002. From inception Dougiamas created Moodle with social constructionist pedagogy in mind (Dougiamas, 2007). Dougiamas (2011) referred to five guiding principles as he continued to develop Moodle:

1. All people are potential teachers as well as learners, and in a true collaborative environment they are both. Dougiamas designed Moodle to give more roles to students that allow them to guide learning. These roles can be controlled on a very granular basis. Dougiamas felt that more control over the course, allows students more flexibility to interact with other students and do things that were previously only done by instructors.

2. People learn particularly well from the act of creating or expressing something for others to see. To ensure this, Dougiamas created Moodle's wikis, forums, glossaries and databases to allow students to connect and share with other students.

3. People learn a lot by just observing the activity of their peers. To uphold this principle, Dougiamas added elements of Moodle called blocks, several of these blocks allow users to see who else is online, what others have done (such as uploading of assignments) and the ability to easily find other's work through tagging.

4. By understanding the contexts of others, we can teach in a more transformational way (constructivism). To encourage contextual understanding, Dougiamas has added user profiles so students can add information about themselves to be shared with other users. He also has included blogs for users to express themselves. Students and instructors can also track each other with various reporting features.

5. A learning environment needs to be flexible and adaptable, so that it can quickly respond to the needs of the participants within it. The very reason for open-source software is to allow others to adopt and/or adapt a program, and Moodle is built to offer varying degrees of adaptation. Instructors can add content with just a few clicks, and students can see grades in real time. Another advantage is that Moodle is customizable and can be changed easily without loss of content. (Dougiamas, 2011)

The activity tools within Moodle are an integral part of its social constructionist design. Constructivists want to develop courses that are student centered, student-directed, collaborative, and focus on cooperative learning. Karagiorgi and Symeou (2005) wrote that a key foundation of constructivism is to create an environment that supports communication and collaboration, so that students can learn from multiple perspectives by

comparing, developing, and understanding other students. Using communication and collaboration activities in the LMS allows for student centered learning, a very important part of the constructivist belief. Studies show that students generally find the LMS environment to be effective, but findings also indicate students need opportunities for collaboration, participation and interaction offered through the LMS (Papastergiou, 2006).

Instructor presence in online learning is also important. Papastergiou (2006) wrote that students perceiving greater instructor presence in their courses are more likely to have a sense of a learning community. In addition, online interactions contribute significantly to the development of students' thinking skills. Further, it is important that faculty develop student-centered approaches, foster a sense of community, provide a human touch, define expectations for participation, and maximize student interactions to keep students from feeling isolated. Shea, Li, and Pickett (2006) stated that students report having at least as much or more connectedness with their online courses as with traditional courses, but faculty often do not readily adopt more advanced tools that allow for constructivist approaches to learning.

The fact that LMS tools are available does not mean they are used properly, or should be used at all in the learning environment. Certain LMS programs lend themselves to an opt-in approach when it comes to their available tools. Blackboard Learn, for example, makes all of its tools available right from the start to all instructors, but in a different approach, Moodle uses an opt-in practice for incorporating tools. Instructors must choose from a drop-down list of activities, picking and choosing according to needs. Lane (2009) wrote that traditionally, Learning Management Systems have catered to an "instructivist" approach to learning, where teachers upload materials for students to read

and then use the built in testing tools to measure the learning. New tools, such as the Web 2.0 tools found in Moodle, provide the ability to design courses that can build constructivist learning.

Since Moodle's inception, companies have sought to make money from its popularity. One way companies have done this is to offer value by hosting Moodle and enhancing Moodle functionality. Blackboard, a provider of instructional technology programs, is one of these companies. In 2010, Blackboard bought two online communication companies that had created integrated communication tools for Moodle: Wimba and Elluminate. The North Dakota University System currently offers one of these tools to all eleven of its institutions, Wimba. Wimba is actually a suite of tools; Wimba Classroom, a web conferencing platform; Wimba Pronto, an instant messenger with audio, video and collaboration; and Voice Tools, which allows instructors to record audio that can be presented right within the LMS. The Wimba suite of tools, along with other integrated communication tools within Moodle, provide for synchronous and asynchronous communication in the LMS environment.

Moodle offers constructivist Web 2.0 tools that provide for both synchronous and asynchronous communication and learning. While synchronous communication is better used for interpersonal participation in distance learning, asynchronous communication provides students with an opportunity for cognitive reflection (Hratinski, 2008). According to Carmean and Haefner (2002), deeper learning should be social, active, contextual, engaging and student-owned. An LMS should provide the social tools that allow for synchronous or asynchronous interaction and the development of relationships among students. An LMS does not provide the pedagogy for a successful learning environment, so

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faculty must understand the LMS environment, know how the provided tools work, be aware of what LMS tools are offered, and utilize LMS tools for their intended pedagogical style.

Communication tools within Moodle are an integral part of its social constructivist design, especially since constructivists want to develop courses that are student centered, student-directed, collaborative, and focus on cooperative learning. A key foundation of constructivism is to create an environment that supports communication and collaboration, so that students can learn from multiple perspectives by comparing, developing and understanding other students (Karagiorgi & Symeou, 2005). This constructivist theory is exactly what Moodle was designed to accomplish, but it is the instructor's adoption of the LMS tools that ultimately make it happen.

<center>Instructor Barriers</center>

The information technology department at a major university can offer the most advanced online social and collaboration tools currently available, but that does not mean instructors will use them. Roughton, Martin, Warren, and Gritmon (2011), stated three reasons why faculty feel they would not want to use synchronous online tools for courses: (a) faculty feel that students prefer the flexibility of asynchronous courses so students can find time to study around their busy lives, (b) faculty feel they lack training with synchronous tools, and (c) faculty feel synchronous tools are not needed to teach the content.

While a person might expect different barriers based on whether instructors are early adopters or technically challenged, Butler and Sellbom (2002) found that barriers were largely considered to be the same no matter the adoption level. Faculty value the ease

and speed at which they can use the LMS rather than looking to adopt more tools they may, or may not need (Ioannou & Hannafin, 2008). Knutzen and Kennedy (2008) add that it is the more experienced teachers in online learning that utilize tools for communication. As instructors become more familiar with online learning, and as they start to use the tools to fit their teaching style, instructors seek more constructivist approaches that utilize the collaborative tools which encourage student-centered learning.

Chizmar and Williams (2001) identified three barriers to faculty adoption of online instructional technology: lack of institutional support, lack of financial support and most of all, lack of time to learn new technologies. Chizmar and Williams (2001) asserted six different expectations, or wants that faculty desire in teaching with technology: (a) instructional technology should be driven by pedagogical goals. (b) faculty would rather have Web based tools that fit a specific need rather than one Web technology that is designed to meet many of their needs, (c) faculty require technical experts to be available when the technology goes beyond their expertise, (d) faculty desire interaction with other peers that are working with the same technologies, (e) technical support and network services should be reliable and fast without frustrating faculty and students, (f) faculty would like to have monetary and intrinsic rewards for adopting and developing technology in their courses.

