Team-Based Versus Traditional Learning in a Blended Learning Environment: Effect on Self-Regulated Outcomes of Nursing Students

A Dissertation submitted

by

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Dedication

This dissertation is dedicated to the loving memory of my mother, Olga Whittaker, who taught me to love God and to strive for excellence.

Acknowledgements

I wish to express my sincere appreciation to my dissertation chairperson Dr. Lois Linden. I truly am grateful for her encouragement and expert guidance through this challenging process. I also thank Dr. Susan Tinley and Dr. Cristy Daniel for their invaluable insights and suggestions that strengthened this research study. Finally, I want to express my gratitude to Dr. Ann Harms who graciously acted as an external auditor for the study.

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Abstract

The purpose of this quasi-experimental study was to compare the effectiveness of team-based blended learning with traditional instructor-led blended learning, on self-regulated online learning activities and learning outcomes, for baccalaureate junior nursing students enrolled in a nursing research and evidence-based practice course. Team-based learning is an instructional strategy that utilizes small group discussion and application activities to promote active student learning. The nonrandomized sample consisted of 98 students enrolled in the traditional instructor-led control group and 86 students enrolled in the team-based learning intervention group. The percentage of total online viewing time was used as a measure of self-regulated online learning activities. Student learning outcomes were quantified by the mean score on two course examinations. A significant ($p<0.001$) increase in self-regulated percentage of online viewing time was found in the team-based learning intervention group. The team-based learning group demonstrated significantly ($p=0.003$) higher mean examination scores than the instructor-led control group. A weak positive relationship ($p<0.01$) was found between examination scores and measures of self-regulated learning online learning activities. The findings indicate that team-based learning is an effective instructional strategy that can be used to promote self-regulated learning and improved learning outcomes in nursing students enrolled in blended online nursing courses.

Chapter I: Introduction

The purpose of this chapter is to provide the intent and rationale for conducting a research study in a pre-licensure baccalaureate nursing research and evidence-based practice course. The purpose, background information, and significance of the research problem are discussed. Research questions, definitions, assumptions, delimitations, and limitations are also presented.

Purpose of the Study

Online learning in higher education has rapidly expanded in the United States and globally (Clayton, Blumberg, & Auld, 2010; Fernandez Aleman, Carillo de Geo, & Mondejar, 2011; Lu, Lin, & Li, 2009). Online enrollment in the United States grew more than 17% in 2009 (Allen & Seamen, 2010). By 2010, over one in four college students was enrolled in at least one online course.

Like other higher education academic programs, schools of nursing have also increased the use of online learning resources. Utilization of online learning varies considerably between nursing programs. Some nursing programs offer large portions of their curriculum completely online, while others utilize a blended or hybrid format. Blended forms of nursing courses offer the interpersonal component of face-to-face classrooms in addition to self-directed technology based learning (Myers, Mixer, Wyatt, Paulus, & Lee, 2011; Shea & Bidjerano, 2010). The use of blended learning has rapidly expanded because nurse educators believe that varied instructional methods enhance student learning outcomes (Hsu & Hsieh, 2011; Sowan & Jenkins, 2013). Many nursing programs utilize specific online resources as modules within classroom-based nursing courses, while others present didactic content online and utilize classroom time for

discussion and application (Fernandez Aleman et al., 2011; Guhde, 2010; Juliani, Corrente, & dell `Acqua, 2011; Kardong-Edgren & Emerson, 2010; Lu et al., 2009).

One of the major goals of undergraduate baccalaureate nursing education programs is to prepare nursing students to be lifelong learners (Cheng, Kuo, Lin, & Lee-Hsieh, 2010; Kocaman, Dicle, & Ugur, 2009; Kuiper, Murdock, & Grant, 2010). Teaching strategies that develop and support self-regulated learning strategies offer preparation for the skills that are needed by nursing students after graduation (Sisk, 2011). As nursing education expands into the online learning environment, new teaching/learning strategies will be required.

Team-based learning was developed by Dr. Larry Michaelsen, in the late 1990s, to address the challenge of teaching large business courses (Michaelsen & Sweet, 2008; Michaelsen, Fink, & Knight, 1997). Since that time, the team-based learning concept has been modified and successfully used in a number of educational settings. Team-based learning is a highly learner-centered approach in which student teams engage in meaningful, problem-focused tasks. Team-based learning has been extensively utilized and evaluated in medical education (Haidet et al., 2012; Parmelee, Michaelsen, Cook, & Hudes, 2012).

Team-based learning has been implemented in nursing education; however, few rigorous research studies that have evaluated learning outcomes (Sisk, 2011). The published work related to team-based learning in nursing are primarily anecdotal accounts or descriptive in nature (Andersen, Strumpel, Fensom, & Andrews, 2011; Lubeck, Tschetter, & Mennega, 2013). The nursing literature has not addressed use of team-based learning in blended online undergraduate nursing courses. The purpose of

this quasi-experimental study was to compare the effectiveness of team-based blended learning with traditional instructor-led blended learning, on self-regulated online learning activities and learning outcomes, for baccalaureate junior nursing students enrolled in a nursing research and evidence-based practice course at a Catholic mid-western university.

Background and Rationale

Self-regulation in online learning. Online and blended forms of classes demand much higher levels of self-regulation than traditional forms of educational settings (Azevedo, 2005; Greene, Moos, & Azevedo, 2011; Michinov, Brunot, LeBohec, Juhel, & Delaval, 2011). Online learning offers the student a significant amount of personal control over their own learning. In the online setting, the student is responsible for determining if, when, and how they will participate in the online lessons. Control of these elements allows the student to focus on their specific learning needs. Time spent in online coursework can be distributed to meet the student's individual needs; therefore, it is viewed as a more efficient and powerful learning methodology (Bonk & Graham, 2012; Shea & Bidjerano, 2010). Although this may be true, a number of authors have pointed out that online learning is only useful to the student who chooses to use it in a productive manner (Artino & Stephens, 2009; Bandura, 2002; Burnette, Ramundo, Stevenson, & Beeson, 2009).

In a review of online education literature, Abrami, Bernard, Bures, Brorokhovski, and Tamin (2010) identified several factors that prevent students from using online knowledge tools in a productive manner. Their findings demonstrated that learners did not necessarily value the outcomes of online learning and they did not see the relevancy

of the topic to their future profession. Students did not believe that the gains in learning were worth the effort they had to expend to achieve a higher outcome. Students also evidenced an unwillingness to try new or unfamiliar online learning tools. Finally, some students indicated that they did not want to take more responsibility for their learning. Abrami et al., (2010) concluded that not all college students have developed the capability to be productive, self-regulated online learners.

Levine and Dean (2012) surveyed 5,000 college students, as well as student affairs professionals, from 270 American colleges and universities. Their research identified a number of factors that impact self-regulation of learning skills in college students. Levine and Dean (2012) identified two specific areas that impact self-regulated learning as it applies to online course work. First, many current college students did not make the connection between the amount of work, depth of the work, quality of work, and the grade given for the work. As an example, Pew researchers found that college students relied heavily on the use of internet sources for academic projects and papers; however, they gave little consideration to evaluating the credibility of those sources (Madden & Jones, 2002). The findings of research, conducted a decade later, demonstrated many of the same concerns identified by the Pew study. Biddix, Chung, and Park (2011) found that students valued speed and efficiency above trustworthiness of sources. Students were aware of the value of library data bases but preferred the speed and user-friendliness of Google® and Wikipedia®. The results were supported by other research that indicated that the principle of ¨least effort¨ was predominant in students' search for information to use in coursework (Colon-Aguirre & Fleming-May, 2012, p. 396). These findings were also consistent with Abrami et al., (2010) who concluded that

many online students were not interested in being responsible for their own learning or willing to expend the effort required for successful online learning.

The second issue Levine and Dean (2012) identified was the practice of multitasking, which is considered to be part of normal behavior in today's college students. Students have a wide array of digital media in which they can participate at any given moment in time. Media multitasking has been shown to be associated with impaired self-regulation and decreased ability to maintain sustained attention to a learning task (Ophir, Nass, & Wagner, 2009; Wei, Wang, & Klausner, 2012; Zimmerman & Schunk, 2001). Ophir et al., (2009) compared four cognitive tasks in a group of high media multitasking students and a group of low multitasking students. Results of the study revealed that high media multitaskers demonstrated significantly greater difficulty in filtering out non-important information from their environment and had significantly greater trouble in ignoring non-important tasks in memory. High multitaskers also evidenced more difficulty in choosing to switch between important and less important tasks.

The effect of media multitasking is of particular concern in online learning. The online course lacks the personal presence of the instructor which is thought to partially inhibit media multitasking in the traditional classroom (Wei et al., 2012). Instead, the online student is learning at their computer with social media, email, and media games readily available. Rosen, Carrier, and Cheever (2013) investigated the study habits of 263 middle school, high school, and college students. The researchers used an observational design, rather than student self-report, to determine time spent in actual online study. Results of the study indicated that students averaged less than six minutes

of actual study time before they switched to a technologic media distracter. Many of the students were observed to begin studying with Facebook® and other social media screens already open and engaged. Rosen et al., (2013) findings were consistent with the results of the Ophir et al. (2009) study. Heavy multitasking and task switching were associated with lower overall academic performance.

Learning takes longer and is not as efficient when the learner is multitasking (Bowman, Levine, Waite, & Gendron, 2010; Butler, Arrington, & Weywadt, 2011; Wickens & McCarley, 2008). Switching back and forth between online coursework and social media has been theorized to undercut the learner's attention from the online lesson, leading to poor learning outcomes (Butler et al., 2011; Wei et al., 2012). There is strong and consistent research evidence that lack of self-regulated learning, as manifested by procrastination, distraction, or heavy use of multitasking, had a negative impact on student academic performance. Not only did use of maladaptive self-regulated learning skills decrease the amount of effective time invested in online studies, it also was found to have a negative effect on the depth and quality of material studied (Bowman et al., 2010; Butler et al., 2011; Ophir et al., 2009). These factors resulted in decreased quality of the student's critical thinking skills and overall lower academic performance (Ophir et al., 2009; Rosen et al., 2013; Wei et al., 2012).

Team-based learning. Team-based learning is an instructional strategy that has demonstrated the potential to positively impact self-regulation in the blended online learning environment. The goal of team-based learning is to promote active student learning through small group activities throughout an entire semester (Michaelsen & Sweet, 2008). When used in the traditional classroom, course content is broken into

individual modules. Students are given pre-class assignments and are expected to come to class prepared (Michaelsen et al., 1997; Michaelsen & Sweet, 2008). The pre-class assignments contain the major content that the students are expected to learn from the modules. Student accountability for class preparation is supported by individual and group readiness assurance quizzes. Each student completes the individual readiness assurance quiz that covers the content in the pre-class assignments. The groups then complete the group readiness quiz which contains the same questions as the individual readiness assurance quiz. It is expected that group members discuss the questions and come to a consensus on the correct answers. Both the individual and group quizzes are graded.

Team-based learning classrooms utilize little, if any, instructor lecture time (Michaelsen et al., 1997; Michaelsen & Sweet, 2008). Rather, the instructor focuses on learning discrepancies identified by the individual and group readiness assurance quizzes. The majority of class time is spent in group problem solving discussions that apply the content that has been learned (Parmalee & Michelsen, 2010). Groups discuss the assigned problem, decide on a solution, and present the rationale to the class.

Team-based learning is readily adaptable to the blended online learning environment. In blended online learning, students are responsible for completing pre-class online readings and video assignments. Individual readiness assurance quizzes may be given online or in class. Class time is spent in small group readiness assurance quizzes and content-related problem solving activities (Gomez, Wu, & Passerini, 2010; Parmalee & Michaelsen, 2010).

Team-based learning addresses the issues related to lack of student self-regulation in online blended courses in several ways. The individual and group readiness assurance quizzes foster students' accountability for their own learning (Michaelsen et al., 1997). Researchers in an Australian university demonstrated that individual readiness scores significantly increased over the semester (Freeman, McGrath-Champ, Clark, & Taylor, 2006). Students were motivated to prepare prior to coming to class. In a qualitative study, Feingold et al., (2008) reported that nursing students described increased motivation to increase pre-class preparation in the team-based learning environment. Gomez et al., (2010) also found increased motivation for out of class preparation in a computer-supported team-based learning course environment.

In addition, the findings of several studies indicated that the team readiness assurance quizzes and group application problems provided structure and process that help students develop team skills (Clark, Nguyen, Bray, & Levine, 2008; Feingold et al., 2008; Freeman et al., 2006). Discussion of multiple group members' thoughts contributed to a wider frame of reference and increased student learning (Feingold et al., 2008; Parmelee et al., 2012). The structure provided by the group application process was shown to have a positive effect on discouraging social loafing by group members (Michaelsen et al., 1997). Peer group pressure and peer modeling have also been found to foster self-evaluation and correction of study habits. Freeman et al., (2006) suggested that disengaged students were given considerable incentives to perform when placed in groups that worked together on projects over an entire semester. Group discussions that took place in class, rather than out of class, were found to result in a higher level of student participation.

Several studies have demonstrated that team-based learning is most beneficial for weaker students. Koles, Stolfi, Borges, Nelson, and Parmelee (2010) studied the effect of team-based learning in second year medical students. Students whose academic performance ranked in the lowest quartile were found to have the greatest increase in mean examination scores. In a similar study, academically at risk medical students were shown to gain the most benefit from implementation of team-based learning strategies (Anwar, Shaikh, Dash, & Khurshid, 2012). Other research studies have demonstrated that weaker students show greater academic gains in team-based learning environments (Chung, Rhee, Baik, & A, 2009; Su, 2007). Academic improvement was thought to be the result of a combination of factors. Students may have increased motivation to prepare for class due to peer pressure from the group (Anderson et al., 2011). A number of studies have demonstrated that group discussion during the group readiness assurance quizzes is a powerful learning tool (Freeman et al., 2006; Gopalan, Fox, & Gaebelein, 2013; Koles et al., 2010). Weaker students, in particular, benefited from the critical thinking skills and positive study habits modeled by their more self-regulated peers (Anwar et al., 2012).

Problem Statement

The research evidence supports the thesis that the ability to self-regulate learning activities has great significance for the academic success of students enrolled in online blended forms of nursing courses. Professional nursing practice, in the 21st century, requires nurses to critically think, engage in evidence-based practice, function as self-directed learners, and work within teams (AACN, 2008). These professional behaviors require a high degree of self-regulation. Professional nurses must be able to continuously

assess their own learning needs, update their skills, and keep their knowledge current. The literature presented, however, has identified a disparity between the types of learning strategies commonly used by college students and the type of self-regulated learning strategies required by healthcare professionals in their day to day practice (Hagemeier & Mason, 2011). As online course work has become more established across nursing education, the need for self-regulated learning skills has also increased significantly. The research literature indicates, however, that many nursing students have not developed effective self-regulatory learning skills. Lack of effective self-regulated learning skills impedes the students' ability to fully participate in online learning activities and to achieve optimal learning outcomes from online coursework.

To achieve the AACN essential outcomes, nurse educators must foster the use of "intentional, active, collaborative, and integrative learning strategies" that promote self-directed, lifelong learning in the nursing curriculum (AACN, 2008, p. 3). In order to optimize student lifelong learning it is important for nurse educators to actively incorporate teaching/learning strategies that support self-regulated learning. Team-based learning is one strategy that has been used across many disciplines to support self-regulated learning. As defined by Michaelsen, team-based learning is characterized by student accountability for their individual preparation and for their participation in peer group work (Michaelsen & Sweet, 2008). Team-based learning has been demonstrated to be effective in traditional classroom courses and has the potential to be effective in the classroom component of blended online courses. Although team-based learning has been implemented in nursing education, there are no research studies that have evaluated self-regulated learning outcomes of team-based learning in the blended learning environment.

This research study proposed to contribute to the body of nursing knowledge by investigating the effects of team-based blended learning versus traditional instructor-led blended learning in an undergraduate nursing research and evidence-based practice course.

Research Questions

The following research questions were posed by this study:

1. Is there a significant difference in self-regulated online learning activities between baccalaureate junior nursing students who participated in team-based blended learning and junior nursing students who participated in traditional instructor-led blended learning in an undergraduate nursing research and evidence-based practice course at a Catholic Midwestern university?
2. Is there a significant difference in student learning outcomes between baccalaureate junior nursing students who participated in team-based blended learning and junior nursing students who participated in traditional instructor-led blended learning in an undergraduate nursing research and evidence-based practice course at a Catholic Midwestern university?
3. What is the relationship between self-regulated online learning activity and student learning outcomes in baccalaureate junior nursing students who participated in team-based blended learning and for junior nursing students who participated in traditional instructor-led blended learning in an undergraduate nursing research and evidence-based practice course at a Catholic Midwestern university?

Operational Definitions

The following operational definitions and descriptive explanations are presented to clarify terminology used in this research study.

Self-regulated learning. Self-regulated learning is the process in which the individual learner takes responsibility for identifying their own learning needs, establishing learning goals, selecting and implementing appropriate learning strategies, and evaluating learning outcomes (Bandura, 1986; Bandura, 2005). In this study, self-regulated learning was measured by the amount of time that the student spent participating in the pre-class online learning activities. The primary measure of self-regulated learning was the percentage of the total possible online viewing time, as measured in seconds. Other measures of self-regulated learning included total online viewing time and the number of log-ins to online lessons.

Online learning activities. In this study, online learning activities included recorded lecture content, hypermedia, and online readings. These learning activities were presented online, within the course website, which was linked to the university's learning management system. In both the traditional instructor-led and team-based learning courses, students were expected to complete the activities for each module prior to coming to class. Students controlled when, how much, and how actively they participated in the online learning activities. In this study, online learning activity was measured as time. The course learning management system tracked time spent in online learning activities in seconds.

Online blended course. Blended courses combine classroom instruction with "computer-mediated" instruction (Bonk & Graham, 2012, p. 5). Online blended courses

provide 30 to 79% of the learning activities in a variety of online formats (Allen & Seamen, 2010). In this study, the nursing research and evidence-based practice course provided 50% of the learning activities in online lecture, video, and other online formats. Online activities provided the equivalent of 90 minutes of face-to-face instruction time. The face-to-face classroom component of this course was 90 minutes each week.

Traditional instructor-led classroom. The traditional instructor-led classroom refers to face-to-face instruction between instructor and students in a formal classroom setting. The instructor determined the content, presentation, and timing of presentation. The course was organized into eight content modules. In this blended online course, core course content was presented in short recorded lectures, videos, and online readings each week. Students were required to view the online didactic content prior to coming to class. The 90 minute weekly face-to-face classroom time included a 30-60 minute lecture that used PowerPoint slides and video presentations. Lecture was focused mainly on review of the main points of the online lessons and application of the module content. The remaining class time consisted of instructor-facilitated small group discussion of topics relevant to research critique and work on the groups' assigned evidence-based practice project. At the beginning of the semester, students were randomly assigned to project groups of 4 students who worked together the entire semester. A group grade was given to all group members who participated in the weekly projects. As part of the final course grade, students evaluated group members' participation at the end of the semester.

