**Lourdes College**

Cagayan de Oro City, 9000

**Effects of Web-Based Application vs. Traditional Instruction   
on Students’ Learning**

A RESEARCH PAPER (chapter 1 and 3) SUBMIITED TO

MR. SALVADOR C. DELA PEÑA, Ph.D.

IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR

EDUCATION 102a RESEARCH METHODOLOGY

BY

ELBERT T. MAESTRE

OCTOBER 24, 2015

**Abstract**

This quasi-experimental study is design to compare the effects of web-based application vs. traditional instruction on students’ learning in two different sections (online vs. traditional section) of the students in St. Mary’s Academy. The experimental group involved 83 students who will receive online instruction on Edmodo.com; the control group that involves 82students who will receive traditional instruction.

**Introduction**

Distance education has grown fast in recent years. In the 2005-2006 academic year, 56% of all 2-year and 4-year institutions in the United States offered distance education courses for various learners. In addition, 12% of all institutions planned to offer distance education courses in the next 3 years (Waits & Lewis, 2003). Currently, online instruction is a primary method for distance education. With online instruction, the student is separated from the teacher and connected through the use of a computer and the Internet. More and more institutions are offering online courses and/or programs to their students in order to meet various learners’ needs. Online learning and instruction, as an integral part of the teaching and learning process, is growing as fast as the technology itself. On the other hand, traditional classroom instruction is face-to-face instruction, typically conducted in a classroom setting in a lecture/discussion/note taking mode.

Recent research has indicated that online education has positively influenced many aspects of education both directly and indirectly (CEO Forum, 2003). Until recently, the viability of online learning was not proven. On one hand, Clark (2000) maintained that media do not influence learning in any condition. On the other hand, Kozma (2003) debated that educational technologies influence learning by interacting with an individual’s cognitive and social processes in constructing knowledge. These debates are still relevant since newly emerging technologies respond to the earlier criticisms and enable learners to use them more efficiently.

According to Phipps and Merisotis (2006) and Russell (2006), there have been two lines of research comparing students’ end-of-semester grades or learning outcomes for online and traditional sections. The first line of research focused on the “significant phenomenon” and cited significant increases in learning outcomes for online learners over their traditional counterparts. The most widely cited literature in this line is McCollum’s (2002) report. McCollum cited a sociology professor who divided his statistics class into two groups: one in online format and one in face-to-face (FtF) format. According to McCollum, online students had more collaboration and their performance outscored their traditional counterparts by an average of 20 percent.

Later studies also supported the “significant phenomenon”. Day, Raven, and Newman (2007) compared and studied the effects of web-based vs. traditional instruction on students’ achievement in undergraduate technical writing in an agricommunication course. They found that online students attained significantly higher achievement scores in the major class project and essay assignments than those in the traditional course. In addition, Day, Raven, and Newman found that online students obtained a higher mean gain in attitudes toward writing.

However, the second line of research supported the “no significant phenomenon.” These studies cited no differences in learning outcomes between online and traditional groups. Navarro and Shoemaker (2008) found that about 90% online learners in a graduate MBA class believed that they learned as much as or more than they would have in a traditional classroom. Schulman and Sims (2006) did not find any significant differences on the posttest scores between the online and traditional students in an undergraduate course. Jones (2007) conducted a comparison study of an all web-based class to a traditional class

This exploratory study is designed to investigate whether online instruction affects learners’ learning. Learners’ progress in the online and traditional sections is assessed by chapter quizzes and assignments, as well as essay writings, peer critiques, and group projects. A pre-course assessment is conducted and analyzed to ensure that both sections are equivalent.

**Statement of the Problem**

This quasi-experimental study aims at determining the effectiveness of application of web based Application vs. the traditional instruction/class related activity on students’ learning in St. Mary’s Academy of Talisayan.

Specifically, this study seeks to answer the following questions:

1. What is the impact of using multimedia in teaching curriculum on the students’ academic achievement?
2. Do the traditional instruction/class-related activity and on-line writing differ significantly?
3. What is the level of academic performance of the students?