Ajjan and Hartshorne (2008) wrote that faculty's attitudes and perceived behavioral control are strong indicators of their intention to use Web 2.0 tools. Although faculty might feel using these tools provide strong pedagogical advantages and increase student satisfaction, few choose to actually use Web 2.0 social constructivist tools. This low usage

may be due to a faculty belief that it is their institution's responsibility to provide technology training (Georgina & Olson, 2008).

The number of students taking online-only courses continues to grow each year. New online tools for delivering educational opportunities are making distance education a high priority for higher education institutions. Probably the most important and "game changing" of these tools is the Learning Management System (LMS).

With the popularity and inclusion of the LMS at higher education institutions across the United States, it is important to understand how this new online software is being utilized to increase student learning. The advancement of Web 2.0 technologies and the eventual utilization of this software within the learning management environment allows for more socialization among users and gives instructors the chance to deliver a social constructivist style of teaching and learning. While some instructors have found new ways to utilize new social constructivist LMS tools through new methods of instructional design, many instructors find barriers to adoption.

CHAPTER 3. METHODLOGY

The focus of this chapter is to provide a nature of the study, and to describe the research design and methods used to carry out the study. This chapter presents the population along with the sampling technique, data collection procedures, and an explanation of the instruments used. The purpose for conducting this research was to find if instructors using the North Dakota University System Moodle (LMS) are utilizing social constructivist activity tools to improve learning in their online-only courses. Other Questions that guided this study are:

1. Are NDUS Moodle instructors using social constructivist tools in their online-only courses?

2. Which of the social constructivist Moodle tools are used most by instructors in their online-only courses?

3. Do NDUS Moodle instructors purposefully intend to incorporate a social constructivist style of learning in their online-only courses?

4. Which of the Moodle activities do instructors feel are most useful for incorporating social constructivist learning in their online-only courses?

5. Are NDUS Moodle instructors using tools found outside of the LMS to develop a social constructivist learning approach for their online-only courses?

Dougiamas (2007) created Moodle to help instructors design courses in an environment that encourages social constructivist learning. This research will begin by determining if social constructivist Moodle activities are being used by faculty in their online-only courses.

Review of Related Literature

The review of literature identified the growing importance of distance learning in the United States (Aud et al., 2011). Much of the literature in this paper was gathered from the *National Center for Education Statistics* (NCES), *Educause,* and *Moodle.org*. Journal articles were acquired mainly through the online library of North Dakota State University.

The LMS is becoming an increasingly popular tool, so Internet companies are seeking to create solutions that meet the challenges of delivering courses through distance learning (Dahlstrom, de Boor, Grunwald, & Vockley, 2011). Dougiamas (2011) used the idea of social constructivist learning as an underlying philosophy to building Moodle activities that utilize Web 2.0 technology. Sclater (2008) wrote that Web 2.0 technologies can provide ways of increased social presence in LMS courses. Although social constructivist activities are available in LMS programs like Moodle, faculty often find barriers to adoption (Roughton, Martin, Warren, & Gritmon, 2011). These barriers are due to lack of institutional support, lack of financial support, and lack of time to learn new technologies. (Chizmar and Williams, 2001)

Population and Sample

The sample for this study was drawn from instructors of two small colleges and two small universities of the North Dakota University System: Mayville State University (MSU), Dickinson State University (DSU), Dakota College at Bottineau (DCB), and Williston State College (WSC). All four of these institutions use NDUS Moodle as their primary LMS. There were 294 faculty members offering 841 courses, online-only or hybrid in delivery, over NDUS Moodle during spring 2012. The sample for this study included all

164 faculty members offering a total of 314 courses completely online. Since this study focused on online-only courses, NDUS faculty that taught hybrid or traditional courses only were omitted from the study.

Instrumentation

Data for this research was gathered using a survey instrument. To help ensure a representative sample, the survey was standardized for all participants. To ensure privacy, survey questions were unattributed and confidential. A pre-test of the survey was conducted to ensure content validity by looking at the relevance of the questions. The survey was tested with four representative content-expert faculty members from either a non-participating NDUS institution, or from faculty that were not part of the sample. To ensure the sample understood terms used within the survey, a list of definitions preceded the survey questions.

The survey assisted the researcher in his attempt to understand if Moodle social constructivist tools are being used, and if instructors intended to develop social constructivist learning among students. To do this, the survey instrument consisted of a series of questions designed to have faculty identify which Moodle activities they used within their online courses during the spring 2012 semester by checking a radial button next to a list of available Moodle activities. The following activities could be used in a social constructivist style of learning, and are available within an NDUS Moodle course: chat, forums (threaded discussions), blogs, wikis, Blackboard IM (also referred to as Wimba Pronto), Wimba Classroom, and Wimba voice threaded discussions. The survey also included activities that are normally used for a more cognitive style of learning; advanced uploading of files, online text, upload a single file, and offline activity. All eleven

of the available Moodle activities were listed on the survey. After identifying which activity tools the sample used, survey participants were asked to identify if they intended to have social constructivist learning in their course, and if so, which tools were used to encourage this type of learning. Instructors were also asked which of Moodle's activities they found most useful for incorporating a social constructivist style of learning. Instructors were then asked if they used educational online software tools found outside of Moodle to develop a social constructivist learning environment, and if so, a space was provided for instructors to identify which tools they used.

The survey collected demographic information about the respondents including their age and gender, which institution they work for, and how many semesters they have been using the Moodle LMS. Questions regarding how many years faculty have been teaching and whether they are employed full or part time provided further demographic insight. Identifying which institution faculty work allowed (a) a look at tendencies and comparisons between institutions, and (b) a look at how Moodle's activity tools usage varied between the two colleges (BSC and WSC) compared to the two Universities (DSU and MSU).

The survey was delivered over the Internet using Qualtrics survey software. The identified population was entered into the Qualtrics database and participants received an email with a link to take the survey. Survey results were organized and tabulated through the Qualtrics software. Qualitrics incorporates survey features called Display Logic and Skip Logic that allowed the survey to only offer relevant questions to the survey participants.

CHAPTER 4. RESULTS

With the advancement of computer mediated learning in distance education, higher education leaders need to understand which new ideas and advancements in learning technologies work best when combined with different theories of learning. The data collected from this research gives insight into how instructors teaching online-only courses from four North Dakota University System (NDUS) institutions utilized the NDUS offered Learning Management System (LMS), Moodle, in spring semester 2012. The purpose of this study was to find out if NDUS instructors purposefully intended to provide student learning using social constructivist methods during spring semester 2012.