Team-based learning classroom. Team-based learning is a learner-centered approach in which student teams engage in meaningful problem-focused tasks. Team-based learning is characterized by the use of small student groups, student accountability,

frequent and immediate feedback, and application of course content (Michaelsen & Sweet, 2008). These criteria were operationalized in six of eight content modules in this research and evidence-based practice course in accordance with Michaelsen et al., (1997). Course policies, online lessons, and all other coursework remained the same as in the traditional instructor-led classroom semester.

Student groups. Students were randomly assigned into groups that worked together the entire semester. Random assignment to groups ensured that student characteristics, e.g., academically strong or academically weak, were evenly distributed across all of the groups (Polit & Beck, 2014). Groups function best when they contain a variety of student resources or characteristics (Michaelsen et al., 1997). Based on research literature, groups of six students were utilized (Michaelsen & Sweet, 2008).

Student accountability. Accountability for online learning was verified by the use of the individual readiness quizzes for each module. The individual readiness quizzes consisted of five to seven multiple choice questions that covered essential content presented in the weekly online lessons. Following the individual readiness quiz, the group members discussed and reached consensus on correct answers to the questions posed by the individual readiness quiz. Group answers were shared with the instructor and class. Individual and group readiness quizzes were included in the course grade.

Frequent and immediate feedback. Face-to-face classroom lecture time was minimal, and focused solely on clarification of unclear content as identified by the individual and group readiness quizzes. Students were able to assess their understanding immediately following the readiness quizzes. The face-to-face class time allowed students the opportunity to ask questions related to content that remained unclear.

Group application of content. Team-based learning group application projects were identical in content to the traditional instructor-led semester. Group projects were focused on topics related to research critique and the group evidence-based practice project. In addition to turning their group projects in for a grade, groups were required to present and defend their rationale to their classroom peers. Students evaluated their group members' participation at midterm and at the end of the semester (Michaelsen et al., 1997).

Baccalaureate junior nursing student. For purposes of this research study, a junior baccalaureate nursing student was defined as a male or female enrolled in a four year baccalaureate pre-licensure nursing program in a Catholic Midwestern university. Second degree nursing students, Registered Nurse baccalaureate completion students, and students who have completed a vocational program were not considered undergraduate baccalaureate nursing students in this study.

Student learning outcomes. For purposes of this study, student learning outcomes were defined by the student's mean score on two 50-question, multiple choice examinations developed by the instructor. Content covered by the examinations included principles of quantitative research, principles of qualitative research, and evidence-based nursing practice.

Assumptions

The underlying assumption of this research study was that the complex nature of self-regulated learning could be examined by comparing levels of time invested in online learning activities. It was assumed that viewing time is an accurate and consistent means of determining participation in an online nursing research course. Advances in learning

management system technology have allowed researchers to more accurately calculate the actual time spent online, rather than simply the number of log-ins recorded (Rogers, 2008; Ryabov, 2012). A second assumption is that student learning occurred as a result of significant participation in online learning activities. It was also assumed that mean examination scores were a valid and reliable measurement that learning had occurred.

Another assumption was that the characteristics of the two groups of baccalaureate junior nursing students were equivalent. Demographic characteristics of nursing students, admitted to this Catholic Mid-western university, were assumed to be stable from year to year. It was also assumed that students had varying levels of self-regulatory capabilities, and that these were also normally distributed across the student population of each nursing class. The assumption was made that there had been no policy, admission, or curriculum changes that would alter the consistency of the two groups of students. A final assumption was that there were no affective differences in teaching strategies, between the two groups of students, which would result in a researcher expectation bias or the halo effect.

Delimitations

The study was conducted using junior nursing students from one baccalaureate nursing program at a Catholic university in the Midwestern United States. There was no intention to generalize findings to other nursing education programs. The study included one junior level nursing research and evidence-based practice course. There was no intention to generalize findings to other nursing courses in the nursing curriculum. Likewise, no generalizations were made to other undergraduate nursing research courses.

This research study did not address student perceptions or satisfaction with team-based learning.

Limitations

The study used a nonrandomized sample of junior nursing students enrolled in a nursing research and evidence-based practice course over two consecutive years. The study sample was highly homogenous; therefore, it could not be considered representative of the entire population of nursing students. Use of a nonrandomized sample limited the ability to infer causality of the findings.

Six of eight course modules were taught using team-based learning. The other two modules were taught using lecture in a traditional classroom format. Exposure to both types of teaching strategies, in one course, may have limited the study's ability to differentiate learning outcomes between the two study periods.

Summary

Online learning has been rapidly incorporated into baccalaureate nursing education programs. Effective use of online learning tools requires a high level of self-regulated learning skills. This chapter described the concept of self-regulated learning in online courses. Many college students, including traditional nursing students, have not developed effective self-regulated learning skills, and therefore may experience difficulties in online classes. Team-based learning has demonstrated potential to increase self-regulated learning in both traditional instructor-led classrooms and in blended online learning environments. Student accountability for their individual learning is the forte of the team-based learning approach. This study focused on determining the effects of blended team-based learning, in comparison to traditional instructor-led blended

instructional strategies, on self-regulated learning outcomes in a nursing research and evidence-based practice course.

Chapter II: Literature Review

The purpose of this quasi-experimental research study was to compare the effectiveness of team-based blended learning, with traditional instructor-led blended learning, on self-regulated online learning activities and learning outcomes, for baccalaureate junior nursing students enrolled in a nursing research and evidence-based practice course at a Catholic Mid-western university. This chapter proposes the conceptual model that guided the study. A review of the literature pertinent to self-regulated learning in a blended online learning environment is presented. In addition, the components of team-based learning and supporting research are discussed.

Theoretical Context

The conceptual model and organizing framework for this study is presented in Figure 2.1. The model is an amalgamation of a number of learning theorists' work in the area of self-regulation of learning (Bandura, 1986; Garrison, Anderson, & Archer, 2010; Kuiper, 1999; Winne, 1996; Zimmerman, 1998). The processes of self-regulated learning operate within a learning environment. Nursing education has traditionally taken place in a face-to-face classroom setting. In the past decade, however, there has been an increasing shift of nursing education away from traditional instructor-led classroom learning and toward technology-based educational strategies (Myers et al., 2011). Technology-based nursing courses compass the continuum of completely online courses to those classes that blend online modules with classroom instruction (Hsu & Hsieh, 2011). The conceptual model proposes that the processes of self-regulation influence learning across classroom and blended online learning environments.

Figure 2.1 Whittaker Model of Self-regulated Learning in Blended Online Courses

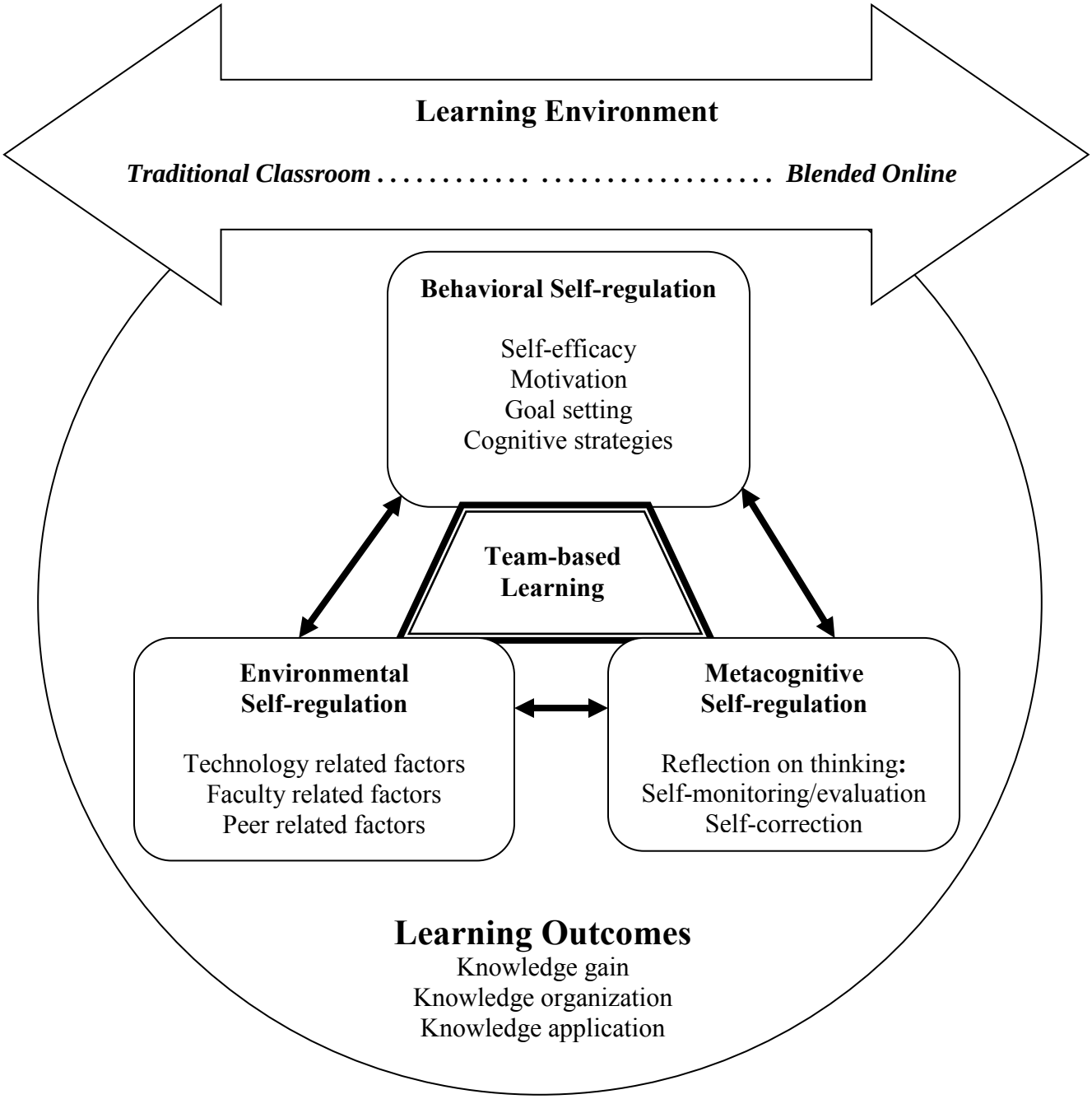


Figure 2.1 Adapted from: Bandura (1986); Garrison et al., (2010); Kraiger et al., (1993); Kuiper (1999); Michaelsen et al., 1997; Winne (1996); Zimmerman (1998)

The conceptual model postulates that self-regulated learning results in measurable learning outcomes. Learning outcomes are most commonly measured in three spheres: Knowledge gain, knowledge organization, and knowledge application (Kraiger, Ford, & Salas, 1993). Differences in individual student learning outcomes result from the learning environment, as well as from individual self-regulatory factors (Schunk & Zimmerman, 2007).

The conceptual model was adapted from Bandura's (1986) theoretical framework explaining the reciprocal nature of behavioral, personal, and environmental factors on human functioning and learning. Bandura theorized that human beings possess self-regulatory capabilities that affect their thought processes, motivation, affective states, and behaviors (Bandura, 1986; 2005). In order to self-regulate, the individual must monitor their behavior, judge and compare the behavior to a predetermined standard, and evaluate the outcome. The individual then takes action to modify or retain the behavior.

Other social cognitive theorists expanded on Bandura's work by emphasizing the cyclical nature of regulation on academic studying (Schunk, 2001; Schunk & Zimmerman, 2007; Zimmerman, 1998). Zimmerman (1998) proposed a framework for studying academic self-regulation that is based on Social Cognitive Theory. This framework consisted of six dimensions of self-regulation, including several elements of cognitive characteristics, metacognitive characteristics, motivational beliefs, and attitudes. Zimmerman's (1998) framework is consistent with more recent research that asserted that self-regulation is best described as a constellation of knowledge, skills, and beliefs (Kuiper et al., 2010; Park & Sperling, 2012; Turan, Demirel, & Sayek, 2009; Wolters, 2003).

Founded on the body of research that emphasized the importance of metacognition, the characteristic of reflection on thinking was added to the conceptual model. Reflection on thinking encompasses the concepts of self-monitoring, self-evaluation, and self-correction. Researchers who have studied metacognition generally regarded these factors as being within the realm of metacognitive regulation (Turan et al., 2009; Winne, 1996; Wolters, 2003). Other metacognition researchers made clear the distinction between self-monitoring/evaluation of learning strategies and self-monitoring/evaluation of learning goals (Koriat, Ma`ayam, & Nussinson, 2006; Kuiper, 1999; Kuiper et al., 2010). The former was viewed as falling within the behavioral realm of self-regulation, while evaluation of goal attainment was considered to be a metacognitive self-regulative function.

The conceptual model incorporates concepts that describe the relationships between technologic/environmental factors, faculty-related factors, and learner-peer social related factors in the blended online learning process (Garrison, et al., 2010). Factors related to informational technology and learning management system capabilities have been identified as important to self-regulation of online learning and were included in the model (Abdous & Yen, 2010; Garrison et al., 2010; Georgouli, Skalkidis, & Guerreiro, 2008). Factors related to faculty expertise, (Paechter, Maier, & Macher, 2010), faculty presence (Garrison et al., 2010; Shea & Bidjerano, 2010), and faculty-student relationship (Abdous & Yen, 2010; Shea & Bidajerano, 2012) were also viewed as important elements of environmental self-regulation. Finally, peer learning relationships have been identified as critical to self-regulation of online learning and were included in the model (Shea & Bidjerano, 2010; 2012; Schunk & Zimmerman, 2007).

Self-regulation is defined as a complex set of behavioral, metacognitive, and environmental processes. These processes are selectively used, and specific to, individual learning contexts (Zimmerman, 1998). The conceptual model depicts the three processes as being reciprocal in nature. As in Bandura's (1986) original theoretical framework, the relationships between the processes are dynamic rather than fixed.

Finally, the conceptual model proposes that team-based learning directly supports all three components of self-regulated learning across the continuum of classroom and blended online learning environments. Team-based learning is a learner-centered educational strategy characterized by student accountability (Michaelsen & Sweet, 2008). Team-based learning has been extensively tested in traditional classroom settings (Michaelsen et al., 1997; Michaelsen & Sweet, 2008). The conceptual model posits that team-based learning is an effective teaching strategy within the blended online learning environment. Heightened individual accountability and accountability to the student team are viewed as supporting and strengthening the behavioral self-regulation factors of self-efficacy, motivation, and cognition (Koles et al., 2010; Michaelsen & Sweet, 2008). The metacognitive processes of self-evaluation and self-correction are supported by the individual and group readiness assurance process that is a major component of team-based learning (Parmelee et al., 2012). Active, in depth group discussions reinforce the environmental peer presence element of the conceptual model (Michaelsen et al., 1997; Garrison et al., 2010). The following sections will provide definitions and supporting discussion of each of the components of the conceptual framework guiding this study.

Behavioral Self-Regulation of Learning

Self-regulated learning is the process in which the individual learner takes responsibility for identifying their own learning needs, establishing learning goals, selecting and implementing appropriate learning strategies, and evaluating learning outcomes (Bandura, 1986; Bandura, 2005). In order for a student to self-regulate their learning, they must be able to monitor their behavior, evaluate their behavior, and modify their behavior. Academic self-regulatory activities may be either proactive or reactive (Bandura, 1986; Bandura, 2005; Pajares, 2002). Students have the ability to design and use multiple strategies for learning. Forethought allows proactive planning, goal setting, and anticipation of consequences (Pajares, 2002). Students also learn from their own successes, failures, and from observing the behavior of others. Vicarious learning from observation of peers, instructors, or others also can be used to develop proactive self-regulatory behaviors (Bandura, 1986; Bandura, 2005; Zimmerman & Schunk, 2001; Schunk & Zimmerman, 2007). For example, a self-regulated student will proactively increase their attention and study time devoted to online modules containing new and difficult content.

Reactive self-regulation is the ability of the student to adjust their behaviors as they are working toward goal achievement (Pajares, 2002; Schunk & Zimmerman, 2007). Bandura stated that the capacity to engage in self-reflection is the most "distinctly human" capability (Bandura, 1986, p. 21). Self-reflection allows the student to make sense of their academic experience, discern their own learning processes, and recognize their own beliefs about their ability to learn (Zimmerman & Schunk, 2001). Self-reflection prompts the learner to engage in self-evaluation and modify their learning

behaviors appropriately (Artino & Stephens, 2009). As an example, a self-regulated learner would reflect on instructor feedback, from an online discussion post, and use that information to improve the quality of subsequent postings.

Online learning gives the student a significant amount of personal control over their own learning process. Learning, however, will only occur if the student possesses the ability to self-regulate their learning activities (Klingsieck, Fries, Horz, & Hofer, 2012; Wolters, 2003). Learner-related behavioral factors such as self-efficacy, motivation, goal setting, and cognitive strategies have been identified as essential to self-directed online learning (Debowski, Wood, & Bandura, 2001; Klingsieck et al., 2012; Wolters, 2003).

Self-efficacy. Bandura (1986) first introduced self-efficacy as a primary tenet of Social Cognitive Theory. Individuals possess self-beliefs that allow them to exercise a degree of control over their thoughts, feelings, and behaviors. Bandura posited that, "What people think, believe, and feel affects how they behave" (Bandura, 1986, p. 25). A number of researchers, from nursing and other disciplines, have studied concepts closely related to self-efficacy. The concepts of confidence, self-confidence, and capability have been found to be strongly correlated with self-efficacy (Chesser-Smyth & Long, 2013; Perry, 2011; Wallin, Bostrom, & Gustavsson, 2012). These concepts share many of the defining characteristics and consequences of self-efficacy and, therefore, will be included in the discussion of self-efficacy.

Self-efficacy has been extensively studied across multiple disciplines for over three decades. Research findings have consistently demonstrated that self-efficacy beliefs have a major impact on learning outcomes in students at all levels. In applying

self-efficacy to academic self-regulation, Zimmerman (1998) suggested that self-efficacy influenced self-regulation in a number of ways. Self-perceived competence and confidence were shown to have a positive influence on which tasks students attempted. Students with high self-efficacy were found to select more difficult learning tasks, while students with low self-efficacy selected easier learning tasks (Pajares, 2002; Zimmerman, 1998). Similarly, high self-efficacy beliefs positively impacted the amount of effort that a student expended on the task. Schunk & Zimmerman (2007) studied the effect of self-efficacy on development of reading and writing skills. Their findings demonstrated that self-efficacy had a critical influence on reading and writing achievement. The student's personal self-efficacy beliefs influenced topic choice, performance, and persistence. Self-efficacy beliefs were also found to be the primary motivational factor related to academic achievement in science education (Bryan, Glynn, & Kittleson, 2011).

Self-efficacy beliefs of nursing students have been studied across a wide spectrum of nursing courses and clinical learning experiences. A concept analysis of self-efficacy in nursing identified cognitive knowledge base, past experiences, and attitudes as antecedents for self-confidence or self-efficacy (Perry, 2011). Learners developed self-beliefs based on past successes and failures in their nursing courses.