**Conceptual Framework**

The conceptual model of this study is anchored on Jerome Bruner’s Constructivist Learning Theory. This theory is a process in which learners construct new ideas or concepts based upon their current/past knowledge. The learner selects and transforms information, constructs hypotheses, and makes decisions, relying on a cognitive structure to do so. Cognitive structure (i.e., schema, mental models) provides meaning and organization to experiences and allows the individual to "go beyond the information given" (Bruner 1966). Constructivism continues to be a main focus of learning theorists, the tools used in education have become increasingly powerful and crossed the crevasse between day-to-day life and education.  These tools relate to one another under the umbrella we term technology.

        Technology as a tool in learning has been embraced by some and disgraced by many, yet today’s digital natives traverse virtual worlds without hesitancy or misgivings. “Students are far more technologically savvy than the institutions that support them” (Desai, Hart, & Richards, 2008, p. 329).  This poses a problem as teachers try to reconcile personal constructivist pedagogies with a tool they are unaccustomed to or intimidated by. Yet, it’s this very tool which opens the door to new and innovative applications of constructivist teaching and learning methods.  According to Desai, Hart, and Richards (2008), “The vast amount of information that computers supply on a daily basis has allowed teachers and students new ways to explore education compared to ordinary instructional tools” (p. 329). Technology offers flexibility and adaptability reflective of pedagogies across various learning models based in constructivism.

Constructivism emphasizes the responsibility of learning lies within the student while the teacher acts as a facilitator of learning.  Desai, Hart, and Richards (2008) stated, “Technology is also often assumed to be the catalyst of new pedagogical change” (p. 327). The pedagogical change impacted by technology within three constructivist based learning theories; activity theory, social constructivism, and situated learning.

*Activity Theory*

Based on Marxist philosophy, Activity Theory was developed from the works of Vygotsky, Leont’ev and Luria (Jonassen, 2000). Aligning the importance of social interaction with cognitive development, Activity Theory provided an alternative to the more popular theories at the time. Traditional theories focused on cognitive development through internal activities separate from external activities while Activity Theory assumes that activity and learning cannot be separated (Jonassen, 2000). Learners produce cognitive tools through social interactions resulting from the cultural environment produced by an activity system.

Technology’s greatest pedagogical impact within this theory may be in the area of social interaction. The exchange of personal, social and cultural norms determines the work environment which in turn creates the rules of performance in an activity system (Benson, Lawler & Whitworth, 2008). In a physical classroom the personal, social and cultural clues are learned from direct social interaction in the form of body language, visual cues and facial expressions (Murphy & Manzanares, 2008). The application of technology in a virtual classroom removes all physical contact and the environment of the system must be determined through email, texting and discussion forums. This impacts the object of Activity Theory by shifting it from teaching students to helping them learn (Murphy & Manzanares, 2008).

*Social Constructivism*

The origins of Social Constructivism are attributed to post revolutionary Russian psychologist Lev Vygotsky. Vygotsky (1978) expanded the Constructivist epistemology by arguing that social interaction plays a key role in the development of cognitive function and higher order thinking results from relationships between individuals. The distinction between constructivism and social constructivism is that in social constructivism learners are incorporated into a knowledge community based on language and culture (Vygotsky, 1978).

Technology has impacted the pedagogies of Social Constructivism significantly. According to Desai, Hart, and Richards (1998) instructional design is a critical factor in the creation of effective online instruction. “One of the most important steps in creating a successful e-learning environment includes the development of flexible technology-based course content” (Desai et al., p.331). There must be a significant investment of time and effort on behalf of the instructor in order to create a successful e-learning environment. “Instructors find that e-learning is much more labor intensive and they have to acquire unusual skills, experience, and dedication to be successful than comparable traditional learning” (Desai et al., p.331).

Social interaction, a key component in the Social Constructivist pedagogy, is also dramatically altered by the impact of technology. “In a nutshell, each major transition in communication media from speech to print to video to electronic form has resulted in changes in our means to create, record, store, distribute, access and retrieve information” (Desai et al., 1998, p.331). As a result of these changes, the social interactions between students and students, and teachers and students have changed. Students are no longer dependant on the teacher as the main source of information. “Web-based environments are important forums for joint problem solving, knowledge building and the sharing of ideas” (Nevgi, Virtanen & Niemi, 2006, p.937).