A survey was sent by email to 164 NDUS faculty that taught online-only courses during spring semester 2012. All surveyed faculty were selected from four North Dakota University System (NDUS) institutions. These institutions and faculty were picked because they utilized the NDUS Moodle learning management system during spring 2012. Of the identified 164 faculty members who were invited to take the survey, 45 faculty members, or 27%, completed or partially completed the survey. Qualtrics, cloud-based survey software, was used to collect the data.

Respondent Demographics

As reported in Table 1, respondents were somewhat evenly spread between their identified age groups. The largest group was in the 50-59 year-old category with 13 respondents. The smallest group was under 30 years of age with four respondents.

Table 1

Respondent Age Groups

Age Range	Response	% Respondents
20-29	4	8.9
30-39	11	24.4
40-49	7	15.6
50-59	13	28.9
60+	9	20.0
No answer	1	2.2

As depicted in Table 2, female survey respondents greatly outnumbered male respondents. While the average number of years instructors reported teaching was 16.4, nearly all respondents had 10 or fewer years teaching online courses. While almost half the instructors had 11 or more years teaching, 40 of the 45 respondents indicated they had taught less than 11 years online.

Table 2

Years Teaching Compared to Years Teaching Online Courses by Gender

Years	Years teaching			Years teaching Online Courses		
	Male	Female	Total	Male	Female	Total
1-3	0	3	3	5	7	12
4-10	5	14	19	10	18	28
11-20	2	5	7	1	3	4
21+	9	7	16	0	0	0
No	0	0	0	0	1	1
Total	16	29	45	16	29	45

Table 3

Respondents by Institution

NDUS Institution	Responses	% of respondents
Williston State College	15	33
Dakota College at Bottineau	9	20
Dickinson State University	8	18
Mayville State University	13	29

When looking at respondents by institution, Table 3 shows that 36% of faculty that responded to the survey indicated they were from Williston State College (WSC), 30% from Mayville State University (MSU), 20% from Dakota College at Bottineau (DCB), and 18% from Dickinson State University (DSU). Some respondents indicated they were employed by more than one institution within the NDUS.

<div align="center">Research Questions</div>

Moodle incorporates a set of activity tools instructors can use within the design of their online course. Research question number one asked "Are NDUS Moodle instructors using social constructivist tools in their online-only courses?". Of the 45 respondents that took the survey, 100% reported that they used at least one activity tool found within Moodle.

Research question number two of this study asked "Which of the social constructivist Moodle tools are used most by instructors in their online-only courses?". As reported in Table 4, results showed the most often used tool was the threaded discussion boards, or *Forums*. Of the 45 faculty responding to this question, 84% reported having used *Forums* in their courses during spring 2012.

Other popular activity tools used by more than 50% of faculty were *Advanced uploading of files*, *Online text*, and *Upload a single file*. Moodle activity tools used least by instructors included mainly communication tools such as *Wimba Voice*, *Wimba Classroom*, *Wikis*, *Blogs*, and *Chat*. Respondents also reported using additional technology tools within Moodle including email, assessments, and animations.

Table 4

Activity Tools used in Moodle

Moodle activity tools	% of respondents	Number of respondents
Chat	13	6
Forums	84	38
Blogs	4	2
Wikis	9	4
Wimba Pronto	22	10
Wimba Classroom	7	3
Wimba Voice	2	1
Advanced uploading of files	71	32
Online text	53	24
Upload a single file	76	34
Offline activity	40	18
Other	16	7

Note. Activity tools listed are available in North Dakota University System Moodle.

Research question number three asked "Do NDUS Moodle instructors purposefully intend to incorporate a social constructivist style of learning in their online-only courses?". Table 5 illustrates that 33 (73.3%) of the 45 respondents to this question answered yes, and 12 (27.0%) respondents answered no.

Table 5

Faculty Intent to Incorporate Social Constructivist Learning in their Online Courses

Response	Male	Female	Total	% Responses
Yes	11	22	33	73.0
No	5	7	12	27.0
Total	16	29	45	100

Research question number four of this study asked "Which of the Moodle activities do instructors feel are most useful for incorporating social constructivist learning in their online-only courses?". Participants were asked to rate each of the Moodle activity tool's usefulness on a five-point Likert scale: not used, not useful, slightly useful, useful, or very useful. Table 6 details that for these respondents, the *Forum* activity tool had the most favorable response. Of the respondents, 83% of faculty rated *Forums* as either useful or very useful relative to incorporating social constructivist learning, with the remainder of the faculty rating it slightly useful. Of the instructors that indicated they had used the *Chat* and *Blog* tools to incorporate social constructivist learning, 100% found the tools to be at least useful to very useful. Of the nearly 33% of faculty that said they used the *Wiki* tool to incorporate social constructivist learning, responses were either slightly useful or useful with no faculty finding the *Wiki* tool to be very useful or not useful.

Table 6 also reports that *Wimba Pronto* had just over 57% of faculty indicate they did not use the tool at all to inspire social constructivist learning. Of the respondents that indicated they did use *Wimba Pronto* to incorporate social constructivist learning, a majority of the users found it to be at least slightly useful. *Wimba classroom* had just over 68% of faculty indicate they did not use the tool, but of those that did, most found the tool to be at least useful or very useful relative to incorporating social constructivist learning. *Wimba Voice* was the least used tool among all Moodle activity tools with only one instructor using the tool at all and the respondent rated the tool not useful to incorporate social constructivist learning.

Advanced upload of files was the second most used tool with only 16.67% of faculty indicating they did not use the tool at all. Of those that did, nearly 71% of faculty found the tool to be at least slightly useful or better relative to incorporating social constructivist learning. With the *Upload a single file* tool, about 54% of faculty found the tool to be at least slightly useful relative to incorporating social constructivist learning.

Although the *Offline activity* tool had nearly 43% of faculty indicate they did not use the tool, over 47% of the faculty rated the tool to be at least useful or very useful relative to incorporating social constructivist learning.

Hodges and Repman (2011) wrote that learning management systems (LMS) do not always meet pedagogical objectives and sometimes faculty need to use instructional activities not contained within the LMS. Research question number five of this study asked "Are NDUS Moodle instructors using tools found outside of the LMS to develop a social constructivist learning approach for their online-only courses?". To answer the research

question, the survey first identified which instructors were using instructional tools outside of Moodle by asking the question: "Did you use online educational software outside of Moodle?". Results as indicated in Table 7 reported that 16 of the 45 total respondents said yes.