High self-efficacy has been shown to have a positive impact on cognitive and skill-based learning outcomes in nursing students. McMullan, Jones, and Lea (2012) found a strong positive relationship between math self-efficacy beliefs and drug calculation performance in British undergraduate nursing students. The students, who were unsuccessful on the math test or the drug calculation test, were more anxious and scored significantly lower in self-efficacy than those students who were successful. A

second study explored mathematics anxiety, mathematics performance, and mathematics self-efficacy in associate degree nursing students (Walsh, 2008). A non-significant positive correlation was found between self-efficacy and the ability to perform basic and complex mathematical tasks. Qualitatively, students expressed high anxiety levels related to medication mathematics testing regardless of self-efficacy levels.

The ability to utilize research, as part of evidence-based practice, is an expectation of professional nurses. Students are expected to develop the ability to search for research-based knowledge, synthesize the available research, and incorporate research-based recommendations into practice. The literature, however, reveals that evidence-based practice is frequently not put into practice. Godin, Bellanger-Gravel, Eccles, and Grimshaw (2008) conducted a systematic literature review of 78 studies related to healthcare professional's intentions and behaviors. Their findings indicated that self-efficacy beliefs about capabilities were the major predictor of health care professionals' actual behavior. Two studies investigated Swedish undergraduate nursing students' self-efficacy and capability beliefs related to evidence-based practice (Florin, Ehrenberg, Wallin, & Gustavsson, 2011; Wallin et al., 2012). Florin et al., (2011) examined nursing students' experience of educational support for evidence-based practice. Their findings demonstrated that students perceived themselves to be highly capable of participating in evidence-based practice. The students felt most capable with their ability to develop and implement search strategies, develop research questions and appraise available research. In the second, related study, Wallin et al., (2012) developed and validated a survey instrument to measure nurses' use of evidence-based practice following graduation from their nursing program. The results indicated that post-graduate nurses' use of research

and evidence-based practice were correlated with their capability beliefs. The researchers' conclusions supported Bandura's definition of self-efficacy beliefs.

Self-efficacy has also been shown to influence affective learning outcomes in nursing education. Two studies explored the relationship between stress, coping and self-efficacy in nursing students. Gibbons (2010) found that self-efficacy had a significant protective influence on emotional exhaustion in nursing students. Students with strong self-efficacy beliefs were more likely to be proactive in the learning strategies that they utilized, and reported decreased levels of stress or burnout. In a companion study, self-efficacy was determined to act as a mediator and a buffer against the effects of stress (Gibbons, Dempster, & Moutray, 2010). Nursing students with high self-efficacy beliefs demonstrated greater well-being and better psychological health.

As online educational technology moves from being an alternative type of education to a course requirement, it becomes increasingly essential that nursing students possess effective basic computer skills. A number of researchers have noted that nursing students may not possess, or perceive that they do not possess, adequate computer skills to navigate through complex learning management systems (Guhde, 2010, Lu et al., 2009; McVeigh, 2009). These findings suggested that computer-related anxiety was a source of stress for nursing students.

Three studies examined university students' perceptions of using online learning systems. Previous success with online learning was found to be a strong contributor to positive outcome expectations (Bates & Khasawneh, 2007; Simmering, Posey, & Piccoli, 2009). Computer self-efficacy significantly mediated the impact of anxiety on perceived ease of use of the online learning system (Saade & Kira, 2009). Self-efficacy also has

been shown to positively affect use of online learning resources. Students with a high sense of self-efficacy made the best use of online instruction (Debowski et al., 2001). Tung and Chang (2008) demonstrated a negative relationship between low computer self-efficacy and nursing students' intention to use online learning resources.

The studies discussed so far have focused on self-efficacy as a predictor of learning outcomes. Self-efficacy has also been found to be reactive to changes in the individual's personal environment, and has been studied as an indicator of effectiveness of the teaching/learning process (Zimmerman, 2000). Nurse researchers have investigated the effect of the nursing education program on students' self-efficacy. Kuiper et al., (2010) studied the effect of increasing the senior level nursing preceptorship course from 60 to 120 hours. Outcomes of the study included significant increases in student perceived self-efficacy.

Communication skills are considered a core competency of nursing practice and are incorporated throughout the nursing curriculum. Students frequently cite communication skills as a source of anxiety during their nursing education (Pike & O`Donnell, 2010; Weissman, 2011). Increased student self-confidence is one of the proposed benefits of clinical simulation. Clinical simulation has been found to positively impact communication self-efficacy in nursing students (Pike & O`Donnell, 2010). Mullan and Kothe (2010) evaluated the relationships between nursing students' self-reported satisfaction, self-rated communication skills, and performance in a simulated nurse/patient encounter. Significant positive correlations were found between satisfaction levels and self-rated communication ability. Similar findings were demonstrated in a small study of nursing students' simulation experiences (Bambini,

Washburn, & Perkins, 2009). Students who completed an obstetrical nursing simulation exhibited significant positive increases in their self-efficacy scores.

Taylor and Reyes (2012) compared self-efficacy in baccalaureate students enrolled in five separate nursing courses. Self-efficacy and resilience were measured at the beginning and end of the semester. Self-efficacy scores rose slightly over the semester, but did not reach statistical significance. In a similar study, Chesser-Smyth and Long (2013) studied specific positive and negative factors that impacted Irish nursing students' development of self-confidence. Both Taylor and Reyes (2012) and Chesser-Smyth and Long (2013) concluded that self-efficacy is a complex concept that develops over time as students successfully complete a series of difficult tasks.

Motivation. Motivation is the energy, or force, that compels an individual to engage in certain behaviors (Bandura, 1986; Pintrich & Zusho, 2007; Ryan & Deci, 2000). Social cognitive theorists posit that self-efficacy beliefs provide the foundation for human motivation (Bandura, 1986; Pajares, 2002; Zimmerman, 2000). Research evidence strongly supported the positive role that self-efficacy played in motivating students to learn. In addition, studies of procrastination in college students have provided further support for the role of self-efficacy in motivation. Low self-efficacy was a significant predictor of procrastination in college students (Park & Sperling, 2012; Strunk & Steele, 2011). Students, with self-oriented perfectionism, were less likely to procrastinate on assignments if they also possessed high self-efficacy beliefs (Seo, 2008). Self-efficacy was demonstrated to completely mediate the relationship between self-oriented perfectionism and procrastination. Klassen et al., (2010) demonstrated that self-efficacy mediated procrastination across two culturally diverse groups of college students

from Canada and Singapore. The cited studies all strongly supported the emerging theoretical literature that self-efficacy is critically important to motivation for self-regulated learning.

Other theorists have described motivation in terms of the level and quality of motivation. Deci and Ryan (1985) proposed that an individual's motivation is governed by both the amount and quality of the motivation. Self-determination theory hypothesized that the orientation of a person's motivation determines why they engage in certain activities. Motivation was described as either intrinsic or extrinsic.

Intrinsic motivation refers to behaviors or activities that are done because the learner finds them interesting, enjoyable, satisfying, or fulfilling (Ryan & Deci, 2000). Intrinsic motivation results in learning for the sake of learning and is considered completely autonomous. Intrinsic motivation is theorized to be the most desirable form of motivation. Healthy individuals exhibit "active, curious behavior and a readiness to learn" (Ryan & Deci, 2000, p. 56).

Because intrinsic motivation is internally generated, it has been viewed as an important topic of research for educators. Kusurkar, Croiset, Mann, Custers, and ten Cate (2012) suggested that intrinsic motivation has played an important, but under-valued, role in medical education. Intrinsic motivation has been conceptualized as being dependent on three learner needs (Deci & Ryan, 1985; Ryan & Deci, 2000; Kusurkar et al., 2012). First is the need for autonomy. Learners need to feel that they are learning because they have an internal focus and want to learn. A qualitative study, of Swedish nursing and medical students, demonstrated that successful students expressed a higher desire for control over their own learning (Bengtsson & Ohlsson, 2010). Nilsson and Stomberg

(2008) found that nursing students with higher intrinsic motivation displayed more well thought out plans for studying and learning. Clayton et al., (2010) and Puzzifer (2008) studied university students' decisions to enroll in online or traditional classroom courses. Regardless of class format, students who perceived that they have a sense of choice and greater ability to direct their own learning exhibited higher motivation to engage in active learning.

The second need of intrinsically motivated learners was the need for relatedness (Deci & Ryan, 1985; Ryan & Deci, 2000; Kusurkar et al., 2012). Relatedness has been described from the perspective of whether the learner believed that the content to be learned was relevant to them personally. A number of studies have theorized that intrinsic motivation and positive learning outcomes were enhanced when learners view the course content as relevant (Bengtsson & Ohlsson, 2010; Nilsson & Stomberg, 2008). Levett-Jones, et al., (2009) demonstrated that negative attitudes, related to the relevance of information technology coursework, resulted in decreased intrinsic motivation in Australian nursing students. In a similar study, Juliani et al., (2011) determined that relevancy to current or future practice was an important factor in determining motivation of nursing students. Huckabay (2009) studied the effects of negative cognitive set on motivation and learning outcomes in a nursing pathophysiology course. Regardless, of whether students held a positive or negative set, all students demonstrated significant levels of learning. Huckabay, however, postulated that enduring learning may not have occurred. Students failed to recognize the relevancy of content and, therefore, lacked intrinsic motivation for long-term learning. These findings were consistent with Abrami

et al., (2010) synthesis of the research literature, which indicated that the effectiveness of online learning was limited by motivational factors.

Competence was the third need of intrinsically motivated learners (Deci & Ryan, 1985; Ryan & Deci, 2000; Kusurkar et al., 2012). The need for competence was strongly associated with self-efficacy or self-confidence (Bandura, 1986; Schunk & Zimmerman, 2007). Findings demonstrated that students only succeeded at a learning task if they had the necessary skills to perform and the requisite self-efficacy beliefs (Godin et al., 2008, McMullan et al., 2012). Lack of requisite skills or low self-efficacy beliefs resulted in decreased motivation to perform the learning task.

Studies have also revealed gender differences related to intrinsic motivation. Brownlow and Reasinger (2000) found that male college students, who exhibited high levels of procrastination, also had low intrinsic motivation and were generally disinterested in course work. Female procrastinators tended to be perfectionists and have high intrinsic motivation. More recent research with nursing students revealed similar findings (Nilsson & Stomberg, 2008). The authors suggested that these findings may be partially explained by the fact that nursing remains a primarily female profession, and men were not adequately represented in the sample.

Extrinsic motivation is defined as motivation that is externally generated and depends upon a force or outcome that is separate from the individual learner (Deci & Ryan, 1985). The behavior or outcome, associated with extrinsic motivation, has some type of instrumental value. Instrumental value can be described as positive or negative. Earning praise from an instructor is an example of positive instrumental value. A failing grade on a test would be an example of negative instrumental value, something that the

learner wants to avoid. Extrinsic learning is viewed as a continuum, consisting of gradations ranging from total external regulation to integration (Deci & Ryan, 1985). Learners who exhibit total external regulation rely on external reward or penalty as their source of motivation. Other learners use a second type of extrinsic motivation, introjected regulation, which is also externally regulated (Ryan & Deci, 2000). In this case, however, the learner engages in activity because of pressure to maintain feelings of self-esteem or self-worth. Identification regulation is a more autonomous form of extrinsic motivation. The learner believes that the activity is personally important and has personal value. The learner then willingly accepts the external regulation. The most autonomous form of extrinsic motivation is integrated regulation, which is described as "full incorporation of the external regulation into the self" (Ryan & Deci, 2000, p. 62). Integrated extrinsic motivation is very similar to intrinsic motivation; however, the behavior or activity is still done to achieve an external outcome.

It should be noted that self-determination theory also includes the category of amotivation. Amotivation is defined as the total absence of motivation to engage in a behavior (Ryan & Deci, 2000). Amotivation usually occurs when the learner does not value the activity, or feels incompetent to complete the activity.

Motivation research, over the past two decades, has consistently associated intrinsic motivation with higher learning outcomes. As Ryan and Deci (2000) pointed out, however, intrinsic motivation only occurred if the learning activity had appeal for the individual learner. Unfortunately, much of the nursing curriculum may not be personally appealing to many nursing students. Maurer, Allen, Gatch, Shankar, and Sturges (2012) compared student motivation and learning outcomes in an allied health human anatomy

and physiology course. Their findings indicated that intrinsic motivation was significantly associated with effective study habits and higher effort. The surprising finding in this study was that, overall, students demonstrated higher levels of extrinsic motivation than intrinsic motivation. Possible explanations given for this finding suggested that students had adopted a more consumerist approach to their education. A consumerist approach did not necessarily link motivations to behaviors such as study habits (Levine & Dean, 2012; Maurer et al., 2012). The other possible explanation provided by the researchers was that the course instructor had a large amount of control over external regulation of the course. In that situation, students responded to the external regulation with increased extrinsic motivation (Ryan & Deci, 2000). This explanation is consistent with qualitative findings that suggested that nursing and medical students identified many extrinsic motivational factors within their academic courses (Bengtsson & Ohlsson, 2010).

In summary, motivation has been demonstrated to have a significant impact on academic performance in college students. Two major constructs associated with learner motivation are self-efficacy and intrinsic motivation. Social cognitive theorists view self-efficacy as the basis for learner motivation (Bandura, 1986). Self-determination theorists suggest that intrinsic motivation is the major determinant of academic performance (Deci & Ryan, 1985).

Goal setting. According to Pintrich and Zusho (2007), all motivational learning theories recognize the importance of purpose, or goals, in human learning behavior. Social cognitive theorists posited that goals function as guides and motivators for future outcomes (Bandura 1986; 2002; Wood & Bandura, 1989). Goals provide clarity related

to what the student is trying to accomplish. In a study of first year Dutch medical students, Helmich, Bolhuis, Lann, and Koopmans (2011) demonstrated the importance of clarity and congruency between student goals and medical school goals for the first clinical experience.

Self-efficacy has been shown to act as both an antecedent and a consequence of goal setting and goal accomplishment (Bandura, 2002; Wood & Bandura, 1989). Self-efficacy beliefs determine the individual's goals and aspirations. Individuals with high self-efficacy beliefs set higher goals for themselves and evidenced a firmer commitment to attaining those goals (Bandura, 2002; Pajares, 2002). High self-efficacy learners expected positive outcomes. Learners with less self-efficacy set lower goals for their learning, exhibited less commitment, and expected less positive outcomes.

Goal orientation has been described in differing ways. In a meta-analysis, of 243 research studies related to achievement goal orientation, Hulleman, Schrager, Bodmann, and Harackiewicz (2010) identified that conceptual and measurement differences existed between conceptualizations of achievement goal orientation. The meta-analysis demonstrated that the same label was frequently used to describe different constructs. There was, however, a general consensus across multiple theoretical perspectives that learning achievement goals fall along a continuum (Wood & Bandura, 1989; Pintrich & Zusho, 2007; Richardson, Abraham, & Bond, 2012; Schunk & Zimmerman, 2007). On one end of the continuum lie avoidance goals, followed by task specific performance goals. On the opposite end of the continuum are general over-arching mastery goals.

Avoidance goals have been classified as performance avoidance, mastery avoidance or work avoidance (Pintrich & Zusho, 2007; Waskiewicz, 2012). Learners

with a performance avoidance orientation attempted to stay out of learning situations where they would be compared unfavorably to other learners. The mastery avoidance orientation resulted in learners avoiding circumstances where they perceived the presence of barriers to their learning achievement (Pintrich & Zusho, 2007). Work avoidance orientation has best been described as an orientation that attempts to minimize the amount of effort expended in a learning achievement situation (Waskiewicz, 2012). Work avoidance orientation was reflected in other research findings that successful use of online learning resources was limited by students' desire to expend minimal effort in the learning process (Abrami et al., 2010; Colan-Aquirre & Fleming-May, 2012).

Task specific goal orientation is centered on obtaining a specific, immediate outcome, such as wanting to get an 'A' on a nursing research paper. Some theorists have labeled these as performance goals (Pintrich & Zusho, 2007; Waskiewicz, 2012). The learner, with a performance goal orientation, was focused on competition and surpassing other students by achieving high grades or recognition of some type. Success or failure was determined by an external reference source.

Individuals with a learning goal oriented toward mastering the learning content and increasing competence were described as having a mastery goal orientation (Pintrich & Zusho, 2007; Kusurkar et al., 2012). Learners with a mastery goal orientation focused on trying to understand their studies and apply the content. To evaluate success or failure, mastery goal oriented learners utilized internal reference standards and comparison to past performance to evaluate success or failure.

Mastery goal orientation is assumed to be more adaptive and is the preferred goal orientation (Wood & Bandura, 1989; Kusurkar et al., 2012; Pintrich & Zusho, 2007;

Schunk & Zimmerman, 2007). Howell and Watson (2007) demonstrated a positive relationship between intrinsic motivation and mastery goal orientation. Students with greater intrinsic motivation demonstrated a higher mastery goal orientation toward learning, and were less likely to procrastinate. Mastery goal orientation was also associated with higher use of metacognitive strategies and with greater organizational cognitive strategies. These characteristics were all consistent with higher self-regulation abilities.

Other researchers have investigated the effects of mastery goal orientation and performance goal orientation on additional aspects of learning in undergraduate students. Waskiewicz (2012) examined the relationship between pharmacy students' innate learning goal motivation and their motivation to achieve on a single low-stakes test. The situational motivator, a standardized knowledge test, had a significant influence on students with task/performance orientation, as well as, those with a work avoidance orientation. Students with a mastery learning orientation were not affected by changes in situational motivation. The authors posited that the findings supported mastery goal orientation as being a more stable and enduring trait. Clayton et al., (2010) studied differences in learning motivation and learning strategies in college students who chose to enroll in online classes versus those who chose traditional classroom courses. Students who chose traditional classroom courses showed significantly higher mastery goal orientation. Students reported that engagement with professor and peers enriched their learning experience.

The findings, of the studies discussed, were consistent with other research that suggested that mastery goal oriented learners were more focused on actual learning.

Mastery goal orientation was found to be a more adaptive orientation than performance goal orientation (Pintrich & Zusho, 2007). A recent systematic review and meta-analysis, however, suggested that the findings of individual studies overestimated the positive effect of mastery goal orientation. In a meta-analysis of 13 years of university academic performance research, Richardson et al., (2012) demonstrated that both mastery learning goal orientation and performance goal orientation were found to have small positive correlations with successful academic achievement. These findings support Wood and Bandura's (1989) contention that motivation may best be regulated by a combination of long-term mastery learning goals and a sequence of shorter-term performance goals. Mastery goals establish the overall direction for learning, while a progression of achievable performance goals direct and support the on-going learning endeavor.

Cognitive strategies. Cognition refers to methods that learners use to integrate multiple factors including the amount of knowledge, type of knowledge, and relationship between knowledge elements, into the learning process (Kraiger et al., 1993). The cognitive learning category contains three aspects that are frequently utilized to measure learning outcomes: Knowledge gain, knowledge organization, and knowledge application. Knowledge gain speaks to what is known, knowledge about how, knowledge about when, and knowledge about why. As learning advances beyond preliminary knowledge acquisition, the learner must also develop meaningful frameworks for organizing the knowledge (Kraiger et al., 1993). Knowledge organization includes grouping meaningful information that can be stored for later recall. Finally, the learner moves on to begin to apply the knowledge. Knowledge application involves using or applying knowledge to solve a new problem. Individual learners display significant

differences in the degree to which knowledge is acquired, organized, and applied. Diversity in students' cognitive learning strategies may arise from the learning environment and from individual factors such as self-efficacy or motivation (Schunk & Zimmerman, 2007; Zimmerman, 2000).