*Situated Learning*

Related to social constructivism, situated learning is a recent, more defined learning theory.  Jean Lave and Etienne Wenger worked together in the late 1980’s and the early 1990’s to study and eventually publish their first book defining and, arguably, justifying situated learning.  “Jean Lave’s ethnographic studies of learning and everyday activity reveal how different schooling is from the activities and culture that give meaning and purpose to what students learn elsewhere” (Brown, Collins, and Duguid, 1989, p. 35).  The premise and pedagogical foundation of this theory is that learning is more effective in shared social situations, termed communities of practice. Wenger went further to define the following three aspects of communities of practice, the domain, the community and the practice.  The domain is the specified shared pursuit and is the shared group attribute. The community is the environment in which interaction takes place and relationships are developed.  The practice is defined as the “shared repertoire of resources: experiences, stories, tools, [and] ways of addressing recurring problems” (Smith, 2009). The concept of communities of practices is heavily weighted in the pedagogies of collaboration and learning contexts.

If learning is to take place in an authentic context, technology, specifically the Internet, must be utilized. This authentic context has “been applied to the learning digital technology and cultures in spaces such as social networking sites as young people immerse themselves in the language, skills and discourses of communities online” (Willet, 2007, p. 170).  If one was to peruse the Internet, countless online groups with specific shared interests exist and within these groups people learn, share, and grow together.  An essential constructivist pedagogical attribute shared within these authentic communities of practice is collaboration.

**Method**

**Experimental Design**

This study will be using a non-equivalent control group design. In both the experimental group (online via Edmodo.com) and control group (traditional classroom/class related activity), the dependent variables of learning performance will be pretested and post-tested. The independent variable is online vs. traditional instruction. A hybrid of instructional techniques is employed in the online section as recommended Kearsley (2009). Specifically, several major features of Edmodo.com will be used throughout the school year such as weekly online writing, peer critiquing, discussion, assignment, online testing, and e-mail. Constructivist learning theory is the major theoretical foundations for online instruction in this course. Instructional design is based on the ADDIE model (Analysis, Design, Development, Implementation, and Evaluation) proposed by Dick, Carey, and Carey (2010). For additional information on design, development, and instructional strategies used in this course, see other publications by the author (Liu, 2003a; 2003b).

**Participants**

The participants of this study are randomly selected students from St. Mary’s Academy, Talisayan, Misamis Oriental. There are83students in the online section and are in included for final analysis and 82 are in the traditional section. Thus, a total of 165 participants are selected to participate in the study. A pretest of course content in both sections will be administered.

**Sampling**

The sample of the study are randomly taken out from the total population of the students in St. Mary’s Academy of Talisayan (High School Department). The researcher used the sloven’s formula to get the sample size who will be the respondents of the study. The researcher divided the participants into control group (Traditional Instruction/Class Related Activity) and experimental group (Online Instruction). The control group will be given class related instructions and traditional ways of teaching. While, experimental group will be given instructions through on-line in Edmodo.com.

**Instruments**

Formative and summative assessments of participant learning will be conducted in two major domains: knowledge and application. Knowledge assessment focused on individual learning and included quizzes and assignment. Application assessment focused on collaborative learning and included a combination of essay writings, peer critiques, and a group research project. The application assessment is consistent with Wade’s (1999) perspective. That is, writing is a unique indicator of student’s learning including communication between student and student, as well as between student and teacher. The final grades of students will be assigned based on these two major assessments. Both sections had the same quizzes, essay writings, and group research paper every week. Each chapter quiz will be administered as an individual open-book test, but without peer discussion in both sections. Each quiz had 25 objective multiple-choice items regarding each chapter to be completed within 40 minutes. The quizzes in the online section were only available during a specific week and will be graded instantly after the completion. Online learners will be delighted to have immediate quiz results and feedback; quiz results and feedback in the traditional section will be reported back to the class in the following week.

**Procedure**

The pretest will be administered in paper-and-pencil format to both sections in the first week to determine initial learning and performance. Next, participants in the online section will be introduced to the features of Edmodo.com environment from the second through the final week. Ongoing posttests, including chapter quizzes and tests, will be administered online for the online section and administered in paper-and-pencil format for the traditional classroom.