Of the 16 responding faculty that indicated they had utilized instructional activity tools located outside of the NDUS Moodle LMS, Table 8 indicates 75% of faculty responded they did not use these online educational tools to incorporate a social constructivist style of learning. Online instructional tools respondents indicated that they used outside of NDUS Moodle were a) Panopto, a course capture tool; b) Google documents, a free website for sharing and collaborating documents; c) Youtube, a video sharing site; d) Prezi, a cloud-based presentation software; and e) KHAN Academy tutorials and videos, similar to Youtube but with an educational focus.

Table 6

Usefulness of Moodle Activity Tools to Incorporate Social Constructivist Learning by

Percentage

Activity tool	Not used	Not useful	Slightly useful	Useful	Very useful	Responses
Chat	72.7	0.0	0.00	18.2	9.1	22
Forums	0.0	0.0	16.7	36.7	46.7	30
Blogs	81.8	0.0	0.00	13.6	4.6	22
Wikis	77.3	0.0	13.6	9.1	0.0	22
Wimba Pronto	57.1	4.8	14.3	14.3	9.5	21
Wimba Classroom	68.2	4.6	4.6	18.9	4.6	22
Wimba Voice	95.0	5.0	0.00	0.0	0.0	20
Advanced uploading of files	16.7	12.5	25.0	25.0	20.8	24
Online text	36.4	13.6	22.7	9.1	18.9	22
Upload a single file	20.8	25.0	20.8	20.8	12.5	24
Offline activity	42.9	4.8	4.8	28.6	19.1	21

Note. Activity tools listed are available in North Dakota University System Moodle.

Table 7

Instructor Use of Online Educational Software Outside of Moodle

Response	Respondents	% of Respondents
Yes	16	36.0
No	29	64.0
Total	45	100

Table 8

Use of Educational Software Outside of Moodle to Incorporate Constructivist Leaning

Response	No. Responses	% of respondents
Yes	4	25
No	12	75
Total	16	100

Additional Findings

Additional survey questions provided responses that added further insight to this research. Responses to research question number three of this research identified that 33

respondents (73%) purposefully intend to incorporate a social constructivist style of learning in their online-only courses. An additional question was asked of these 33 faculty: "Given the definition of social constructivist learning … did you purposefully intend to incorporate a social constructivist learning approach in your course(s) using Moodle activity tools?". Table 9 illustrates that of the 33 faculty reporting they purposefully intended to incorporate social constructivist learning in their courses, 29 said they used NDUS Moodle activity tools to do so, three said they did not use Moodle to do so, and one faculty member abstained from answering.

Table 9

Faculty Intent to Incorporate Social Constructivist Learning using NDUS Moodle

Response	Male	Female	Total
Yes	10	19	29
No	1	2	3
No Answer			1
Total	11	21	33

In addition, another question was asked of the 29 respondents reporting they purposefully intended to incorporate social constructivist learning and used Moodle to do so: "Which of the following Moodle activity tools did you use in order to inspire social constructivist learning?" Table 10 indicates that 97% of those faculty used the *Forum* tool

to inspire social constructivist learning. Other top responses included Moodle activity tools usually found in gathering student assignments that are uploaded to Moodle. Of the respondents, 30% or more said they used *Advanced uploading of files*, *Upload a single file*, and *Offline activity*. Table 10 also indicates tools used least to inspire social constructivist learning were *Chat*, *Blog*, *Wikis*, *Wimba Pronto* and *Wimba Classroom* were reported as being least used. *Wimba Voice* was not indicated as being used by any of the respondents.

In order to provide further insight as to why instructors use certain activity tools over others within Moodle, faculty were asked which of the activity tools they had received either formal or informal training. Knutzen and Kennedy (2008) wrote that as instructors become more familiar with online learning, and as they start to use the tools to fit their teaching style, faculty seek more constructivist approaches and will be more likely to utilize collaborative tools that encourage student-centered learning. Georgina and Olsen (2008) wrote that a low usage of these tools could be in part a belief by faculty that it is the institution's responsibility to provide faculty training.

Within the survey, respondents were asked: "Have you received either formal or informal training from your institution regarding any of the Moodle activity tools listed below?". Table 11 illustrates that of the 44 faculty responding to this question, 64% reported having received training on *Forums*, 61% had previously trained on the *Upload a single file* tool, 59% received training on *Advanced uploading of files*, and 55% were trained to use *Wimba Classroom*. Activity tools that faculty reported having the least amount of training were *Wimba Pronto*, *Wikis*, and *Wimba voice*. Only 14% of respondents indicated having received training on *Blogs*, and 18% of respondents had not received training on any of the Moodle activity tools listed.

Table 10

Moodle Activity Tools Used to Inspire Social Constructivist Learning

Moodle activity tool	% of respondents	No. of respondents
Chat	17	5
Forums	97	29
Blogs	7	2
Wikis	7	2
Wimba Pronto	13	4
Wimba Classroom	10	3
Wimba Voice	0	0
Advanced uploading of files	33	10
Online text	17	5
Upload a single file	30	9
Offline activity	30	9

Note. Moodle tools listed are from North Dakota University System Moodle.

As displayed in Table 12, data extracted from the survey when looking at gender indicated that 76% of women indicated they had purposefully incorporate social constructivist learning in their online courses compared to 69% of men. Of the tools used

within Moodle to incorporate social constructivist learning, both men and woman preferred the *Forum* activity tool with 100% of woman using the tool and 90% of men. When asked if instructors used online instructional tools found outside of Moodle, 38% of woman said they had compared to 31% of men.

Other interesting data can be found in comparing results by institution. Of the 44 respondents that indicated whether or not they purposefully intended to incorporate a social constructivist learning approach in their online only courses, Table 13 indicates that faculty from three of the four institutions mainly answered yes. However, responses from Dakota College at Bottineau indicated only a one-person margin in responses. Results as indicated in Table 14 also revealed that while faculty generally did not use online instructional tools outside of Moodle, Dakota College at Bottineau had nearly 56% of faculty respond that they had used outside instructional tools.

Summary

Data shows that all surveyed faculty used at least one Moodle activity tool during the spring 2012 semester. Most respondents intended to provide a social constructivist style of learning in their courses and used NDUS Moodle to do so. The most preferred Moodle activity tool to accomplish social constructivist learning, was the *Forum*. Faculty were more likely to use activity tools found within Moodle than online instructional tools located outside of Moodle. Woman were more likely to incorporate social constructivist learning than men, and the most widely used activity tool, *Forums*, was the activity tool where faculty had received the most amount of training.