The use of active cognitive learning strategies has demonstrated positive effects on problem solving, critical thinking, and perseverance in college students (West & Sadoski, 2011; Zusho & Pintrich, 2003). Zimmerman (1998) identified 4 specific cognitive strategies that successful learners utilize across a variety of learning situations. These included task strategies, imagery, self-instruction, and time and resource management.

Task strategies. Task strategies incorporate the analysis of the learning task and selection of the best strategies to achieve the task. Specific task strategies may include breaking the task down into manageable pieces, prioritizing the content pieces, selecting learning strategies, and organizing the best strategies to facilitate learning. Zimmerman (1998) reported that successful students use between 15 and 20 specific strategies when studying. Frequently cited task strategies included making lists of specific tasks that must be accomplished during studying, and developing mnemonics or other tactics to help the student remember facts. Preparation prior to class, timely review of information presented in class, prioritizing information, and repeated review of information were found to be significant learning task strategies used by successful first year medical students (West & Sadoski, 2011).

Organizational task strategies included structuring learning material by dividing it into parts, identifying what is relevant, and deciding what is irrelevant (Zimmerman,

1998). Strategies for organizing complex knowledge encompassed outlining, developing a hierarchy of important concepts, or constructing a diagram to illustrate relationships between concepts. Two studies, conducted in Scandinavia, demonstrated the importance of these organizational task strategies on academic performance in undergraduate students. Heikkila, Niemivirta, Nieminen, and Lonka (2011) classified students as non-academic, self-directed, or helpless based on their ability to self-regulate learning. Students classified as helpless scored significantly higher in the category of task irrelevant behavior. High use of task irrelevant study behaviors indicated a deficiency in the ability to strategize and prioritize information. Decreased ability to strategize learning tasks was also exhibited by Norwegian students who failed an introductory psychology course (Diseth, Pallesen, Brumborg, & Larsen, 2010).

In an integrative literature review, Pitt, Powis, Levett-Jones, and Hunter (2012) identified the ability to process and organize information as key cognitive strategies associated with critical thinking and academic success of nursing students. Literature from nursing and other disciplines has emphasized the importance of cognitive strategies in critical thinking and learning. Pitt et al. (2012) however, indicated that the exact role of critical thinking, in cognition and metacognition, has not been clearly delineated in the nursing literature.

Imagery. Imagery is the process by which a learner generates and remembers a mental image of the material to be learned (Zimmerman, 1998). Recent research on multimedia learning demonstrated that the use of both narrative and image material had important roles in learning (Leutner, Leopold, & Sumfleth, 2009). Comprehension increased when students associate a visual image with the material to be learned.

Neuroscience, through the use of neuroimaging, has contributed to the study of how individuals learn. Researchers used neuroimaging to identify differences in brain activity in subjects who utilized different cognitive strategies during a memory retrieval task (Miller, Donovan, Bennett, Aminoff, & Mayer, 2012). Individual differences in encoding and cognitive style accounted for most of the variability. Brain activity of individuals who visualized word stimuli differed significantly from those who did not use visual imagery. Use of imagery was greatest when the memory task involved words that were easy to image, and decreased as the words became more difficult to image.

Leutner et al., (2009) compared the effects of mental imaging on student comprehension of science textbook content. One group used mental imagery while reading the textbook. The other group drew pictures after completing the same reading assignment. The study results demonstrated a significantly greater increase in learning in those students who visualized the material while reading. In a similar study, Makany, Kemp, and Dror (2009) investigated the effectiveness of linear versus non-linear note taking during both a lecture and panel discussion. Image generation in non-linear note taking included the use of either graphing or concept mapping. The investigators found that non-linear note takers averaged 20% higher in comprehension related task performance measures.

Self-instruction. Self-regulated learners use specific self-instructional strategies to guide their learning performance. Deep learning approach and surface learning approach have been identified as two distinct approaches that students use in learning (Pintrich & Zusho, 2007). The learning approach that the student assumed is dependent upon their perception of the learning environment, the learning task, and the perceived

relevance of the task (Lizzio, Wilson, & Simons, 2002). Students who were satisfied with the learning environment and valued gaining specific knowledge or competencies were found to experience higher academic performance (Paechter et al., 2010; Tung & Chang, 2008).

Learners who take a deep learning approach endeavor to make sense of newly acquired knowledge by relating it to knowledge that they have previously learned (Pintrich & Zusho, 2007). Deep learners focus on learning how new information fits into what is already known (Phan 2011). They actively engage ideas and demonstrate innate curiosity in the subject. Students who utilized a deep learning approach also demonstrated higher and more effective use of organizational task skills (Lizzio et al., 2002; Stegers-Jager, Cohen-Schotanus, & Themmen, 2012; West & Sadoski, 2011; Zusho & Pintrich, 2003). Deep learners prioritized more efficiently and spent their study time on learning relevant content (Diseth et al., 2010).

Students who assumed a surface learning approach tended to rely on rote learning or memorization of course material (Lizzio et al., 2002). Surface approach learners were found to focus more on being able to reproduce the specific content, rather than on comprehension and application (Heinje-Penninga, Kuks, Hofman, & Cohen-Schotanus, 2010). Short term learning was usually driven by class deadlines, rather than a thoughtful organized approach to learning (Hagemeier & Mason, 2011). Strategies that supported rapid initial learning have been correlated with decreased enduring learning.

Rehearsal and elaboration are two cognitive learning strategies associated with self-instruction that have been described in the literature. Rehearsal has been most commonly identified as a surface approach strategy (Winne, 1996; Zusho & Pintrich,

2003). The student's focus was on memorization and recall of information. Students frequently employed rehearsal by actively saying or writing key information (Zimmerman, 1998). Although rehearsal was most often used for learning tasks related to rote memorization, it has also been utilized to promote deeper learning (Weinstein, Acee, & Jung, 2011; Zusho & Pintrich, 2003). As an example, nursing students utilized rehearsal to learn medication calculation skills by solving a series of practice medication calculation problems (McMullan et al., 2012).

A second cognitive learning strategy, elaboration, involved making connections between newly learned material and existing knowledge (Phan, 2011; Winne, 1996; Zusho & Pintrich, 2003). Elaboration has been utilized in both surface and deep learning. When used in the surface approach to learning, elaboration included forming mental images to connect the information with a familiar object, or the use of mnemonic strategies to support memorization. In deeper processing, elaboration was shown to utilize paraphrasing and summarizing (Zusho & Pintrich, 2003). Identifying connections, comparing, and contrasting the new information with previously learned material were other elaborative processes used in deeper learning (Leigh, Rufferford, Wild, Cappleman, & Hynes, 2012; Weinstein et al., 2011). Utilization of deep learning strategies, such as elaboration, has been demonstrated to increase development of clinical reasoning and problem-solving skills in nursing students (Hoffman et al., 2011).

The relationship between deep learning and successful academic achievement has not been consistently supported in the research literature (Phan, 2011). Stegers-Jager et al., (2012), found that deep learning strategies were positively associated with resource management strategies, but not with academic performance in first year Dutch medical

students. Another study, of second year medical students, found that the need for cognition was more significant than the use of deep learning strategies in both open-book and closed-book examinations (Heijne-Penniga et al., 2010). Zusho and Pintrich (2003) observed decreases in use of rehearsal and elaboration strategies during an introductory college chemistry course. They noted a concomitant increase in the use of task organization and other cognitive strategies over the course of the semester.

The majority of research evidence over the past decade, however, supported the hypothesis that deep learning is positively associated with academic achievement. Deep learning strategies have been consistently identified as positive predictors of academic achievement in undergraduate students (Diseth et al., 2010; Heikkila et al., 2011; Howell & Watson, 2007; Wolters, 2003). The results were constant across studies conducted in North America and several European countries. The relationship between deep learning and academic performance was also upheld in studies of healthcare professions students. West and Sadoski (2011) identified that self-testing, and other deep learning strategies, were successfully used by high performing medical students.

A number of nurse researchers have studied specific interventions to increase use of deep learning strategies by nursing students. Kuiper et al. (2010) discovered that increased student hours spent with a preceptor resulted in nursing students using more forward reasoning strategies. Australian nursing students indicated that an interactive computerized decision support framework increased their use of deep processing strategies and heightened their interest and motivation in learning (Hoffman et al., 2011). Leigh et al., (2012) found that using a patchwork text assessment strategy promoted deep learning in a nursing postgraduate leadership course. Rather than completing a single

large project, students were asked to synthesize how a series of small projects met the learning outcomes of the course.

The use of concept mapping has been posited to increase understanding and academic performance (Gul & Boman, 2006; Makany et al., 2009). The relationship between concept mapping and deep learning, however, has not been widely studied. In a randomized controlled trial, Nejat, Kouhestani, and Rezaei (2011) studied the effects of concept mapping on Iranian nursing students' deep learning. Deep learning significantly increased in the concept mapping group. The types of deep approaches used by the experimental group were identified as significantly different from approaches used by the control group.

Time and resource management. Time and resource management have been broadly conceptualized as the amount of effort, intensity of effort, and extent of effort that a student applies to a learning task (Phan, 2011; Stegers-Jager et al., 2012; Zimmerman, 1998). Although it seems logical that the amount of time spent on a learning task would be positively correlated with achievement outcomes, research studies have not consistently demonstrated this relationship. Time spent studying was shown to be mediated by task strategies, such as, prioritization and organization of information (Howell & Watson, 2007; Wolters, 2003). Time management was not demonstrated to equate with total study time, but rather to a synthesis of task strategies and time spent on relevant information (Diseth et al., 2010 Goldfinch & Hughes, 2007; West & Sadoski, 2011). Students who were high achievers were more likely to schedule, plan, and manage their study time (Puzzifer, 2008). Increased time spent on studying for

examinations was found to be associated with use of inefficient learning strategies and lower scores on examinations (Heijne-Penniga et al., 2010).

Resource management refers to how well the student makes use of available learning resources. Management of learning resources has been identified as having particular relevance to online and blended forms of college courses where the need for self-regulated learning is heightened (Bandura, 2001; Garrison et al., 2010; Shea & Bidjerano, 2010). In the traditional classroom, the instructor has substantial control over the learning resources. In online or blended classes, the learner must choose to participate and utilize the available learning resources. A number of studies have reported decreased student engagement in online college courses. A variety of reasons have been postulated, including lack of engagement with professor and peers (Abdous & Yen, 2010; Hale, Mirakian, & Day, 2009). Other researchers found that decreased motivation and effort regulation have a negative impact on student participation (Abrami et al., 2010; Clayton et al., 2010; Puzzifer, 2008).

Limited student engagement and decreased participation has been consistently identified as having a negative impact on student academic performance. Pitt et al., (2012) conducted an integrative review of the nursing literature that investigated the relationship between nursing students' cognitive, motivational, and behavioral factors and their academic performance. Academic engagement was found to play a significant role in student performance and attrition. Salamonson, Andrew, and Everett (2009) investigated the impact of engagement factors in second year Australian nursing students enrolled in a pathophysiology course. Completion of homework was found to have the strongest positive correlation with academic achievement. Student attendance at lectures

was demonstrated to be the second highest significant predictor of student academic achievement. Kardong-Edgren and Emerson (2010) demonstrated that student attendance at lectures decreased after introduction of lecture podcasts. Student satisfaction with the podcasts was high. Specific learning outcomes were not investigated, however, so conclusions about the impact of podcasts on academic performance could not be made.

Findings from investigations of the relationship between learning, engagement, and participation of medical students have been consistent with previously cited nursing studies (Burnette et al., 2009). The importance of resource management and participation was also observed in a study of first year Dutch medical students (Stegers-Jager et al., 2012). The researchers, in both studies, suggested that participation in a variety of learning resources mediated the relationship between effort regulation and academic performance.

In summary, the literature related to use of cognitive strategies in college students can be condensed to three points. First, the preponderance of research studies, over the last decade, indicated that the use of cognitive strategies had a positive correlation with academic achievement (Zimmerman, 1998). Second, although most students consistently used particular patterns of cognition, cognitive strategies were found to be dynamic. Over time, successful students changed or adapted the cognitive strategies that they used (Zusho & Pintrich, 2003). Finally, cognitive strategies were discovered to work in concert to produce desired learning outcomes (Goldfinch & Hughes, 2007; Stegers-Jager et al., 2012). Deep learning strategies coupled with effective organizational task management consistently resulted in higher academic achievement than when each strategy was used alone.

Metacognitive Self-Regulation of Learning

Metacognition is commonly defined as "thinking about thinking" (Turan et al., 2009, p. E477). According to Winne (1996), metacognition is characterized by "reflecting on thinking" (p. 341). Metacognition was first associated with the theorist John Flavell (1979). Flavell posited that metacognition was composed of knowledge, experiences, goals, and tasks. One important question that arose from Flavell's conceptualization, was defining the difference between cognitive and metacognitive strategies. Subsequent theorists have suggested that the distinction rests in how the information is used in the learning process (Koriat et al., 2006; Kuiper et al., 2010; Winne, 1996). For example, learning goals are developed based on what the student believes they need to know to be successful in a class. From those goals a series of learning strategies, that the student believes will meet the learning goals, are selected and put into action. These are cognitive strategies. Cognitive strategies provide the actual steps, or methods, used to achieve learning goals. Metacognitive strategies are the evaluative and corrective thinking processes that are used to ensure that the learning goals have been achieved. Knowledge is judged to be metacognitive if it is utilized in a strategic way to make sure that a learning goal is met (Koriat et al., 2006). Thinking processes, such as studying, lead to feedback. Feedback can be either self-generated or from an external source, such as, an exam, peer input, or input from the instructor.

Megacognition includes monitoring of learning, evaluation of feedback related to learning goals, and correction of learning strategies to maintain or achieve learning goals. Most theoretical literature and research studies, however, have not made specific distinctions between metacognitive self-monitoring and self-evaluation (Koriat et al.,

2006; Winne, 1996; Zimmerman & Schunk, 2001). The lack of distinction and frequent interchange of terms has made separation of the concepts difficult. For purposes of this discussion, self-monitoring and self-evaluation have been combined.

Self-monitoring/evaluation. Winne (1996) described self-monitoring as the ¨fulcrum upon which self-regulated learning pivots¨ (p. 341). Metacognitive monitoring and evaluation refers to the process of obtaining and using feedback for self-assessment of progress made toward achievement of learning goals (Dunlap, 2005; Koriat et al., 2006). Assessment included the efficacy of the cognitive strategies implemented as well as the knowledge and learning goals attained.

Studies conducted by Koriat et al., (2006) suggested that, in general, most adults are relatively accurate in their self-monitoring assessments. Ku and Ho (2010) examined the role of metacognitive strategies in critical thinking processes. The sample population was a small group of Chinese college students. The study found that skilled critical thinkers demonstrated a high level of metacognitive planning and evaluating. In contrast, McCabe (2011) demonstrated that American college students frequently overestimated their knowledge and were overly confident in the effectiveness of their study strategies. In McCabe's study, undergraduate students were asked to predict the utility of learning strategies used in five educational scenarios. Results of the study indicated that global performance of metacognitive accuracy was very low. The highest metacognitive performance was seen in students who were able to discuss the scenarios as part of a group seminar.

Research related to metacognitive self-monitoring has frequently used judgments of learning as the outcome variable. Judgment of learning requires participants to

estimate the likelihood that they will recall a specific knowledge item on a later test. Soderstrom and McCabe (2011) studied the effect of item relatedness and item value in college students. Their findings demonstrated that students believed the information that they perceived as high value would be recalled better than information that they perceived as low value. Recall performance revealed that there was no difference in recall of high value versus low value information. Students maintained their perception, of the association between high value information and better recall, even after being tested. Soderstrom and McCabe (2011) related these findings to students' study habits. Student beliefs, related to value of information, may inaccurately inform them about the need for study and the amount of effort that will be required to meet their learning achievement goals. Hagemeier and Mason (2011) also explored the effect of relevancy and value on study habits and preparation for examinations. Their results indicated that pharmacy students who performed poorly on examinations demonstrated less self-monitoring and evaluation activities. Low performing students were more likely to evaluate the examination as inadequate, rather than the quality of their own examination preparation.

Turan et al., (2009) investigated the effects of a problem-based medical curriculum on medical students' metacognitive processing activities. Their findings indicated that students in the problem-based medical curriculum demonstrated higher metacognitive awareness and self-monitoring than medical students in more traditional instructor-led classroom programs. Dunlap (2005) studied the effects of problem based learning on undergraduates in a software engineering capstone course. The use of self-reflection journaling was observed to increase metacognitive self-evaluation. The guided

journals promoted recognition of accomplishments and personal development throughout the capstone course.

Nursing educators have also examined the effects of curricular changes on metacogition in nursing students. Kuiper et al., (2010) found that an increase of senior clinical practicum hours resulted in higher use of metacognitive strategies by senior nursing students. Analysis of reflective journaling indicated that students with increased practicum hours demonstrated a greater number and higher quality of self-evaluation strategies. In another study, the effects of an online blended nursing ethics course were investigated in Taiwanese nursing students (Hsu & Hsieh, 2011). Consistent participation in the threaded discussion increased metacognitive awareness and use of metacognitive evaluation strategies.

Self-correction. Koriat et al., (2006) suggested that self-correcting behaviors should be viewed as controls that direct the regulation of cognitive processes and behaviors. Regulation of information processing and behavior is dependent upon the accuracy of metacognitive self-monitoring. For example, students must accurately monitor the amount and importance of information in order to properly study for an examination. Monitoring the degree of learning and judgments of learning assists the student to distribute study time among different knowledge topics. If the judgments of learning are inaccurate, the allotment of study time will be problematic. Regulation of information recall is also dependent on the accuracy of self-monitoring and judgments of learning. Koriat (2009) suggested that students' intuitive feelings and corrective responses, related to their answers to examination questions, were positively related to monitoring and judgment of their knowledge base. Accurate self-monitoring of the

knowledge base resulted in higher confidence levels in answering examination questions. In a series of six experiments, Koriat et al., (2006) presented evidence that metacognitive control/correction was based on self-monitoring. The reciprocal relationship between self-monitoring and self-correction was found to occur at the same time in multiple learning situations.

The positive effects of metacognitive self-correction strategies have been demonstrated in the research literature. Kuiper et al., (2010) demonstrated that increasing the senior nursing clinical practicum resulted in greater use of self-corrective strategies related to patient care planning. Students showed increased ability to monitor care planning. They demonstrated significant improvements in their capacity to develop, correct, and refine better strategies for delivering patient care.

Howell and Watson (2007) examined learning strategies and procrastination in undergraduate students. Their findings revealed that non-procrastinating students utilized significantly higher levels of cognitive and metacognitive strategies. Students who procrastinated demonstrated decreased ability to accurately monitor and correct goal attainment strategies. Successful students in a software engineering capstone course also displayed increased self-corrective learning strategies (Dunlap, 2005). Students evidenced ability to structure, evaluate and complete tasks in order to effectively realize their learning goals.