**Statistical Tool**

This study will be using statistical processing for analyzing all processes:

* Calculating the mean and median
* Calculating the standard deviation
* T-test to examine the difference between the performance of control and experimental groups.

**References**

Benson, A., Lawler, C., & Whitworth, A. (2008). Rules, roles and tools: activity theory and the comparative study of e-learning. *British Journal of Educational Technology, 39* (3), 456-457. doi:10.111/j.1467-8535.2008.00838.x

Brown, S., Collins A., & Duguid, P. (1989). Situated cognition and the culture of learning. *Educational Researcher, 19*(1), 32-42. Retrieved March 18, 2009,

CEO Forum (2003). The CEO forum: School technology and readiness report [Online]. DC:          CEO Forum. Available: http://www.ceoforum.org/.

Clark, R.E. (2000). Reconsidering research on learning from media. Review of Educational Research, 53, 445-459.

Clark, R. E. (2000). Media will never influence learning. Educational Technology, Research and Development, 42(2), 21-29.

Day, T., Raven, M. R. & Newman, M. E. (2007).  The effects of world wide web           instruction and traditional instruction and learning styles on achievement and changes in student attitudes in a technical writing in an agricommunication course.  Journal of Agricultural Education, 39(4), 65-75.

Desai, M., Hart, J., & Richards, T. (2008). E-learning: paradigm shift in education. *Education*, *129* (2), 327-334. Retrieved March 10, 2009, from Ebscohost database.

Kozma, R. B. (2003). Will media influence learning? Reframing the debate. Educational Technology Research and Development, 42, 7-19.

Jonassen, D.H. (2006). Revisiting activity theory as a framework for designing student-centered learning environments. In Jonassen, D.H. & Land, S.M.(Eds.),*Theoretical foundations of learning environments* (pp. 89-121). Mahwah, New Jersey: Lawrence Erlbaum Associates.

Jones, E. (2007). A comparison of all web-based class to a traditional class. Texas, USA. (ERIC Document Reproduction Service ED 432 286).

McCollum, K. (2002). A professor divides his class in two to test value of online instruction. Chronicle of Higher Education, 43, 23.

Murphy, E. & Manzanares, M. (2008). Contradictions between the virtual and physical high school classrooms: A third-generation activity theory perspective. *British JournaL   
of Educational Technology, 39* (6), 1061-1072.

Navarro, P., & Shoemaker, J. (2008). The power of cyberlearning: An empirical test. Journal of Computing in Higher Education, 11(1), 33.

Nevgi, A., Niemi, H., & Virtanen, P. (2006). Supporting students to develop collaborative learning skills in technology-based environments. *British Journal of Educational Technology, 37* (6), 937-947.

Phipps R. & Merisotis J. (2006). What's the difference? A review of contemporary research on the effectiveness of distance learning in higher education. Washington, DC, USA: The Institute for Higher Education Policy.

Russell, T. L. (2006). The no significant difference phenomenon. Office of Instructional Telecommunications, North Carolina State University, USA.

Schulman, A. H., & Sims, R. L. (2006). Learning in an online format vs. an in-class format: An experimental study. T. H. E. Journal, 26(11), 54-56.

Smith, M. K. (2003, 2009). Communities of practice, The encyclopedia of informal education. Retrieved April 2, 2009 from[www.infed.org/biblio/communities\_of\_practice.htm](http://www.infed.org/biblio/communities_of_practice.htm)

Vygotsky, L.S. (1978). *Mind in society: The development of higher psychological processes*. Cambridge, MA: Harvard University Press.

Wade, W. (1999). Assessment in distance learning: What do students know and how do we know that they know it?  T.H.E. Journal, 27(3), 94-100.

Waits, T., & Lewis L. (2003). Distance education at degree-granting postsecondary institutions: 2000-2001. U.S. Department of Education. Washington, DC, USA: National Center for Education Statistics (NCES Pub 2003-017).

Willett, R. (2007). Technology, pedagogy and digital production: A case study of children learning new media skills. *Learning, Media, and Technology, 32* (2), 167-181. doi:10.1080/17439880701343352