Table 11

Faculty Training of Moodle Activity Tools

Activity tool	Received training	% Receiving training
Chat	14	32
Forums	28	64
Blogs	6	14
Wikis	9	20
Wimba Pronto	15	34
Wimba Classroom	24	55
Wimba Voice	10	23
Advanced uploading of files	26	59
Online text	17	39
Upload a single file	27	61
Offline activity	13	30
No training	8	18

Note. Activity tools listed are available in North Dakota University System Moodle.

Table 12

Differences in Gender Responses

Responses	% Male	% Female
Incorporated social constructivist learning	69	76
Preferred Moodle activity tool (*Forum*)	90	100
Used instructional tools found outside of Moodle	31	38

Table 13

Intent to Incorporate a Social Constructivist Style of Learning

Response	Williston State College	Dakota College at Bottineau	Dickinson State University	Mayville State University
Yes	13	5	6	10
No	3	4	2	3

Table 14

Percent of Faculty use of Instructional Tools Found Outside of Moodle by Institution

Response	Williston State College	Dakota College at Bottineau	Dickinson State University	Mayville State University
Yes	31	56	25	31
No	69	44	75	69

CHAPTER 5. CONCLUSION

The purpose of this study was to find out if North Dakota University System (NDUS) instructors that used Moodle during spring of 2012 purposely intended to provide social constructivist learning in their online-only courses. The study also looked at whether instructors intended to utilize social constructivist Moodle activities to allow for social constructivist learning. This study gave insight as to which activities were most widely used by instructors and provided demographics of instructors using Moodle activities. This survey study also explored if instructors utilized alternate instructional tools outside of the Moodle learning management System (LMS) and indicated whether instructors intended to use these alternate tools to support social constructivist learning.

Research Questions

In 2008, the NDUS started to support the Moodle LMS for four of the eleven higher education institutions within North Dakota: Dickinson State University, Mayville State University, Williston State College, and Dakota College at Bottineau. Utilizing a survey, this study answered the following questions regarding instructor use of Moodle for online-only courses:

1. Are NDUS Moodle instructors using social constructivist tools in their online-only courses?

2. Which of the social constructivist Moodle tools are used most by instructors in their online-only courses?

3. Do NDUS Moodle instructors purposefully intend to incorporate a social constructivist style of learning in their online-only courses?

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4. Which of the Moodle activities do instructors feel are most useful for incorporating social constructivist learning in their online-only courses?

5. Are NDUS Moodle instructors using tools found outside of the LMS to develop a social constructivist learning approach for their online-only courses?

Major Findings

Results from the survey showed that 100% of faculty respondents were using Moodle and had utilized at least one activity tool during spring 2012. Most faculty intended to utilize a social constructivist style of learning and a majority of the faculty preferred Moodle to do so, rather than online learning tools found outside of Moodle. Woman more likely intended to utilize social constructivist learning than men, and the tool for which faculty had received the most training, *Forums*, was also the most widely used Moodle activity tool, as well as, the most widely used tool for incorporating social constructivist learning.

Discussion

Research question number one of this study asked "Are NDUS Moodle instructors using social constructivist tools in their online-only courses?" While results showed that all respondents had indeed utilized at least one activity tool, this could be in part due to institutional guidelines. Dickinson State University for instance requires that faculty teaching online-only courses must have a syllabus displayed within Moodle for all online courses. Mayville State University has the same guideline, but adds that instructors must also have interactivity within their online courses and meet a set of rubric guidelines for all

online-only courses. The other two institutions, Williston State College and Dakota College at Bottineau, have similar policies.

Such institutional guidelines show commitment from the institutions to utilize a learning management system, and data from this research showed faculty are responding to institutional guidelines by utilizing Moodle. However, beyond having the basic commitment, the complexity of the utilization within the courses was not measured in this study and would be a good topic for future research.

The second research question of this study asked "Which of the social constructivist Moodle tools are used most by instructors in their online-only courses?" As indicated in Table 4, 84% of faculty reported that they utilized the *Forum* activity tool in their online course. While the *Forum* activity tool was the most widely used tool, the next four highest percentages were all very similar activities that centered on student assignments: *Advanced uploading of files*, *Online text*, *Upload a single file*, and *Offline activity*. So similar are these assignments, a newer version of Moodle set to be released to NDUS institutions summer of 2013 combines all four of these activities into one single activity tool simply called Assignments.

It was interesting to note that Moodle activity tools which provided communication among students, such as Blogs, Wikis, and *Wimba Classroom* were each used by less than 10% of respondents. *Wimba Classroom* was utilized by only seven-percent of the respondents, yet this software tool is designed specifically to encourage communication and collaboration among faculty and students. One explanation might be that *Wimba Classroom* is a synchronous web conferencing tool and may not meet faculty preferences

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or specific institutional guidelines that online-only courses be asynchronous throughout each semester. A similar tool to *Wimba Classroom* is *Wimba Pronto* in that each tool promotes the use of synchronous communication. Even though they are similar, *Wimba Pronto* had 22% of respondents indicate they had used it within their courses compared to just 7% for *Wimba Classroom*. This could be because while *Wimba Pronto* is synchronous, it also allows users to choose their availability through a presence indicator, and does not require students and faculty to be present at any specific scheduled time.

The third research question of this study asked "Do NDUS Moodle instructors purposefully intend to incorporate a social constructivist style of learning in their online-only courses?" As indicated in Table 5, 73% of faculty said they did intend to incorporate a social constructivist style of learning. While most faculty did intend to have social constructivist learning, 27% indicated they did not. Interpreting these numbers would indicate a social constructivist style of learning is important to most faculty; however, there are still a notable amount of faculty that do not feel a need to incorporate social constructivist learning in their courses. This could be due to instructional style, or the instructor may have felt the content of the course did not lend to this type of instruction. Instructor barriers to the adoption of social constructivist tools found within Moodle could also keep an instructor from utilizing a social constructivist style of learning. A further study could be done to investigate why faculty do, or do not, think a social constructivist style of learning is appropriate within their online-only Moodle courses.

Research question number four of this study asked "Which of the Moodle activities do instructors feel are most useful for incorporating social constructivist learning in their online-only courses?" Results in Table 6 indicated that nearly 47% of faculty respondents

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believed the *Forum* activity tool to be *Very useful*. This correlated with being the most widely used Moodle activity tool by faculty. Other tools indicated as being *Very useful* were the four assignment tools also indicated as being most used by instructors: *Advanced uploading of files*, *Online text*, *Upload a single file*, and *Offline activity*. However, when you look at the full range of answers from instructors that indicated they used each tool, *Not useful* to *Very useful*, three of the four assignment tools were fairly evenly distributed along the Likert scale: *Advanced uploading of files*, *Online text*, and *Upload a single file*. While *Upload a single file* scored high compared to other tools as being *Very useful*, it also scored high compared to other tools as being *Not useful*. When looking at tools that were not indicated as being used much by faculty, such as *Chat*, *Blogs*, *Wikis* and *Wimba Classroom*. Faculty scored these tools as being mainly *Useful* or *Very useful*. So, while faculty did not use *Chat*, *Blogs*, *Wikis*, and *Wimba Classroom* as much, the ones that did found they were useful in incorporating a social constructivist style of learning. Those respondents that used three of the four assignment activity tools: *Advanced uploading of files*, *Online text*, and *Upload a single file*, were fairly split when indicating their usefulness in incorporating a social constructivist style of learning.