Other researchers have demonstrated that college students have difficulty comprehending and utilizing self-correcting metacognitive strategies. Hagemeier and Mason (2011) found that pharmacy students reported infrequent use of the metacognitive self-testing techniques. Students did not recognize, understand, or consistently utilize

self-testing as a self-correcting learning strategy. In addition, students identified spacing of study time as a better way to study for examinations; however, they did not report that they incorporated spaced study strategies into their personal study routines. The students, in this and other studies, reported that their study routines were crisis-driven cramming sessions immediately prior to examinations. A review of self-regulated study activities in college students corroborated the findings that students did not alter their study routines to incorporate spaced study time (Kornell & Bjork, 2007). These findings were consistent with McCabe's (2011) research that demonstrated the need for students to both know about effective metacognitive learning strategies and be willing to incorporate them into their study routines.

In summary, the studies of metacognition suggested that monitoring and controlling learning strategies is a complex activity that involves directed attention and sophisticated reasoning processes. The research evidence also advanced a strong reciprocal relationship between metacognitive self-regulation and behavioral self-regulation. Theorists have demonstrated the strong back and forth relationship between cognitive strategies and metacognitive strategies (Flavell, 1979: Koriat et al., 2006; Winne, 1996). Dunlap (2005) provided evidence of the positive relationship between self-efficacy and metacognitive monitoring and control. The next section will demonstrate that metacognition and self-efficacy also have a reciprocal relationship with environmental factors of self-regulation in the online learning environment.

Environmental Self-Regulation of Learning

Self-regulation of learning in an online environment is influenced by a number of environmental factors. Bandura (2005) posited that there are three mechanisms by which

the environment affects self-regulation. Some environmental factors are not alterable and must be lived with. For example, the fact that particular course modules are only offered online is not an alterable environmental factor. Other environmental factors may be accepted or rejected by the learner. The student may choose to view the online lessons, or not. Finally, individuals are capable of creating some of their own environment to serve their own purposes. Students who choose to participate in study groups, with self-regulated peers, are examples of this concept.

Garrison et al. (2010) developed the Community of Inquiry Framework to describe factors that impact learning in the online learning environment. Three concepts taken from their framework provide a useful context for discussing environmental self-regulation factors in blended online nursing courses. Garrison et al. (2010) suggested that online learning is enhanced when three criteria are met. First, information technology must support the learning needs of students. Second, there is a strong and supportive teaching presence to support learning. Finally, a strong social presence is in place to support peer learning.

Technology-related factors. The ease of use of the learning management system and quality of the programming have been identified as key technological components of online courses (Eom, Wen, & Ashill, 2006; Georgouli et al., 2008). A number of nursing research studies have reported that, although considered a digital native generation, many nursing students lack sufficient computer skills to navigate through a complex learning system (Guhde, 2010; Lu et al., 2009). Levett-Jones et al. (2009) studied nursing students' information technology competence and confidence. Students reported that they did not have adequate computer skills to complete course work. Resistance to using

informational technology was rated as high and many students did not understand the relevance of information technology to nursing. McVeigh (2009) also identified students' lack of confidence in their computer skills as problematic for online learning in nursing courses. McVeigh suggested that it is difficult to distinguish if the students' skills were actually inadequate, or whether the results simply reflected a perceived lack of confidence.

Students, in online courses, have identified feelings of anxiety and loss of control due to inconsistencies and difficulties in using the learning management system (Cazwell & Rodriguez, 2011). Juliani et al., (2011) reported that most students were satisfied with the technology, but also recounted having numerous technologic difficulties. Students indicated that it was important for technology to be fast, efficient, and easy to navigate. Adequacy of instructions and orientation to the learning management system were essential also identified as components for student success (Georgouli, et al., 2008).

Research findings have demonstrated a reciprocal relationship between behavioral factors of self-regulation, environmental self-regulation, and metacognitive self-regulation factors (Bandura, 2005; Turan et al., 2009). As previously discussed, self-efficacy beliefs played a pivotal role in determining students' motivation to engage in online learning. Students who believed that they possess the requisite technology skills have demonstrated higher motivation to engage in online learning (Saade & Kira, 2009; Tung & Chang, 2008). Likewise, reciprocity was shown between metacognitive skills and environmental factors related to online learning. The information technology venue requires a greater need for self-monitoring, self-evaluating, and self-correcting behavior (Greene et al., 2011; Turan et al., 2009). Studies have indicated that students must

monitor, evaluate, and correct not only their learning outcomes, but also whether they have the requisite technology skills to engage in learning (Turan et al., 2009).

Faculty-related factors. Faculty or teaching presence has been considered from the dimensions of design, direction, and facilitation (Garrison et al., 2010). A number of studies have demonstrated the importance of the three faculty-related dimensions. Design refers to the adequacy and comprehensiveness of the content delivered online, as well as the quality of the online presentation. Sun, Tsai, Finger, Chen, and Yeh, (2008) established that elements of online course design were significantly associated with student satisfaction and student performance. Likewise, the direction provided by faculty was shown to have a significant impact on student satisfaction and performance (Paechter et al., 2010; Shea & Bidjerano, 2010; 2012; Sun et al., 2008). Faculty direction was shown to control the extent to which course expectations were clearly identified to the students. The availability, adequacy, and clarity of course information and instructions were reported to be significant faculty-direction factors (Paechter et al., 2010).

Faculty facilitation factors, associated with student satisfaction and academic success, have been extensively studied during the past decade (Shea & Bidjerano, 2010; 2012). Abrami et al., (2010) indicated that the quality and diversity of assessments, time requirements, and inter-connectedness of faculty and students all played critical roles in successful online education. In a meta-analysis of 74 research studies, Bernard et al., (2009) found that student-faculty connection and interaction was consistently associated with higher learning outcomes in online students.

Students' evaluations of online learning experiences consistently emphasized the importance of faculty availability (Abdous & Yen, 2010; Hale et al., 2009). Paechter et

al., (2010) studied Austrian students' experiences with online learning courses. Of the many factors influencing student performance and satisfaction, instructor expertise and support were found to have the most significant impact. Direct interaction with the course instructor was shown to significantly enhance the learners' construction of knowledge and satisfaction with the course. In addition, students reported higher feelings of media competency when they were able to personally interact with, and receive feedback from, the course instructor. Artino and Stephens (2009) compared online learning experiences of undergraduate students with experiences of graduate students. Their findings revealed that undergraduate students had more experience with online technologies, but that they also required more direct teacher support and structure. Clayton et al., (2010) also reported that undergraduate students expressed the importance of engagement with their professor in online courses.

The importance of faculty presence was demonstrated in Shea and Bidjerano's (2010) evaluation of factors that influence online learning. Teaching presence was found to be an important, but often overlooked, factor in online learning. Shea and Bidjerano (2010) posited that strong teaching presence supports development of learner self-efficacy, which is consistent with Bandura's (1986; 2002) work on modeling. Modeling refers to the process by which the learner patterns their cognitive thoughts, affective beliefs, and behaviors after those of the model (Schunk & Zimmerman, 2007). Increased teaching presence, in online courses, has been shown to increase the potential for modeling to occur (Bandura, 2002; Debowski et al., 2001; Shea & Bijerano, 2010). Self-regulated learners were cognizant of how instructors could assist them in their learning process. Zimmerman (1998) suggested that self-regulated students readily identified

instructor-models and engaged in help seeking behaviors. Students who were less self-regulated placed less value on faculty presence and were hesitant to approach their instructor for help.

As Shea and Bidjerano (2010) demonstrated, learner self-efficacy was increased in online courses with a strong faculty presence. Modeling and engagement with the instructor were viewed as a resource management cognitive strategy. Faculty presence also provided feedback to the student. Feedback was necessary for metacognitive self-evaluation and self-correction to occur. These findings were consistent with Clayton et al. (2010) and Paechter et al. (2010) who both noted the importance of faculty guidance on students' achievement. The connection between faculty presence, behavioral self-regulation, and metacognitive factors further emphasize the reciprocal nature of self-regulated learning.

Peer-related factors. Self-regulated learners effectively utilize the peer group as a learning resource. Zimmerman (1998) suggested that self-regulated learners were able to identify how the use of peer help-seeking activities, study partners, and peer project teams could assist them in the learning process. Self-regulated peers supported effective learning strategies (McCabe, 2011). Self-regulated learners also were shown to be highly effective models to their peers (Schunk & Zimmerman, 2007). Less regulated students learned effective study habits from their self-regulated peers.

Peer to peer relationships have been described as social presence in the online setting (Garrison et al., 2010). Researchers investigating the Community of Inquiry Framework found that self-regulated peers provided important feedback to fellow students (Garrison et al., 2010; Shea & Bidjerano, 2010). In addition, the studies

suggested that peer social presence acted as a mediating variable between teaching presence, metacognitive self-correction, and cognitive processing (Shea & Bidjerano, 2012).

Yoo and Chae (2011) studied the effects of student peer review on communication skills and learning motivation in Korean nursing students. Communication skills and motivation levels significantly increased in nursing students who engaged in the small-group peer review intervention. Students reported that the peer review intervention helped them to improve their own communication skills. Students described using self-reflection, on their own communication skills, while reviewing their peers' performance.

Chesser-Smyth and Long (2013) investigated the relationships between theoretical and clinical preparation on development of self-confidence in first year Irish nursing students. Their findings indicated that the students' greatest sources of self-confidence came from the peer group and from working as a team. The results of this study also supported the concept of modeling espoused by social cognitive theorists (Bandura, 1986). Students reported that observation of vicarious experiences, of other team members, increased their own self-confidence.

The importance of peer support, on academic performance, was supported by Goldfinch and Hughes (2007). Their findings concluded that students' confidence in teamwork was part of the best predictive model of success in first year undergraduate college students. The importance of knowledge sharing with peers was found to be a significant factor in the model of online learning achievement developed by Paechter et al., (2010). Puzzifer (2008) also studied the relationship between self-regulation factors

and online course grades. A small, but non-significant, positive relationship was found between peer learning strategies and final grades. These three studies demonstrated that utilization of peer resources, in the form of modeling, study group, project teams, or as a source of self-confidence has a shared relationship with resource management. Peer evaluation also had an important role in self-monitoring and self-correction, indicating the reciprocity between peer social presence and metacognitive factors of self-regulation. (Schunk & Zimmerman, 2007; Yoo & Chae, 2011).

Learning Environment

Schools of Nursing have utilized a variety of learning environments since the inception of formal nursing education in the late 19th century. Following the lead of early medical schools, nursing schools adopted the apprenticeship model (Brubacher & Rudy, 1997). Emphasis was placed on clinical learning and service to the hospital, with students spending long hours providing direct patient care. Didactic content was generally provided in lecture format. With the emergence of university-affiliated schools of nursing, the learning environment became centered on the traditional instructor-led classroom format.

Online learning environment. Rapid expansion of healthcare technology, coupled with an explosion of knowledge, has challenged the tradition of lecture-based courses in schools of nursing (Giddens & Brady, 2007; Lubeck, Tschetter, & Mennega, 2013; Robert Wood Johnson Foundation, 2010). The burgeoning knowledge content can no longer be presented in the traditional instructor-led classroom learning environment. Beginning in the late 1990s, nursing education programs began to implement and evaluate various methods of technology-based instruction. In the last decade, web-based

instruction has significantly increased due to improved learning management systems, advances in computer technology, and financial constraints related to the rising cost of college education (Georgouli et al., 2008; Myers et al., 2011). By 2010, over 25% of college students were enrolled in some type of online coursework (Allen & Seamen, 2010).

The online learning environment differs significantly from the traditional instructor-led classroom (Bernard et al., 2004). In the traditional classroom, the instructor is responsible for determining the type of content to be taught, the timing and amount of content presented, and the mode of presentation. Teaching in the traditional classroom is face-to-face. The instructor provides a personal presence that is thought to enhance student motivation for learning (Wei et al., 2012).

Web-based teaching is similar to classroom-based instruction in that they both require application of the principles of good practices in education (Chickering & Ehrman, 1996; Sowan & Jenkins, 2013). The best practices adapted for online courses are summarized in Table 2.1. The significant differences, in online best practices, arise from the importance of addressing both technology and the course infrastructure.

Having easy to navigate technology and adequate technological support is critical to successful online courses. Students cannot learn if they cannot consistently and reliably access and navigate through the online content. Course infrastructure has also been identified as being critical to successful online learning (Georgouli et al., 2008; Shea & Bidjerano, 2010; Sun et al., 2008). Course infrastructure, including instructions, guidelines, requirements, expectations, and procedures must be clearly specified in the

Table 2.1 Principles of Good Practices in Online Education

Good Practice	Application to Online Course
Active learning	Opportunities for active engagement are provided -discussion boards -group projects -individual projects
Feedback	Students are encouraged to critically think Faculty provides feedback in a timely manner Feedback is available from peers via projects or online discussion
Time on task	Time allotted for online lessons is comparable to time allotted for in comparable classroom lessons Web-based learning materials are succinct and readily available
Collaboration with peers	Students have the opportunity to interact with classmates in a structured format to promote collaboration and learning -online discussions -projects
Interaction with course faculty	Faculty establish times when they are accessible to students Opportunities for formal and informal interaction with faculty are built into the course design
High expectations	Course expectations are equivalent to those of classroom Course expectations, procedures, and processes are clearly communicated in the course syllabus
Respect for diversity of learning and persons	Multiple learning strategies are incorporated into course material Course syllabus and interactions support respect for persons and diversity of views

From "Implementing the seven principles: Technology as lever," by A. Chickering and S. Ehrman, 1996, October, *AAHE Bulletin*, *October*, pp. 3-6. (Appendix A)

online learning environment. A comprehensive, specific, and easy to understand course syllabus is essential in an online course.

Bonk and Graham (2012) compared the face-to-face learning environment with the online learning environment. They suggested that face-to-face learning environments are associated with high levels of physical space, short instructor response or lag time, use of multiple senses, and are high in human connectedness. The online learning environment differs significantly from the traditional instructor-led classroom in these areas. Bonk and Graham (2012) described the online learning environment as a virtual space with potentially long response or lag times. Use of the senses is limited and, in the case of online readings, is only visual. Human connectedness, in the form of student-faculty relationships or peer-to-peer relationships, is limited.

Although generally supportive of online learning environments, the nursing literature has also identified the limitations described by Bonk and Graham (2012). A number of studies have evaluated students' perceptions of the learning environment in online nursing courses. An integrative review, of studies evaluating online nursing courses, identified the ability to communicate with the online instructor and peers as a strong satisfier (Mancuso-Murphy, 2007). Conversely, the lack of the human connectedness factor was rated as a major dissatisfier in the online learning literature reviewed. The need for interaction and connectedness was further explored by Sitzman (2010) who surveyed 122 online baccalaureate nursing students from five universities. Surprisingly, the most important factors were related to the instructor's ability to manage the online process and clearly communicate the process and related expectations. Even

when connectedness and student-faculty interaction are lacking, clear communication was identified as a strong satisfier.

Other investigations have revealed additional issues that interfere with student satisfaction with the online learning environment. Creedy et al., (2007) studied third year BSN students' perceptions of an online learning environment. The students reported unfavorable perceptions of technical support and faculty support. Researchers found a surprising lack of computer literacy among those nursing students, leading to difficulties in using the web-enhanced learning programs. Another study evaluated second degree nursing students' performance and satisfaction with a web-based course (Kearns, Shoaf, & Summey, 2004). Students in the web-based course scored significantly higher on course performance measures. The lack of timely instructor feedback was a major source of dissatisfaction with the online course.

Class size has also been demonstrated to play a role in student satisfaction with both traditional classroom and online learning environments. In traditional classroom learning environments, class size is limited by classroom seating capacity. Class size in online courses is virtually unlimited. Burruss, Billings, Brownrigg, Skiba, and Connors (2009) found that larger online class sizes resulted in greater feelings of decreased interaction and connectedness. Both faculty-student relationship and peer-to-peer interaction were found to be negatively influenced by larger online class size.

Mancuso-Murphy (2007) conducted an integrated review of online nursing students' experiences with web-based instruction. Her findings further support the importance of faculty-student communication and the sense of connectedness. In addition, faculty expressed concern that they were less able to identify problems that

students were having in the online course. Faculty felt it was more difficult to change strategies to target specific problem areas that students were experiencing. The faculty also reported that the online courses required more time and commitment from both faculty and the students.

Blended online learning environment. The lack of human interaction is viewed as the major limitation of totally online courses, and is the driving force behind the heightened interest in blended learning (Lim & Morris, 2009). In a 2006 survey, online educators predicted a significant shift away from totally online courses and toward blended learning environments (Kim & Bonk, 2006). The current interest in blended learning is reflected in the healthcare education literature. In a systematic review of the literature, Rowe, Frantz, and Bozalek (2012) found a total of 71 recent studies that considered the effectiveness of blended learning interventions in healthcare education. The interest in blended online learning is also apparent in the nursing education literature. Nurse educators indicated that they believe that varied instructional methods enhance student outcomes (Hsu & Hsieh, 2011; Rigby et al., 2012). The multiple instructional methods used in blended learning were theorized to better meet the varied learning styles of students (Lim & Morris, 2009; Rigby et al., 2012).

Blended learning is defined as a mix of face-to-face classroom instruction and computer-mediated technologies (Bonk & Graham, 2012). A course is considered to be blended if 30% to 79% of the learning activities are computer-mediated (Allen & Seamen, 2010). Lim and Morris (2009) further expanded this definition by stating that the instructional mix must be appropriate to and support learning outcomes. Careful selection and combination of face-to-face instruction and computer-mediated

instructional strategies resulted in the greatest benefit to learning (Shea & Bidjerano, 2010).

In a systematic review of blended online healthcare education courses, Rowe et al., (2012) concluded that the majority of studies found positive learning effects from the blended learning environment. They noted, however, that the types of classroom and computer-mediated instructional strategies varied significantly from study to study. Nursing research studies also demonstrate the variation of blended learning methodologies. Sung, Kwon, and Rya (2008) studied Korean nursing students in a blended e-learning course that included case studies and medication administration. Analysis of pre-test and post-test scores indicated that students in the blended course demonstrated better self-efficacy and knowledge about medication administration.

Hsu and Hsieh (2011) investigated outcomes of a blended undergraduate ethics course. Students attended a weekly class followed by participation in an online threaded discussion. Participation in the online discussions was found to be a significant predictor of the course grade. In addition, blended learning was positively associated with metacognitive and self-regulatory development. In a follow-up study, Hsu (2012) investigated student responses to an undergraduate nursing ethics course. The blended course combined classroom lectures, online video scenarios, and an online chat room. Qualitative content analysis revealed that students felt that the blended learning environment encouraged active learning, improved problem solving skills, and enhanced reflection. Students also indicated that blended learning was more time consuming and perceived that it required more work than the traditional classroom learning environment.

Rigby et al., (2012) also used a qualitative design to evaluate three cohorts of nursing students enrolled in an undergraduate mental health nursing course. The cohorts included a class that utilized only face-to-face learning, a class that utilized only online learning, and a class that utilized blended learning. Thematic analysis indicated that the students were most satisfied with the blended learning environment that included both online activities and face-to-face support. Blended learning was viewed as the most effective and efficient learning environment.

Using a mixed methods approach, Sowan and Jenkins (2013) studied the effect of an interactive hybrid nursing research course on both student satisfaction and learning outcomes. The research course was based on the seven principles of effective teaching (Chickering & Ehrmann, 1996). Students reported high satisfaction with the course and scored significantly higher than student counterparts in the same course taught in the traditional instructor-led classroom.

The nursing literature mirrors the conclusions of Rowe et al., (2012) systematic literature review. The nursing studies used different combinations of online technology and face-to-face learning strategies. While these variations made comparison of results difficult, they reflected the best practice of customizing instruction strategies to meet specific learner needs (Lim & Morris, 2009; Shea & Bidjerano, 2010; Sowan & Jenkins, 2013). The nursing studies identified positive student outcomes from the blended learning environment, although most of the outcomes related to student satisfaction. There were only a small number of well-designed studies that evaluate student participation and actual learning outcomes in the blended learning environment (Sowan & Jenkins, 2013).

Learning Outcomes in Online Courses

In healthcare education, learning includes attainment of new knowledge, skills, attitudes, and behaviors from a variety of teaching-learning activities throughout the curriculum. Learning outcomes are the intended or unintended effects of a teaching-learning encounter (Allan, 1996; Helmich et al., 2011). Learning outcomes are defined as the broad, all-encompassing consequences of learning. Cognitive learning outcomes are the most frequently and most easily measured educational outcomes (Kraiger et al., 1993). Cognitive learning outcomes can be described as what the student should know or be able to do upon completion of a particular course of instruction in the healthcare education program. Therefore, in healthcare education, both cognitive and practice application learning outcomes must be considered.

The effectiveness of online classes has been consistently demonstrated across a variety of academic disciplines. A meta-analysis of 232 studies, covering the years 1985 to 2003, found that well-designed online courses were as effective as traditional classroom-based courses in achieving cognitive learning outcomes (Bernard et al., 2004). The meta-analysis included a variety of learning outcomes related to examination scores, course grades, other achievement indicators, and continuation in course. A number of nursing research studies have also measured learning outcomes in the form of exam scores or course grades. Findings demonstrated that cognitive learning outcomes were equivalent or exceeded outcomes from traditional classroom courses (Fernandez Aleman et al, 2011; Lu et al., 2009). Other studies found that the students' perceived knowledge gain was greater in the traditional classroom group; however, there were no significant

differences in the mean exam scores or in course grade distribution (Abdous & Yen, 2010; Hale et al., 2009).

Measuring cognitive learning outcomes in online courses. Cognitive learning contains three aspects that are most frequently utilized to measure learning outcomes: Knowledge gain, knowledge organization, and knowledge application (Kraiger et al., 1993). Knowledge gain speaks to what is known, knowledge about how, knowledge about when, and knowledge about why. Knowledge gain corresponds to Bloom's revised taxonomy category of remembering (Anderson & Krathwohl, 2001). Knowledge organization includes grouping meaningful information that can be stored for later recall and is related to Bloom's category of understanding. Knowledge application involves using or applying knowledge to solve a new problem, and corresponds to Bloom's category of applying (Anderson & Krathwohl, 2001).

A number of nursing research studies measured online learning outcomes, as cognitive knowledge gain, in the form of exam scores or course grades. Mahoney, Marfurt, daCunha, and Engebretson (2005) investigated the effect of an online asynchronous threaded discussion teaching strategy in an undergraduate psychiatric mental health nursing course. Student learning was measured through examination of discussion content and by objective testing. Examination scores were higher for the online content. Students reported using higher levels of critical thinking during the online discussion threads, although the patterns were inconsistent across the two semesters of the study.

Fernandez Aleman et al., (2011) evaluated the effects of a web based medical surgical module in second year nursing students in Spain. This study measured

knowledge gain, as well as, knowledge organization, and retention of medical surgical nursing content. The findings indicated that there were no significant differences between the web based and classroom methods. The web based students did score higher on the final exam, indicating greater organization and retention of knowledge over time.

Several studies have studied the use of web-based learning in pharmacology and medication administration. Sung et al., (2008) compared a blended nursing pharmacology and medication administration course with a traditional face-to-face course format. Pre-test and post-test comparisons indicated that the students in the blended course scored higher in learning outcomes related to drug knowledge and medication administration procedures. Hale et al., (2009) evaluated the outcomes of a streaming media pharmacology course with a traditional classroom pharmacology course taught by the same instructor. Cognitive learning outcomes were measured by multiple choice quizzes and examinations, and focused on recall and understanding of information. The researchers found that the students' perceived knowledge gain was greater in the traditional classroom group; however, there were no significant differences in the mean exam scores or grade distribution.

Once learners have acquired cognitively-based knowledge, they progress to application of learning. A small number of nursing research studies measure application learning outcomes from online nursing courses. Lu et al., (2009) studied the effect of a web-based course on acquisition of intramuscular injection skills by Taiwanese nursing students. The web-based experimental group demonstrated higher cognitive knowledge scores, as well as, significantly higher skill performance of intramuscular injections. A second study, conducted by Mullan and Kothe (2010) evaluated a communication skills

module that was part of a first year nursing course. Student self-rated communication abilities were measured prior to and following completion of the communication skills module, and were compared to the student's formal grade. Measurement of knowledge application outcomes was based on the student performance in a simulated nurse/patient encounter. Lee and Lin (2013) studied the effectiveness of a pediatric medication safety e-learning program in Taiwanese nursing students. Students who completed the e-learning program had significantly higher pediatric medication management scores than students in the comparison classroom group.

In a meta-analysis of 14 nursing education and medical education studies, Feng et al., (2013) compared the effectiveness of situated e-learning with traditional classroom learning. Results of the meta-analysis demonstrated that situated e-learning significantly increased novice learner's application of knowledge as measured by clinical performance. There was, however, no significant difference in cognitive learning outcomes as compared to traditional classroom didactic learning.

In summary, learning outcomes are broad, expansive consequences of the teaching/learning process. The nursing literature describes measurement of learning outcomes primarily by remembering, understanding, and less frequently, applying. Nursing research studies have demonstrated that learning outcomes in online and blended courses are equivalent or better than learning outcomes in traditional classrooms.

Measuring participation in online activities. A number of researchers have noted that the effectiveness of the online learning environment is heavily dependent upon the individual student's level of participation in online activities (Abrami et al., 2010; Artino & Stephens, 2009; Burnette et al., 2009; Greene et al., 2011; Klingsieck et al.,

2012). A review of the relevant literature indicates that the terms participation, engagement, and involvement are frequently used interchangeably. For purposes of this discussion, the term participation will be used. Measurement of student participation in online learning activities has been evaluated as one possible determinant of student learning outcomes in blended online learning courses. It is important to understand how patterns of student participation affect other learning outcomes (Hershkovitz & Nachmias, 2012). In addition, information related to student participation can be used to guide educational interventions to increase the effectiveness of the online instruction (Rodgers, 2008).

A number of methods have been used to measure student participation in online courses. The majority of studies have focused on student participation in online discussion boards or other messaging tools (Hrastinski, 2008). The emphasis on the number of student discussion postings probably reflects the large number of online courses that utilize peer discussions specifically to increase participation and foster a sense of connectedness. The major limitation of using discussion postings, as a measure of student participation, is that other potential areas of participation are ignored.

Another commonly utilized method of measuring student participation in online courses is the use of student self-report. Students are asked to recall the amount of log-ins, or time spent in online activities, for a particular period of time. Hsu and Hsieh (2011) utilized a questionnaire to identify student participation in an online blended nursing ethics course. In addition, they measured participation in an online threaded discussion. Online participation was positively associated with increased satisfaction, metacognitive awareness, and development of self-regulation.

Chen, Lambert, and Guidry (2010) used a set of questions developed by the National Survey of Student Engagement to query college students about their engagement in online courses. Their findings demonstrated a positive correlation between student use of online technology, engagement, and learning outcomes. They noted, however, that using self-report data collection methods created significant limitations of the study. Specifically, they reported concerns related to reliability and validity of the questionnaire. Self-report measures are susceptible to discrepancies in recall (Lobiondo-Wood & Haber, 2010). Students may not accurately remember the time they spent in online activities. Social desirability may also threaten the accuracy of self-report instruments measuring student participation (LoBiondo-Wood & Haber, 2010). Students may respond in a way that they think is most favorable.

The third major method of measuring student participation in online courses is the use of Web mining techniques. Hershkovitz and Nachmias (2011) described Web mining as a set of procedures used to identify online course usage by individual students. The purpose is to discover and analyze students' online participation based on their logged activity. Ryabov (2012) suggested that merely counting the number of log-ins is a crude method of measuring online participation, because log-ins may vary from very brief hits to prolonged engagement in an online reading or video. Burnette et al., (2009) findings also demonstrated the problem with relying on log-in data. Medical students, in a pediatric emergency medicine rotation, were provided with online videos on pertinent clinical topics. Online participation was measured by log-in data. Test scores were significantly increased for each video that was viewed; however, the researchers could

not determine definite causality. They were not able to ascertain how much of the online videos were watched by students when they logged in.

Advances in learning management systems have allowed researchers to more accurately calculate the actual time spent in online activities, rather than simply recording the numbers of log-ins (Hershkovitz & Nachmias, 2011; Rodgers, 2008; Ryabov, 2012). A number of studies have demonstrated the value of using time spent in online activities as a measure of participation. Rodgers (2008) found that higher online participation had a significant positive impact on student performance. His results demonstrated that one additional hour of online participation was found to increase the module grade by almost one percent. These findings were consistent across college students of different ages and different ethnicities. In a similar study, Ryabov (2012) demonstrated the importance of time spent in online coursework on course grades. His results showed that time spent online mattered most for weaker students, particularly for raising a failing grade.

Team-Based Learning

Professional nursing practice, in the 21st century, requires nurses to critically think, engage in evidence-based practice, function as a self-directed learner, and work within teams (AACN, 2008). Team-based learning is a highly learner-centered approach in which student teams engage in meaningful, problem-focused tasks. In contrast to problem-based learning and other group-based instructional approaches, one instructor can manage 20 or more student teams (Parmelee et al., 2012). Team-based learning has been extensively utilized in medical education, but is relatively new in nursing education (Parmelee et al., 2012; Mennenga & Smyer, 2010). In a 2011 systematic literature review, Sisk (2011) found only two research studies that evaluated use of team-based

learning in nursing students. Other published literature was primarily descriptive or correlational in nature (Mennenega, 2013).

Components of team-based learning. As conceptualized by Michaelsen, team-based learning is characterized by four essential elements (Michaelsen & Sweet, 2008). The four elements include student peer team formation, student accountability, frequent and immediate feedback, and group learning assignments that develop and promote application learning. According to Michaelsen, this combination of attributes sets team-based learning apart from other group instructional approaches (Michaelsen & Sweet, 2008; Michaelsen et al., 1997).

Formation of student groups. The first essential component of team-based learning is the formation and management of the student groups. Groups should be as diverse as possible in order to ensure that each team has similar resources to draw from (Parmelee et al., 2012; Parmelee & Michaelson, 2010). In a literature review, of studies conducted on team-based medical education, Haidet et al., (2012) identified four factors related to successful formation of diverse student teams. These factors included the method and criteria for selection, determination of the size, and time frame that student teams will work together.

Care must be taken in how the teams are selected. To avoid development of counter-productive coalitions, teams should not be self-selected (Parmelee & Michaelsen, 2010; Michaelsen & Sweet, 2008). When assigning group members, instructors are advised to consider the students' background factors and overall experience level. Random assignment may be used to achieve diversity of assignment when the instructor is unfamiliar with the class members.

Michaelsen and Sweet (2008) recommended a group size of five to seven students, as this size best allows for equal distribution of student resources. The size of the student group may be adapted to fit the needs of the particular course and type of group assignments. Thomas and Bowen (2011) implemented team-based learning in an ambulatory medicine clerkship. They pre-assigned medical students into groups of four to five to achieve maximum diversity. In contrast, Willett, Rosevear, and Kim (2011) arbitrarily divided second year medical students into groups of eight to ten students. Medical students in this study indicated dissatisfaction with working in groups smaller than ten. Limitations, in how team-based learning was implemented, may have accounted for the findings of this study. Larger groups may have allowed some group members to under-participate, while smaller groups were more apt to discourage loafing by group members (Michaelsen et al., 1997). Overall, most of the medical education studies of team-based learning reported using five to seven medical students per group (Okubo et al., 2012; Koles et al., 2010; Chung, Rhee, Baik, & A, 2009).

Two published nursing studies also used pre-assigned groups of students. Clark et al., (2008) studied the outcomes of team-based learning in a nursing pharmacology course. They assigned students into groups of seven. In the other published nursing study, Feingold et al., (2008) divided students into permanent teams of four to five students. One other study, conducted with undergraduate service quality management students, used only three students per group (Su, 2007). The author of this study suggested that further research is needed to investigate the distribution of individual abilities within teams.

Another component of student team selection is that the teams should be permanent and remain together throughout the entire course (Michaelsen et al., 1997). Effective groups require time to develop. Permanent teams develop cohesiveness and increase their level of performance over the course of the semester (Michaelsen & Sweet, 2008). Use of permanent teams also allows for assignment of longer-term projects that develop over an entire semester. Long term projects mirror professional practice issues more accurately, encourage students to look past short-term solutions, and foster students' ability to build effective team skills.

Accountability. Student accountability is the second essential element of team-based learning. Michaelsen et al., (1997) identify both individual advance preparation and individual participation in group activities as necessary components of accountability. Team-based learning does not utilize the traditional lecture format. Students are given pre-class assignments and are expected to come to class prepared to utilize the knowledge from those assignments (Parmelee et al., 2012; Mennenga & Smyer, 2010; Michaelsen & Sweet, 2008). Pre-class assignments may include readings from textbooks, online lessons, or other web-based resources.

A major component of accountability is the Readiness Assurance Process® which includes a short pre-test, taken by individual students, at the beginning of the class period. The pre-test covers key content areas from the pre-class assignments and readings. In a proposed model for incorporating team-based learning into a nursing education curriculum, Mennenga and Smyer (2010) suggested that the length of the individual readiness test will vary depending upon amount of content and length of class. They recommended a 25 question test for three hours of class time. Chung et al., (2009)

used a test of 5 questions for a two hour class period. Regardless of length, all authors emphasized that the individual readiness test should reflect the most essential content and key concepts.

Team-based learning also fosters accountability of the individual student to the team (Michaelsen & Sweet, 2008). Group members are accountable to each other for their class preparation. Immediately following the individual readiness test, the group readiness assessment test is given. The group readiness test contains the same questions as the individual readiness test. The group has the opportunity to discuss each question and come to a consensus on the correct answer.

Factors such as attendance in class, positive and meaningful participation in team discussions, and participation and completion of team projects are other measures of individual student accountability to their team. Parmelee and Michaelsen (2010) suggest that, when team-based learning was properly applied, students came prepared and were accountable to each other for the quality of their individual and team efforts. Team members held each other accountable for coming to class prepared and ready to fully participate.

Frequent and immediate feedback. One of the hallmarks of team-based learning is that it is an instructional approach that provides immediate feedback, as well as, feedback on an ongoing basis. As envisioned by Michaelsen, team-based learning includes immediate assessment of individual readiness, followed by assessment of group readiness, and feedback from the instructor (Michaelsen et al., 1997). Parmelee and Michaelsen (2010) proposed that the readiness assurance process is a ¨powerful opportunity for individual feedback and peer teaching¨ (p. 120). The group discussion

provides a rich opportunity for peer learning and for peer feedback as students discuss their rationale for the way they answered each question (Mennenga & Smyer, 2010; Parmelee & Michaelsen, 2010). Michaelsen and Sweet (2008) suggested using the Immediate Feedback-Assessment (IF-AT®) self-scoring scratch-off sheet, although this is not required. This technique provides immediate feedback regarding individual performance and group performance. Both the individual readiness assessment score and the group readiness assessment score may be used as part of the student's grade. Michaelsen and Sweet (2008) advised that the group score be weighted more heavily than the individual score to emphasize the importance of group discussion and consensus.

Michaelsen et al., (1997) recommended that the group answers be concurrently shared with the instructor and class. This allows for the instructor to provide immediate feedback, to the entire class, on any areas in which the students have questions. Immediate corrective input, from the instructor, allows the students to correct any misconceptions that they have about the class content (Michaelsen & Sweet, 2008). Following instructor feedback, students have the ability to appeal any questions that they missed on the individual or group readiness assurance tests (Mennenga & Smyer, 2010; Michaeleson & Sweet, 2008). Parmelee et al., (2012) encouraged faculty to be flexible in how the appeal process is handled. They suggested that a well-supported appeal verbalized in the classroom might be rewarded with a verbal commendation and credit for the question. Other situations may require a written appeal. Regardless of the appeal method used, the appeal process is part of the overall Readiness Assessment Process®, which affords another valuable strategy for the instructor to provide feedback and clarification of essential class content (Haidet et al., 2012).

Application of Course Content. Once students have completed the individual and group readiness tests and the instructor has given appropriate feedback, the student groups are presented with application problems related to the class content. There are many application activities that could be used, as long as the focus is on deep thinking and engagement in content-focused group discussion (Mennenga & Smyer, 2010; Michaelsen & Sweet, 2008; Parmelee & Michelsen, 2010). Four criteria must be considered when developing effective application exercises. First, the problem should be significant. The most effective application problems come directly from the pre-class assignment content and have a definite connection to the students' current professional practice. Andersen, Strumpel, Fenson, and Andrews (2011) reported that it was challenging for faculty to develop group application problems, of sufficient difficulty, that would encourage significant group discussion. The second guideline for group application problems is that all groups should work on the same problem. When all groups work on the same problem, or very similar problems, accountability to the entire class is enhanced (Parmelee & Michaelsen, 2010). The group application problem should require students to make a specific choice related to the problem. Teamwork and group discussion should be fostered while the group works to come to a specific decision (Mennenga & Smyer, 2010; Parmelee & Michelsen, 2010). Andersen et al., (2011) noted that some students were uncomfortable with the ambiguity of some of the group problems. Students wanted one correct answer rather than having to critically think about the advantages and disadvantages of various options. Finally, each student group will report their conclusions simultaneously. Each group's solution to the problem is open to discussion and challenge from other groups (Parmelee & Michelsen, 2010).

Simultaneous reporting encourages depth and richness of discussion and provides additional feedback to the student groups. Simultaneous reporting may be accomplished by groups posting online, writing on white-board, or posting on paper mounted on the classroom walls.

One of the most important consequences of team-based learning is that students learn how to cooperate and relate to other team members. Parmelee et al., (2012) stressed the importance of healthcare professions students learning to work efficiently in inter-disciplinary teams. Effective group work included the ability to give, and receive, constructive feedback (Parmelee et al., 2012; Gallegos & Peeters, 2011).