Research question number five of this study asked "Are NDUS Moodle instructors using tools found outside of the LMS to develop a social constructivist learning approach for their online-only courses?" Responses indicated in Table 7 that a majority of faculty did not utilize instructional tools outside of Moodle. This could be due to a reluctance to use tools not supported by their institution, barriers to adoption such as lack of time and training, or a fear of breaking student privacy laws. Further investigation as depicted in Table 8 indicated of those faculty that did choose to use instructional tools found outside of

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Moodle, most did not use the instructional tools to incorporate social constructivist learning.

During the survey, respondents were invited to list which instructional tools they used outside of Moodle. Results included Youtube, KHAN academy tutorials, Prezi, and Panopto, all of which are designed for students to observe presentations but have little or no collaboration or communication elements. This lack of communication and collaboration elements leaves the researcher to believe instructors that wished to incorporate social constructivist learning in their courses intended to utilize Moodle activity tools as their primary way of achieving this style of learning.

Additional Discussion

Another question asked among faculty that purposefully intended to incorporate social constructivist learning was whether they specifically intended to use Moodle to do so. The question was asked: "Given the definition of social constructivist learning … did you purposefully intend to incorporate a social constructivist learning approach in your course(s) using Moodle activity tools?" Faculty responses as listed in Table 9 indicated a majority of faculty, 29 of the 33 respondents, did intend to use Moodle activity tools to incorporate a social constructivist style of learning. Given the low usage by respondents of instructional tools found outside of Moodle to incorporate social constructivist learning as found in Table 8, these numbers help to verify that faculty did intend to use Moodle as their primary choice for incorporating social constructivist learning in their online-only courses. This could be due to Moodle training opportunities that gave faculty more familiarity with the social constructivist tools found within Moodle.

Since most respondents indicated they intended to utilize social constructivist learning, and since most faculty also indicated they utilized Moodle to do so, respondents were asked "Which of the following Moodle activity tools did you use in order to inspire social constructivist learning?", as indicated in Table 10. Results mirrored an earlier survey question regarding which tools they used the most in Moodle as indicated in Table 4. The *Forum* activity tool was the top choice with 97% of responding faculty, and the four assignment activities: *Advanced uploading of files*, *Online text*, *upload a single file*, and *Offline activity*, all had about 30% of the respondents say they used the tools for inspiring social constructivist learning. However, there were slight increases in *Wimba Classroom* and the Moodle *Chat* tool when comparing results from Table 10 and Table 4. *Wimba Pronto* declined in responses. This could be in part because some faculty might use *Wimba Pronto* as simply a way to communicate with peers. *Wikis* and *Blogs* also had similar numbers of responses to the earlier statistics in Table 4.

This research firmly shows that within NDUS Moodle, the *Forum* activity tool is the most widely used tool for inspiring social constructivist learning. *Forums* are designed for student interaction and can be easily added to courses. They foster communication which is an important aspect of social constructivist learning. However, when looking at the other top choices found in Table 10, the assignment tools: *Upload a Single file*, *Online text*, and *Advanced uploading of files*, these Moodle tools provide less opportunity for student interaction in that students do not communicate or collaborate through the tool. Additional research would shed light as to how faculty used these assignment tools to incorporate social constructivist learning. Another top scoring tool for inspiring social constructivist learning in Table 10 is the *Offline activity* which could be any sort of

instructional activity used by faculty that resulted in a grade, either online or not.

Additional research could be done to find out what types of Offline activities instructors are

using to inspire social constructivist learning when utilizing Moodle for their online-only

courses. These types of Offline activities might include social interaction for writing a

paper, or for preparing a group presentation.

When selecting tools found within Moodle to incorporate social constructivist

learning, faculty also used the tools for which they received the most training. As depicted

in Table 11, faculty had received training on the *Forum* activity tool more than any other

tool. *Advanced uploading of files* and *Upload a single file*, two of the assignment tools, also

received a high percentage of training from faculty. However, even though *Wimba*

Classroom was not a widely used tool, and was not one of the Moodle tools faculty used

most to incorporate social constructivist learning, it tallied a high percentage of faculty who

had received training. This could be due in part to the tools higher complexity, along with

institutional requirements that do not allow for synchronous elements within online-only

courses.

Other tools such as Blogs, Wikis, and *Wimba Voice* all had low percentages of

faculty who had received training and were also not widely used. In general, the training

faculty received on each Moodle tool as indicated in Table 11 mirrored that of the tools that

faculty indicated they used the most in Table 4, with the exception of *Wimba Classroom*

since it was not widely used despite faculty having received training. One explanation for

this might be that there were more opportunities for *Wimba Classroom* training since this

Moodle tool has additional North Dakota University System training offerings along with

the training each institution provides. While most Moodle training events would include all

of the activity tools found in Moodle, the *Wimba Classroom* activity tool is often its own training event due to its complexity. This may have resulted in more faculty training exposure to *Wimba Classroom* than would normally be provided by each institution.

When comparing gender responses from the survey, there appears to be a higher percentage of women indicating they would incorporate social constructivist learning than men. Women were more likely to use the *Forum* activity tool, and also more likely to use instructional tools found outside of Moodle. These differences may be explained by exploring gender difference in instructional styles. Laird, Garver, and Niskode (2007) wrote that women spend less time lecturing and more time on active classroom practices and incorporate more interactivity in their courses. More research could be done to investigate whether this translates to online-only courses.

Throughout the research, the NDUS instructors from the four institutions utilizing Moodle spring of 2012 indicated that they intended to incorporate social constructivist learning into their courses. The highest utilized activity tool in Moodle, *Forums*, was also the most utilized activity tool for incorporating social constructivist learning and was the tool instructors had received the most training. Discussion forums are generally a way for instructors to allow students to communicate. However, beyond the *Forum* activity tool, other widely used activity tools were not designed in general for student interaction, but rather for handing in assignments. Meanwhile, Moodle activity tools designed around student interaction, communication, and collaboration were used less frequently by faculty. So while instructors did intend to incorporate social constructivist learning, it appears they focused mainly on the *Forum* activity tool to accomplish their objectives.