Several methods of peer evaluation, in team-based learning, have been reported in the literature (Haidet et al., 2012). The most commonly utilized methods for achieving peer evaluation included quantitative evaluation of each team member's participation and contribution to the team's success. Qualitative approaches have also been used in conjunction with quantitative measures. Su (2007) surveyed Taiwanese students in a team-based learning service-quality management course. The findings of the study demonstrated a significant negative correlation between the perceived importance of the course and students' peer evaluations of team members perceived to be less participative. Feingold et al., (2008) conducted a content analysis of nursing student perceptions of team-based learning. Students reported that peer evaluation increased awareness of their own participation in their team. Yoo and Chae (2011) demonstrated the positive effects of peer review on communication skills and motivation in Korean nursing students. Although this study did not use team-based learning, the findings supported the positive effect of peer evaluation feedback in the small group setting. In contrast, Andersen et al.,

(2011), surveyed students at midterm and end of the semester, and found no meaningful differences in peer evaluation scores between known high-performing team members and known low-performing team members.

In conclusion, team-based learning is an educational strategy that has been used across a number of academic disciplines to increase student accountability for their own learning. It has been found to be particularly effective in large courses. Components of team-based learning include formation of long-term student teams, individual student accountability for their own preparation, accountability of the student for participation in the team, frequent and timely feedback from the instructor, and group projects directed at application of the course content. Team-based learning supports and enhances development of self-regulated learning behaviors by holding students accountable for individual preparation for class, as well as being accountable as a functioning team member.

Relationship of team-based learning to self-regulated learning. The conceptual framework, guiding this research study, proposes that self-regulated online learning is dependent upon a reciprocal relationship between behavioral, environmental, and metacognitive factors. In addition, the conceptual model proposes that team-based learning directly supports all three areas of self-regulated learning.

Behavioral self-regulation. The effect of team-based learning on learner self-efficacy has not been directly addressed in the researcher literature. Research has demonstrated, however, that team-based learning exerted a positive effect on academic outcomes for all levels of students. Medical students, in team-based learning classes, demonstrated consistently higher examination scores than their counterparts in traditional

classrooms (Koles et al., 2010; Chung et al., 2009). Even when reported student satisfaction with team-based learning was low, examination scores were found to be equivalent or higher than in traditional classrooms (Willet et al., 2011). Thomas and Bowen (2011) compared the effects of team-based learning with small-group learning in an ambulatory medicine clerkship. Exam scores were higher in team-based learning regardless of whether students received the team-based intervention during their first or second rotation. Okubo et al., (2012) studied clinical reasoning ability in medical students enrolled in problem-based learning classes versus students enrolled in team-based learning classes. Students in the team-based learning classes demonstrated significantly higher clinical reasoning ability

The academic benefits of team-based learning were also demonstrated in recent nursing literature. Cheng, Liou, Tsai, and Chang, (2013) found that Taiwanese nursing students, enrolled in a team-based learning maternal-child nursing course, perceived that they had higher academic achievement than in previous courses. Their perceptions were validated by significantly higher final examination scores.

The literature has not directly addressed whether team-based learning plays a role in improved self-efficacy or other factors supporting behavioral self-regulated learning. There is some descriptive evidence to support the impact of team-based learning on student motivation. Feingold et al., (2008) studied nursing student perceptions about team-based learning. Content analysis revealed that student motivation to increase pre-class preparation and team performance was enhanced in team-based learning. Clark et al., (2008) also suggested that motivation to prepare and participate in class was increased in a team-based undergraduate nursing course. In the discussion of how they

implemented team-based learning, Andersen et al., and (2011) noted that students who received lower midterm peer evaluations were motivated to improve their readiness and participation.

Metacognitive self-regulation. Team-based learning supported metacognitive self-regulation of learning in several ways. Parmelee et al., (2012) suggest that the readiness assurance quizzes foster students' ability to self-evaluate and correct their study habits and preparedness for class. Self-monitoring and self-correction are essential to being successful on the individual and group readiness tests and play a critical role in the group application projects. Medical students enrolled in a team-based learning pathophysiology course reported that problem solving in groups was a highly effective way to learn, critically think, and apply the course content (Rawekar, Garg, Jagzape, Deshpande, Tankhiwale, & Chalak, 2013).

Nursing students, enrolled in a team-based first semester clinical nursing course, identified the value of group discussion of clinical problems (Feingold et al., 2008). Students engaged in self-monitoring and self-corrective thinking during group discussion. Listening to other students' thoughts contributed to development of a wider frame of reference related to the clinical problem. These findings were consistent with Parmelee et al., (2012) interview data from medical students enrolled in team-based learning courses. In addition, students valued the requirement that they provide a sound rationale to substantiate their answer to application problems (Feingold et al., 2008). Students were stretched to go beyond their knowledge level (Parmelee et al., 2012). Even in cases where the answer, or rationale, was not completely correct, valuable learning occurred after instructor feedback and further class discussion.

Team-based learning promotes development, evaluation, and refinement of self-reflection skills that are critically important to professional nursing practice (AACN, 2008). Clark et al., (2008) suggested that development of these skills is vital to becoming a lifelong learner. Unfortunately, a number of authors indicated that students are used to the lecture method of learning, and did not perceive the benefits of team-based learning (Parmelee & Michaelsen, 2010; Bick et al., 2009; Chung et al., 2009; Clark et al., 2008; Rao & Shenoy, 2013). Fujikura et al., (2013) found that fourth year medical students' acceptance and preference for team-based learning increased as they became more accustomed to and proficient with the learning strategies used in class. By the end of the year, students' acceptance of team-based learning had increased significantly. The majority of students, however, continued to indicate a preference for traditional instructor-led and problem-based learning classroom activities.

Environmental self-regulation. Team-based learning also effectively supports environmental self-regulation across a variety of educational environments. In the team-based instructional approach, the instructor acts as a content expert who guides the students through the learning process. The faculty role of content expert is consistent with the Community of Inquiry conceptualization of the online instructor's role (Paechter et al., 2010). Rather than the traditional lecture format, the instructor provides the students with readings, online assignments, and group application problems from which to learn the course content. The student is responsible for preparing and learning the content. It is inevitable that some content will be unclear to some students. Through the use of the readiness assessment process, the instructor's role is to provide immediate and sufficient feedback to each student and team (Michaelsen et al., 1997; Mennenga &

Smyer, 2010; Parmelee & Michaelsen, 2010). This feedback process assures that content has been clarified and that learning and proper application have occurred.

Team-based learning also supports the conceptualization of peer-related factors. Utilization of peer resources in the form of modeling, discussion groups, project teams, or as a source of self-confidence are shared features of self-regulated learning and team-based learning (Schunk & Zimmerman, 2007; Michaelsen et al., 1997). Team-based learning is based on the premise that team members hold each other accountable for advance preparation and participation in intense give-and-take group discussions (Michaelsen et al., 1997). Self-regulated learners effectively utilize the peer group as a learning resource. Self-regulated peers provide important feedback to fellow students (Garrison et al., 2010; Shea & Bidjerano, 2010). Teams have to work together to agree on group answers for readiness assessment test questions. Gopalan et al., (2013) found that the combined use of both individual and group readiness tests most effectively stimulated group discussion and critical thinking. Students reported that they were curious about how other students had thought through and answered the individual readiness test questions.

Team members must be able to reach agreement on a rationale for their proposed solutions to group application problems (Michaelsen et al., 1997). Group projects and assignments are an effective means of assuring students' understanding of basic content. Group work develops higher-level critical thinking skills and prepares the student to participate as member of a healthcare team (Mennenga & Smyer, 2010; Rawekar et al., 2013).

Summary

This chapter has presented a conceptual framework of self-regulated learning in a blended online learning environment. Definitions and conceptualizations from social cognitive theorists, self-determination theory, goal achievement theory, the Community of Inquiry framework, and metacognition theories have been discussed. The conceptual model posits that self-regulated online learning results from a reciprocal relationship between behavioral, metacognitive, and environmental factors. Behavioral self-regulation factors include self-efficacy beliefs, motivation, goal setting, and cognitive strategies, such as task organizational skills, deep learning, and resource management skills. Metacognitive self-regulation factors included self-monitoring/evaluation and self-correction strategies. Environmental self-regulation included factors related to the learning management system and information technology, faculty-student relationship, and peer learning relationships. Each of the three major concepts' unique contributions to the process of online self-regulated learning was discussed.

Team-based learning is a learner-centered approach in which student teams engage in meaningful, problem-focused activities. Team-based learning supports the conceptual framework by requiring the student to be accountable for preparatory learning, enhancing motivation, encouraging self-monitoring and self-corrective metacognitive processes, and providing immediate instructor and peer feedback. Nursing research, related to team-based learning, has primarily focused on student perceptions and affective engagement rather than on self-regulated learning outcomes.

Chapter III: Methods and Procedures

The purpose of this chapter is to describe the methodology used to compare the effectiveness of team-based blended learning, with traditional instructor-led blended learning, on self-regulated online learning activity and learning outcomes for baccalaureate junior nursing students. This chapter presents the research design, sample selection, and ethical considerations. Data collection procedures, data collection instruments, and data analysis procedures are also discussed.

Research Design

This study used a quantitative, retrospective quasi-experimental design to examine the effectiveness of the team-based learning intervention versus a traditional instructor-led control classroom on the online activity and student learning outcome variables. Quasi-experimental designs include an experimental intervention, but lack randomization of subjects to experimental and control groups (Polit & Beck, 2014). This is often referred to as a nonequivalent control group design. Quasi-experimental designs allow the researcher to test an intervention in practice and educational settings where randomization of subjects is not feasible. This study was retrospective in that the instructor-led control group was comprised of students who completed the course in 2012 and the team-based learning intervention group of students who completed the course in 2013. The study was a post-test only design using retrospective data from the two semesters. The post-test only design is appropriate to use when outcomes cannot be measured before the intervention (LoBiondo-Wood & Haber, 2010). Learning outcomes and online lesson participation could not be measured prior to the team-based learning educational intervention. In addition, a non-experimental correlational design was

utilized to identify the relationship between the measure of self-regulated online learning and learning outcomes in both groups of students. Correlational designs were used to examine how changes in one variable were associated with changes in the second variable (LoBiondo-Wood & Haber, 2010; Munro, 2005). In this study, time spent in online lessons was correlated with mean examination scores to determine, and describe, any relationship between them for each group of students.

The major disadvantage of quasi-experimental and correlational designs is that they limit the ability to determine causality of the study findings (LoBiondo-Wood & Haber, 2010). Use of a post-test only design has particular limitations in a nonequivalent control group study. The researcher cannot be certain that the experimental and control groups are equivalent or comparable. Similarly, correlational designs cannot be used to determine causality. The researcher can only state that a relationship between two variables was statistically supported. Efforts to control threats to internal and external validity of the study were used to strengthen the quasi-experimental and correlational designs.

Identification of the Sample

Baccalaureate junior nursing students enrolled in a blended research and evidence-based practice course at a Catholic Midwestern university were included in the study. The study semesters included fall of 2012 and fall of 2013. The sample included only nursing students from one traditional four-year baccalaureate nursing program. Exclusion criteria included students enrolled in a second degree baccalaureate program or Registered Nurse completion program. One student who withdrew from the course prior to course completion was also excluded from the study. Prior to data collection, an a

priori power analysis was done to determine statistical adequacy of sample size. The computation was based on an alpha level of 0.05, 80% power, and medium effect size (Cohen, 1992). Based on this calculation, 64 subjects per group were required.

A convenience sample of 184 students enrolled in the course was utilized for the study. Convenience sampling is a method of nonprobability sampling where subjects are selected into the study by nonrandom methods (Polit & Beck, 2014). Use of convenience sampling increases the risk that the sample may not be characteristic of the overall population. The instructor-led control group consisted of 98 students enrolled in fall of 2012, and the team-based learning intervention group included 86 students enrolled in fall of 2013. Because the students were in pre-existing instructor-led control and team-based learning intervention groups, random assignment to groups was not possible. Therefore, this study used nonrandomized assignment to groups. Use of non-randomized groups may result in the threat of selection bias influencing the findings of the study (LoBiondo-Wood & Haber, 2010). Careful attention was paid to analysis of group differences to rule out other alternate explanations for the study findings due to the lack of randomization (Polit & Beck, 2014).

Table 3.1 presents a comparison of the demographic characteristics of the two groups of students. Non-significant differences, related to gender and ethnicity, were found between the instructor-led control group and team-based learning intervention group. Overall, both groups were predominately female, X^2=0.323, df=1, p=0.570, and Caucasian, X^2=0.000, df=1, p=0.983. The age range of the instructor-led group was 19.7 years to 29.4 years. The team-based learning group was slightly older ranging in age

from 19.8 to 30.6 years of age, however the difference was nonsignificant, t=0.000, df=184, p=0.211.

Group differences in academic achievement were considered to be a possible source of selection bias in this study. Cumulative grade point average (GPA) and the student's final course grade in the sophomore level pathophysiology course were analyzed to determine if academic differences existed between the instructor-led control group and the team-based learning group. The pathophysiology course grade was selected because existing statistics from the research site have demonstrated it to be the best predictor of student academic success in the nursing program (E. Howell, personal communication, July 1, 2013). Letter grades for the pathophysiology course were converted to an interval scale: A=4.0, B+=3.5, B=3, C+=2.5, C=2, D=1, and F=0. Students who received less than a passing grade (C) were required to retake the pathophysiology course. For purposes of this study, the original grade earned was used for comparative data analysis.

Table 3.1 presents a comparison of the academic achievement variables for the instructor-led control group and the team-based intervention group. There were no significant group differences in the pathophysiology course grades, t=-0.799, df=184, p=0.425. Group differences in grade point averages were also statistically insignificant, t=-0.22, df=184, p=0.982. The mean grade point average was slightly higher in the team-based learning group. The range of values for the control group was 2.34-3.98, which was very close to the team-based learning range of 2.4-4.0.

Table 3.1

Comparison of Demographic and Academic Achievement Variables in Traditional Instructor-led and Team-based Learning Groups

Variable	Instructor-led Control Group (n=98)	Team-based Learning Intervention Group (n=86)	*p* value
Age in years Mean (S.D.)	20.78 (2.22)	21.13 (1.61)	0.21
Gender			
Female	94.9% (93)	96.59% (83)	0.57
Male	5.1% (5)	3.41% (3)	
Ethnicity			0.98
African American	1	1	
Asian	6	4	
Caucasian	89	78	
Hispanic	1	3	
Native American	1	0	
Grade Point Average Mean (S.D.)	3.31 (0.42)	3.32 (0.37)	0.98
Pathophysiology Course Grade Mean (S.D.)	2.87 (0.80)	3.14 (.33)	0.42

Instructor-led control group. The instructor-led classroom control group consisted of 98 junior nursing students who completed the course during the fall semester of 2012. Each module included 90 minutes of online lesson activities and 90 minutes of face-to-face instructor-led classroom instruction. Students were expected to complete the weekly online content prior to coming to class. Face-to-face classroom time consisted of 30-60 minutes of lecture and class discussion focused mainly on review and application of the module content. The remaining class time consisted of small group discussion of topics relevant to research critique and work on the groups' assigned evidence-based practice project. Students were randomly assigned to project groups of four using sequential random assignment methods (LoBiondo-Wood & Haber, 2010). Sequential random assignment required that the first student be selected randomly (LoBiondo-Wood & Haber 2010). Thereafter, every eighth student was assigned into a group until all groups were filled. Students worked together in the same groups for the entire semester.

Team-based learning intervention group. The team-based learning intervention group included 86 students enrolled in the course during the fall 2013 semester. The overall course structure was identical to the instructor-led control semester. Online coursework remained the same as in the control semester. The 90 minute face-to-face classroom, in contrast, was taught using the principles of team-based learning (Michaelsen et al., 1997). In order to provide for the greatest diversity of teams, students were randomly assigned into groups of six students using sequential random assignment methods. Research in team-based learning has demonstrated that teams of six provide optimal diversity of student demographic and academic achievement factors

(Chung, Rhee, Baik, & A, 2009; Koles et al., 2010; Michaelsen et al., 1997; Okubo et al., 2012). Students worked together in the same teams for the entire semester.

Table 3.2 presents a comparison of the educational strategies utilized in the instructor-led control group and the team-based learning intervention group. In the team-based learning group, accountability for online learning was verified by the use of the individual readiness quiz followed by an identical group readiness quiz. Team-based learning classroom lecture time was minimal, and focused solely on clarification of unclear content as identified by the individual and group readiness quizzes. Group application projects were identical in content in both the instructor-led and team-based learning group; however, there were some major differences in how the group discussion projects were operationalized. To facilitate shared group leadership and discourage under-participation, a different student was assigned as the team-based learning group leader each week. In addition to turning their weekly group activities in for a grade, team-based learning group leaders were required to present and defend their group's rationale to their classroom peers. The instructor-led group evaluated group member participation following the final examination; whereas, team-based learning students evaluated group member participation at both midterm and at the end of the semester (Michaelsen et al., 1997).

Table 3.2

Comparison of Educational Strategies used in Control and Intervention Groups

Educational Strategy	Instructor-Led Control Group	Team-Based Learning Intervention Group
Content	6 modules: Clinical problem/Literature Purpose/Research questions/ Hypothesis Quantitative designs Sampling strategies Data quality Qualitative designs	6 modules: Clinical problem/Literature Purpose/Research questions/ Hypothesis Quantitative designs Sampling strategies Data quality Qualitative designs
Content Delivery	2-4 short online learning activities/week Equivalent to 90 minutes of classroom time	2-4 short online learning activities/week Equivalent to 90 minutes of classroom time
Group formation	Randomized into groups of 4	Randomized into groups of 6*
Accountability for online learning	None	Individual readiness quizzes* Group readiness quizzes*
Face-to-face classroom	90 minutes total	90 minutes total
Lecture	30-60 minutes Focused on review and application of online content	No formal lecture* Instructor lecture focused on unclear content areas identified by quizzes*
Group application activities	Related to research critique and group evidence-based practice project Turned in for grade	Related to individual research critique and group evidence-based practice project Presented and critiqued by fellow students*
Group evaluation	Likert-type scale at the end of semester	Likert-type scale at mid-term and end of semester*

Note. *These reflect essential components of team-based learning (Michaelsen et al., 1997).

Setting

The study took place in the College of Nursing of a Catholic university in the Midwestern United States. The undergraduate baccalaureate nursing program consisted of eight semesters of general education, nursing support courses, and four clinical nursing courses. The research and evidence-based practice course was taken during fall semester of the junior year, and was taken concurrently with the first nursing care management course. The research and evidence-based practice course was a three credit hour course. Content was divided into eight learning modules that were presented over 15 weeks. The class was divided into two sections that each met once a week for 90 minutes.

The course was transmitted between the parent campus and a smaller satellite campus. Five of the team-based learning modules were taught by transmission from the parent campus for both the instructor-led group and the team-based learning group. The remaining team-based module was taught by transmission from the satellite campus to the parent campus for both groups.

Ethical Considerations

Ethical considerations in this study included methods of protecting the study subjects' rights. In addition, biases that could interfere with the study's validity and credibility were addressed.