Recommendations for Future Research

While this research gives insights as to the intent of faculty to use specific Moodle activity tools along with intent to utilize social constructivist learning, further studies are warranted to explore more specifically how faculty are using NDUS Moodle activity tools within their courses. Also, research could be conducted to explain how faculty specifically intend to use different activity tools to create social constructivist learning within their online course. When examining the low usage of *Wimba Classroom, Wikis*, and *Blogs*, as indicated in this research, it would be interesting to research the barriers that keep instructors from utilizing these Moodle activity tools.

Limitations of the Study

This study was intended to give insights as to how NDUS Moodle is used by instructors teaching online-only courses at Williston State College, Dakota College at Bottineau, Mayville State University, and Dickinson State University. However, the study did not provide insight as to how NDUS Moodle is being used for courses that are traditional in the sense that students and instructors meet face-to-face, yet still utilize Moodle. An assumption was made that instructors using Moodle should or want to be utilizing a social constructivist style of learning. This study was not meant to assess the efficacy of Moodle, or social constructivist Moodle tools, but only give a description of the use of Moodle.

Final Conclusions

This study identified that NDUS instructors from Williston State College, Dakota College at Bottineau, Mayville State University, and Dickinson State University are

utilizing Moodle for their courses. Most of the instructors intended to utilize a social constructivist learning style in their courses, and also intended to use Moodle to do so. The question remains, how deeply do faculty actually intend to adopt a social constructivist style of learning into their courses?

While most instructors report an element of social constructivist learning within their course by utilizing the Forum tool, is the utilization of this one tool enough student and faculty interaction to say they truly incorporated social constructivist learning? Certainly this depends on how the tool is being used and its effectiveness in the specific activity. More information is needed on how Moodle tools are designed and used within online-only courses.

Moodle provides plenty of opportunity for synchronous communication and collaboration, especially with web conferencing tools such as Wimba Classroom (recently renamed Blackboard Collaborate Web Conferencing) and Blackboard IM, yet these synchronous and more complex tools were used less by instructors even though they tend to offer greater opportunity for social constructivist learning. This could be in part to institutional guidelines barring synchronous activities, or a host of instructor barriers, including the time it takes to include and adopt more complexity within online-only courses. Online-only courses and the use of Learning Management Systems as a way to deliver online-only courses, continues to change, develop, and mature. Instructors will also need to continue to change, develop, and mature their methods of online instruction, including the use of social constructivist learning to help students communicate and collaborate in the online world.

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APPENDIX

Survey

Thank you for taking this survey, it should only take a few minutes to complete. You are receiving this survey because you have been identified as an instructor that utilized the NDUS Moodle Learning Management System for the spring 2012 semester.
First, let's start by reviewing a few terms:

NDUS Moodle: The Learning Management System located at: http://lms.ndus.edu/, and used mainly by Dakota College at Bottineau, Williston State College, Mayville State University and Dickinson State University.

Social Constructivist Learning: A belief that learning builds on itself, is a result of a collection of prior experiences, and students can learn even better by sharing their experiences. Students will inevitably learn differently according to their life experiences. Social Constructivists believe that learning is a social and collaborative activity on which an individual learns through his or her involvement with other people. Social Constructivists believe that people can obtain knowledge they normally would not be able to understand through engaging with other people. (Vygotsky, 1978)

Now, please answer the following questions:

Q1: NDUS Moodle has a series of available social constructivist activity tools for online learning. Please identify which of the following Moodle tools you used in your online course(s) during the spring 2012 semester. (check all that apply)

☐ Chat

☐ Forums (Threaded discussion boards)

☐ Blogs

☐ Wikis

☐ Blackboard IM (Pronto)

☐ Wimba Classroom

☐ None of the above listed activity tools

☐ Wimba voice (Threaded voice discussion board)

☐ Advanced uploading of files

☐ Online text

☐ Upload a single file

☐ Offline activity

☐ Please list other activity tools you used
_____

Q2: Have you received either formal or informal training from your institution regarding any of the Moodle activity tools listed below? (If yes, check all that apply)

- ☐ Chat
- ☐ Forums (Threaded discussion boards)
- ☐ Blogs
- ☐ Wikis
- ☐ Blackboard IM (Pronto)
- ☐ Wimba Classroom
- ☐ I have not received activity tool training

- ☐ Wimba voice (Threaded voice discussion board)
- ☐ Advanced uploading of files
- ☐ Online text
- ☐ Upload a single file
- ☐ Offline activity
- ☐

Q3: Given the definition of social constructivist learning detailed at the beginning of this survey, during spring 2012, did you purposefully intend to incorporate a social constructivist learning approach in your course(s)? This approach may include encouraging student-to-student communication, collaboration, or social interaction.

○ Yes

○ No

Q4: Given the definition of social constructivist learning detailed at the beginning of this survey, during Spring 2012 semester, did you purposefully intend to incorporate a social constructivist learning approach in your course(s) using Moodle activity tools?

○ Yes

○ No

*(If answered no, then respondent skips ahead to this question: Did you use educational online software outside of Moodle?)

Q5: Which of the following Moodle activity tools did you use in order to inspire social constructivist learning? This approach may include encouraging student-to-student communication, collaboration, or social interaction? (check all that apply)

☐ Chat

☐ Forums (Threaded discussion boards)

☐ Blogs

☐ Wikis

☐ Blackboard IM (Pronto)

☐ Wimba Classroom

☐ Wimba voice (Threaded discussion board)

☐ Advanced uploading of files

☐ Online text

☐ Upload a single file

☐ Offline activity

☐ Please list other activity tools you used to inspire social constructivist learning

Q6: How useful were the following activities in helping students learn using a social constructivist style? This approach may include encouraging student-to-student communication, collaboration, or social interaction? (check all that apply)

	Not used	Not useful	Slightly useful	Useful	Very useful
Chat	○	○	○	○	○
Forums (Threaded discussion boards)	○	○	○	○	○
Blog	○	○	○	○	○
Wikis	○	○	○	○	○
Blackboard IM	○	○	○	○	○
Wimba Classroom	○	○	○	○	○
Wimba Voice (Threaded discussion)	○	○	○	○	○
Advanced uploading of files	○	○	○	○	○
Online text	○	○	○	○	○
Upload a single file	○	○	○	○	○
Offline activity	○	○	○	○	○

Q7: Did you use educational online software outside of Moodle?

◉ Yes

○ No

*(If answered no, then respondent is skips ahead to: What is your gender?)

66

Q8: Did you use educational online software outside of Moodle with the purposeful intent to incorporate social constructivist learning in your Spring 2012 course(s)?

○ Yes

◉ No

*(If answered no, then respondent skips next question.)

Q9: Please list the educational online software you used outside of Moodle to inspire social constructivist learning . (Please separate by comma if there is more than one.)

[   ]

Q10: What is your gender?

○ Male

○ Female

Q11: What is your age? [   ]

Q12: How many years have you been teaching? [   ]

Q13: How Many years have you been teaching online?

◉ 1 – 3 years

○ 4– 10 years

○ 11 – 20 years

○ 21 + years

Q14: Which institution were you employed at during the Spring 2012 semester?

- ● Williston State College

- ○ Dakota College at Bottineau

- ○ Dickinson State University

- ○ Mayville State University

UNDERSTANDING THE USE OF SOCIAL CONSTRUCTIVIST MOODLE
ACTIVITIES WITHIN THE NORTH DAKOTA UNIVERSITY SYSTEM

Dear NDUS Moodle online instructor,

My name is Randy Wald. I am a graduate student in the Department of Education at North Dakota State University, and I am conducting a research project to get a better understanding of how NDUS online instructors are using Moodle within the North Dakota University System. More specifically, I am hoping to understand if instructors are encouraging communication, collaboration, and social interaction within their Moodle courses.

You are included in this survey because you are a North Dakota University System instructor that taught an online-only course during spring 2012, using the North Dakota University System Moodle. Your participation is entirely voluntary, and you may change your mind or quit participating at any time, with no penalty; however, your assistance would be greatly appreciated in making this a meaningful study. If you decide to complete this survey, you may want to print off this screen and keep it for your information.

In the survey, I will give a couple of definitions of key terms. You will be able to refer to these definitions as I ask a series of questions about how you used Moodle during spring, 2012. I will end the survey with a few demographic questions.

We will keep private all research records that identify you. Your information will be combined with information from other instructors taking part in the study, and I will write about the combined information I have gathered. You will not be identified in these written materials. We may publish the results of the study; however, we will keep your name and other identifying information private.

If you have any questions about this project, please contact me at *701-231-6223, randy.wald@ndus.edu o*r contact my advisor, Thomas Hall, Ed.D. at (701) 231-8589, thomas.e.hall@ndsu.edu. If you have questions about the rights of human participants in research, or to report a problem, contact the NDSU Institutional Review Board (IRB) Office, at (701) 231.8908, or ndsu.irb@ndsu.edu.

The survey should take less than 10 minutes to complete the questionnaire about your use of Moodle, and the survey will be open until July 2nd, 2012. To complete the survey, please click on the link at the bottom of the page. Thank you for your participation in this study. If you wish to receive a copy of the research results, please email me at *randy.wald@ndus.edu*, or call me at *701-231-6223*.

Sincerely,
Randy Wald

I just wanted to send out a little reminder to help out a poor struggling graduate student. Please take this short survey if you haven't already. It's should only take about 4 minutes to complete.

Thanks!

Randy Wald

NDSU   North Dakota State University
                    School of Education
                    NDSU Dept. 2625
                    PO Box 6050
                    Fargo, ND 58108-6050
                    701.231.7921

UNDERSTANDING THE USE OF SOCIAL CONSTRUCTIVIST MOODLE ACTIVITIES WITHIN THE NORTH DAKOTA UNIVERSITY SYSTEM

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We will keep private all research records that identify you. Your information will be combined with information from other instructors taking part in the study, and I will write about the combined information I have gathered. You will not be identified in these written materials. We may publish the results of the study; however, we will keep your name and other identifying information private.

If you have any questions about this project, please contact me at *701-231-6223,*

*randy.wald@ndus.edu o*r contact my advisor, Thomas Hall, Ed.D. at (701) 231-8589, thomas.e.hall@ndsu.edu. If you have questions about the rights of human participants in research, or to report a problem, contact the NDSU Institutional Review Board (IRB) Office, at (701) 231.8908, or ndsu.irb@ndsu.edu.

The survey should take less than 10 minutes to complete the questionnaire about your use of Moodle, and the survey will be open until July 23rd, 2012*.* To complete the survey, please click on the link at the bottom of the page. Thank you for your participation in this study. If you wish to receive a copy of the research results, please email me at *randy.wald@ndus.edu*, or call me at *701-231-6223*.

Sincerely,
Randy Wald

Follow this link to the Survey:
${l://SurveyLink?d=Take the Survey}

Or copy and paste the URL below into your internet browser:
${l://SurveyURL}

Follow the link to opt out of future emails:
${l://OptOutLink?d=Click here to unsubscribe}

IRB Approval Letter

NDSU

NORTH DAKOTA STATE UNIVERSITY

701.231.8995
Fax 701.231.8098

Institutional Review Board

Office of the Vice President for Research, Creative Activities and Technology Transfer
NDSU Dept. 4000
1735 NDSU Research Park Drive
Research 1, P.O. Box 6050
Fargo, ND 58108-6050

Federalwide Assurance #FWA00002439

Monday, June 25, 2012

Dr. Thomas Hall
School of Education
FLC 210B

Re: IRB Certification of Human Research Project:

**"UNDERSTANDING THE USE OF SOCIAL CONSTUCTIVIST MOODLE ACTIVITIES
WITHIN THE NORTH DAKOTA UNIVERSITY SYSTEM"**
        Protocol #HE12226

Co-investigator(s) and research team: **Randy Wald**

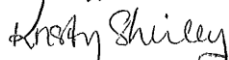Study site(s): **varied**   Funding: **n/a**

It has been determined that this human subjects research project qualifies for exempt status (category #
1/2) in accordance with federal regulations (Code of Federal Regulations, Title 45, Part 46, *Protection of
Human Subjects*). This determination is based on the protocol form received 6/5/2012 and
consent/information sheet received 6/25/2012.

Please also note the following:

- This determination of exemption expires 3 years from this date. If you wish to continue the
  research after 6/24/2015, the IRB must re-certify the protocol prior to this date.
- The project must be conducted as described in the approved protocol. If you wish to make
  changes, pre-approval is to be obtained from the IRB, unless the changes are necessary to
  eliminate an apparent immediate hazard to subjects. A *Protocol Amendment Request Form* is
  available on the IRB website.
- Prompt, written notification must be made to the IRB of any adverse events, complaints, or
  unanticipated problems involving risks to subjects or others related to this project.
- Any significant new findings that may affect the risks and benefits to participation will be reported
  in writing to the participants and the IRB.
- Research records may be subject to a random or directed audit at any time to verify compliance
  with IRB policies.

Thank you for complying with NDSU IRB procedures; best wishes for success with your project.

Sincerely,

Kristy Shirley

Kristy Shirley, CIP, Research Compliance Administrator