Human subjects' protection. Approval to access data from the learning management system was requested and obtained from the research site (Appendix B). Approval from the Institutional Review Boards (IRB) of the College of Saint Mary and the research site university was obtained prior to beginning the study (Appendices C and D). The study utilized pre-existing retrospective data related to course management and

course educational strategies. The study was approved as exempt by the IRB (College of Saint Mary, 2012). Informed consent was not required in exempt studies; however, confidentiality and anonymity of the subjects' data must be maintained. This study used student data that was grouped, with all identifiers removed, prior to download on to a spreadsheet. Demographic information was analyzed separately from grades and online activity time to prevent association of data with individual students. All data collected and statistical analysis was maintained in a secure password-protected electronic file. Paper copies of data were kept in a locked cabinet in the researcher's office. All data files will be securely maintained by the researcher for seven years following completion of the study. After seven years, electronic data files will be permanently deleted from the hard drive. Paper data files will be shredded and disposed of by a contractor designated by the research site in accordance with University policies and procedures.

Validity, credibility, and bias. Leedy and Ormrod (2005) suggested that research studies involving educational interventions are subject to a number of potential bias threats. Bias is defined as any factor, related to the intervention or data collection, which interferes with or influences the results of the study. Polit and Beck (2014) advocated that nurse researchers have an ethical responsibility to ensure that bias is minimized and validity, truthfulness, and credibility of the research study is maximized.

Reactive effects were considered to be a potential threat to the validity of this study. Reactivity can threaten both measurement and intervention fidelity (Polit & Beck, 2014). The Hawthorne effect results from study subjects' awareness that they are participating in a study. In this research study, the Hawthorne effect was controlled by retrospective data collection. The study subjects were not aware that the teaching/

learning strategies used in class, their online lesson participation, and examination grades were under investigation.

Reactivity threats related to intervention fidelity were more difficult to control in this research study because the researcher/educator could not be blinded to the experimental and control condition. Leedy and Ormrod (2005) identified experimenter expectancy as the situation in which the researcher/educator expects the teaching/learning intervention to be more effective. As a result of this expectation, the educator may teach the material in a more enthusiastic or vigorous manner, thereby altering the learning outcomes of the students. This phenomenon has also been referred to as the halo effect or novelty effect (LoBiondo-Wood & Haber, 2010).

Strategies used to minimize experimenter expectancy bias, in this study, included reflexive journaling and external audit. Reflexivity involved "attending continually" to the effect that the researcher/educator has on presentation of the intervention and data collection (Polit & Beck, 2014, p. 326). Since data collection included only retrospective records retrieval, the focus of reflexive journaling was on maintaining intervention fidelity. Prior to each team-based learning class, the researcher reflected on thoughts about module content and method of presentation. The researcher's experiences of teaching using team-based learning, for the previous two semesters in the accelerated nursing research and evidence-based practice course, were also included in the reflective journal. An external inquiry audit was performed by a nursing faculty member who held a doctoral degree in education. The auditor reviewed the reflexive journal notes and the recorded podcasts of the corresponding team-based learning classes to discover any

evidence of researcher bias or deviations from intervention fidelity as identified in the reflexive journal. No evidence of researcher bias was noted (Appendix E).

Data Collection Procedure

Data collection procedures included retrospective retrieval of archived student examination scores and online lesson activity from the university's learning management system. Examination scores and online participation activities were retrieved from fall 2012 for the instructor-led control group, and from fall 2013 for the team-based learning intervention group. Permission to use the course information was received from the Dean of the College of Nursing at the research site (Appendix B).

The primary online lessons for each of the six content modules that are part of the both the instructor-led classroom control semester and team-based learning intervention semester were identified. The modules and online lessons included in the analysis are shown in Table 3.3. These online lessons were chosen for analysis because they represent the core knowledge from each module that students were expected to master in this research and evidence-based practice course.

The six online lessons represented a variety of online instructional strategies including recorded voice-over-PowerPoint lectures, instructional music videos, and online database-search tutorials. The length of each online lesson was calculated, and is provided in Table 3.3. The range of online lesson times was 169 seconds to 1047 seconds in length, with a mean of 608 seconds and a total viewing time of 3647 seconds. The same online lessons were used for the instructor-led control semester and the team-based learning intervention semester.

Table 3.3

Length of Core Knowledge Content Online Lesson Modules

Core Content Online Lesson	Online Instructional Strategy	Lesson Length in Seconds
Clinical problem / Literature sources	Database tutorial	902 seconds
Purpose/ Research Questions/ Hypotheses	Recorded lecture/ music video	458 seconds
Quantitative designs	Voice-over-PowerPoint recorded lecture	1047 seconds
Sampling strategies	Instructional music video	169 seconds
Data quality	Voice-over-PowerPoint recorded lecture	469 seconds
Qualitative designs	Voice-over-PowerPoint recorded lecture	602 seconds
Total viewing time		3647 seconds

The learning management system tracked online participation, in seconds for each online lesson, for every student enrolled in the course during both semesters. Online participation time was paired with the mean examination grade for each student. The learning management system generated a group report for each semester. Prior to download, student identification numbers were removed. Participation time and mean exam grade data were downloaded onto a spread sheet for data analysis.

Data Collection Tools

Research Question #1. Is there a significant difference in self-regulated online learning activities between baccalaureate junior nursing students who participated in team-based blended learning and junior nursing students who participated in traditional instructor-led blended learning in an undergraduate nursing research and evidence-based practice course at a Catholic Midwestern university?

Online time was calculated, by the learning management system, beginning at the time the user clicked to start the online class. Online time ended when the user clicked stop or the program reached the end of the recording. The times for multiple log-ins were combined into a composite viewing time for each online lesson. Composite viewing times for all online modules were summed for each student. The individual student's summed composite viewing time was divided by the total possible viewing time to yield a percentage of total possible viewing time for each individual student in both groups.

Data quality issues related to using time online activity revolve around the reliability and validity of using log-in activity as a measure of student participation. Rodgers (2008) and Ryabov (2012) recommended that actual time spent on the online task is the most consistent and accurate means of determining online participation. It

must be recognized that online students can be engaged in distracters, such as social media, during the time they are logged on to the lesson (Rosen et al., 2013). Research, however, has consistently demonstrated that greater time spent online results in improved learning outcomes (Burnette, et al., 2009; Hershkovitz & Nachmias, 2011). Other research studies have also emphasized the importance of time-on-task in online learning. Significant positive relationships between the amount of time spent in online lessons, greater use of self-regulatory learning strategies, and positive academic performance have been consistently demonstrated in research across a number of academic disciplines (Michinov et al., 2011; Rogers, 2008; Ryabov, 2012). Increased distraction-free time spent in online lessons was found to be particularly beneficial to lower performing students (Rybov, 2012).

Research Question #2. Is there a significant difference in student learning outcomes between baccalaureate junior nursing students who participated in team-based blended learning and junior nursing students who participated in traditional instructor-led blended learning in an undergraduate nursing research and evidence-based practice course at a Catholic Midwestern university?

Student examination scores were utilized as a measure of cognitive learning outcomes. The examination scores were derived from two instructor-developed 50-question multiple choice examinations. The same examination questions were used for the instructor-led control group and the team-based learning intervention group. Individual student scores for the two examinations were summed and averaged to yield a mean examination score for each student. Mean examination scores were used as a measure of online learning outcomes rather than the student's course grade.

Differentiation of student academic performance by mean examination scores has been demonstrated to be the best reflection of student participation in online didactic content and mastery of course content (Rodgers, 2008; Ryabov, 2012). In the study course, the course grade included group and individual projects, and therefore, did not totally reflect the individual student's ability. Although the first examination covered quantitative content and the second examination covered qualitative content, there was some content that was applicable to both examinations. Protection of human subjects' rights is an example of a content module that was tested in both examinations. Using the mean examination scores provided a more accurate representation of the nursing students' academic abilities across the entire course.

Research question #3. What is the relationship between self-regulated online learning activity and student learning outcomes in baccalaureate junior nursing students who participated in team-based blended learning and for junior nursing students who participated in traditional instructor-led blended learning in an undergraduate nursing research and evidence-based practice course at a Catholic Midwestern university?

In this study, the total amount online time that the student spent in the online learning modules and the number of log-ins to online lessons were used as the measures of self-regulated online learning activity. The amount of time that each student spent on an online lesson was calculated by the learning management system. Online time was calculated in seconds for each online lesson module and included all viewing times for multiple log-ins. In addition, the learning management system provided information related to the total number of log-ins to online lessons for each student.

Learning outcomes were measured by the individual student's mean examination score for the course. Using the mean examination score gave a more accurate representation of the students' learning outcomes across the entire semester. Individual student's total online viewing time was compared to their mean examination score, for both the instructor-led control group and the team-based learning intervention group. Total online viewing time captured those students who viewed the online lessons multiple times. The individual student's total number of log-ins to online lessons was also compared to their mean examination scores. This comparison identified the effect of the number of online lessons viewed. The combination of total viewing time and total number of log-ins provided a more complete description of the effect of self-regulated online activity on examination scores.

Data Quality Measures

The test bank utilized for this course was developed over seven semesters of examination data. Different, but comparable, published nursing research studies were used for the two examinations each semester the course was taught. Careful attention was given to the quality and comparability of the research articles used. The examination questions were sufficiently broad, so that they could be utilized for the different research articles used from semester to semester. The research articles selected to measure student learning outcomes in the instructor-led control semester and in the team-based intervention semester were previously utilized as examination articles. All of the selected examination research articles, used in this study, were selected because they had previously demonstrated content validity, acceptable item difficulty and item discrimination, and satisfactory levels of test reliability.

Content analysis. Content analysis of items from both examinations was conducted to assure data quality. Examination items were taken from a bank of questions developed for this research and evidence-based practice course. LoBiondo-Wood and Haber (2010) suggested that content validity should be determined as part of development of a data collection instrument. Content validity is concerned with how well the measurement instrument and its component items represent the "universe of content or the domain of the construct" (LoBiondo-Wood & Haber, 2010, p. 288). Preliminary content validity of the examination items was achieved through consensus of two experienced nurse educator/researchers. In addition, comparison of items to the course textbook and test bank questions supplied by the textbook publisher was conducted to assure the scope and relevance of the examination questions.

Examination items measure cognitive learning in the areas of knowledge gain, knowledge organization, and knowledge application (Anderson & Krathwohl, 2001). Since team-based learning is designed to increase application of learning, the cognitive level of each examination item was analyzed. Of the total questions used for the two examinations, 50% were at the application of knowledge level, 38 % at the knowledge/understanding level, and 12% at the knowledge/remembering level.

Item difficulty. In addition to content analysis, statistical analysis of examination questions was performed. An item analysis report was computer-generated for each examination question and provided information related to item difficulty and item discrimination. The item analysis report, provided by the university grading service, supplied response frequencies, percentage of students answering correctly, and point biserial index for each question.

Item difficulty is measured by the total percentage of students who answer the question correctly (McGahee & Ball, 2009). Possible examination question percentages range from zero to 100%. The higher the percentage of correct responses, the easier the question is. Questions with correct responses less than 50% are considered difficult and may require revision. A test bank of questions that demonstrated consistent item difficulty of 41% to 100% was developed over four semesters. Examination questions covered content from the eight course modules. The percentage of questions for each module and the range and mean item difficulty of questions for each content area are presented in Table 3.4.

McGahee and Ball (2009) advised that some questions contain knowledge that is critical, and it is expected that 100% of the students will answer those questions correctly. Inclusion of these questions is consistent with the purpose of the course and the intent of the examination. Approximately 10 percent of test questions, in this research and evidence-based practice course, were considered to be in the critical knowledge category. Examples of essential knowledge questions included content related to identification of the purpose statement of a given nursing research article, classification of the level of the study for evidence-based practice purposes, and determination that protection of human subjects' rights was discussed in the research article.

Item discrimination. The ability of an examination question to differentiate between students who answer correctly or incorrectly and score high or low on the entire test was examined. Point biserial calculations describe the predictive power of a test item, that is, do students who would be expected to answer a question correctly actually do so (McGahee & Ball, 2009, p. 167). The point biserial is a correlation between the

score for the individual item and the total score for the entire test (Munro, 2005). Point biserial coefficients of greater than 0.20 are generally considered acceptable on examinations. Lower coefficients may be appropriate for questions measuring critical knowledge (McGahee & Ball, 2009). For example, Burnette et al., (2009) utilized questions with point biserials of 0.15 to measure medical students' core knowledge of pediatric emergency medicine content.

Point biserials were calculated by the university grading system for each examination question. The point biserials for questions in each content area are presented in Table 3.4. Ninety percent of the exam items demonstrated point biserials of 0.20 or greater. The point biserials for essential knowledge questions ranged from 0.0 to 0.17.

Reliability. Reliability refers to the degree to which a measurement instrument, such as an examination, measures the concept consistently and is free from measurement error (Polit & Beck, 2014). The most frequently used measure of reliability is internal consistency. Internal consistency measures the extent to which items within the test measure the same concept.

The study university grading system measured the reliability of graded examinations using the Kuder-Richardson-20 index. The Kuder-Richardson-20 coefficient is a measurement of homogeneity of test items in examinations that use dichotomous response formats (LoBiondo-Wood & Haber, 2010). The examinations in the study course utilized multiple-choice questions, as well as, a small number of true/false questions.

Table 3.4

Examination Item Analysis by Content Area

Content Area of Examination Questions (Percent of Test Items)	Item Difficulty Mean % (Range)	Item Discrimination Mean Point Biserial (Range)
Clinical problem / literature review (12%)	0.75 (0.41-0.92)	0.36 (0.25-0.57)
Purpose/ research questions / hypotheses (24%)	0.88 (0.72-1.00)	0.24 (0.14-0.51)
Research ethics (6%)	0.78 (0.40-0.90)	0.23 (0-0.42)
Sampling (12%)	0.79 (0.50-1.00)	0.24 (0.15-0.63)
Quantitative / qualitative designs (8%)	0.85 (0.63-1.00)	0.34 (0.15-0.61)
Threats to external validity / generalizability (6%)	0.70 (0.43-0.86)	0.28 (0.16-0.49)
Threats to internal validity / data collection (24%)	0.79 (0.45-0.95)	0.35 (0.17-0.51)
Evidence-based practice (10%)	0.90 (0.85-0.95)	0.25 (0.20-0.38)

The Kuder-Richardson-20 index is a reflection of four measurements: the total number of test items, the number of correct responses to an item, the number of incorrect responses to an item, and the variance of that set of scores (Tavakol & Dennick, 2011). Coefficients, for Kuder-Richardson-20, range from 0 to 1.0.

McGahee and Ball (2009) proposed that a Kuder-Richardson-20 coefficient of 0.50 or better is an acceptable level of reliability for nursing examinations. This is due to the fact that most nursing examinations cover multiple content areas and, therefore, are not homogenous in content. In the study research and evidence-based practice course, the Kuder-Richardson-20 coefficients for the instructor-led control semester were 0.58 and 0.75 for the first examination. The coefficients for the instructor-led control group second examination were 0.56 and 0.60. The Kuder-Richardson coefficients for the team-based learning intervention semester were 0.69 and 0.73 for the first examination, and 0.63 and 0.52 for the second examination. No examination questions were discarded from analysis for either group, as there were no significant deviations in item difficulty or item discrimination that would negatively affect examination reliability.

Data Analysis

Data was analyzed using IBM SPSS Statistics® version 21. Descriptive statistics, including frequencies, range, and percentage, were used to describe differences in demographic characteristics, online viewing time, and examination scores between the instructor-led control group and the team-based learning intervention group. Table 3.5 summarizes the level of measurement of the study variables and inferential statistical analyses used in this study. Differences in categorical variables were analyzed using non-parametric statistics. An independent *t* test was utilized to test the differences in

online participation time between the instructor-led control and the team-based learning intervention groups and for differences in mean examination scores between the control and intervention groups. Use of the independent *t* test requires a nominal level independent variable with at least two separate unrelated groups (Munro, 2005). The dependent variable must be continuous, or at the interval or ratio level of measurement. In this study, the instructor-led control and team-based learning intervention groups were classified as nominal level and were two separate and distinct groups. Online viewing time (in seconds) and examination scores were both considered to be ratio-level data.

The relationship between online lesson viewing time and the mean examination scores was examined for both groups using correlational statistics. The most commonly used correlational statistical test, Pearson's correlation coefficient, measures the linear relationship between two interval or ratio level variables (Munro, 2005). The correlation coefficient ranges from -1.0 to +1.0. Use of parametric statistics requires a normal distribution of the dependent variable and adequate sample size (Munro, 2005). Nonparametric statistics were used for analysis when the assumptions of normal distribution or adequate sample size were violated.

Sample size was calculated using an a priori power analysis. At a power of 0.80, and moderate effect size, the projected sample size was adequate for a two-tailed *t* test (Cohen, 1992; Munro, 2005). The level of statistical significance for all analyses was set at $p<0.05$ (Cohen, 1992; Munro, 2005).

Table 3.5

Statistical Analysis of Study Variables

Variable	Level of Measurement	Statistical Analysis
Demographic Variables:		
Age	Ratio	Independent *t* test
Gender	Nominal	Chi Square
Ethnicity	Nominal	Chi Square
Academic Achievement Variables:		
Grade Point Average	Interval	Independent *t* test
Pathophysiology Course Grade	Interval	Independent *t* test
Percentage of Total Online Viewing Time	Ratio	Independent *t* test
Mean Examination Score	Ratio	Independent *t* test
Total Online Viewing Time (in seconds)	Ratio	Pearson's *r* Correlation* Kendall's tau**
Number of Online Log-ins	Ratio	Pearson's *r* Correlation* Kendall's tau**

*Used for normal distributions

**Used for non-normal distributions

Summary

This chapter described the research methodology and data collection procedures utilized in this research study. The study employed a retrospective quasi-experimental research design. A nonrandomized sample of baccalaureate junior nursing students, from one Catholic Midwestern university, served as the study population. The instructor-led classroom control group was enrolled in the nursing research and evidence-based practice course in the fall of 2012. The team-based learning intervention group was enrolled in the same course in the fall of 2013.

Data collection included retrospective retrieval of student viewing time of selected core online lessons. Mean examination scores, from two valid and reliable course examinations, were used as a measure of learning outcomes. Data analysis included descriptive and nonparametric statistics for demographic characteristics. Independent *t* tests were used to analyze differences, in percentage of online lesson viewing time and mean examination scores, between the instructor-led control group and the team-based learning intervention group. Correlational statistics were used to identify the relationship between the composite online viewing times and mean examination scores in both the control and intervention groups.

Chapter IV: Results

The purpose of this chapter is to present the results of the study designed to compare the effectiveness of team-based blended learning with traditional instructor-led blended learning in baccalaureate junior nursing students enrolled in an undergraduate nursing research and evidence-based practice course. This chapter will discuss the methods used to analyze the data. Data results for each research question and a summary of significant findings will be presented.

Data Analysis Methods

Data was analyzed using IBM SPSS Statistics® version 21. An independent *t* test was utilized to test the differences in self-regulated online learning activities, as measured by the percentage of total possible online viewing time, between the instructor-led control and the team-based learning intervention groups. Independent *t* tests were also used to test for differences in mean examination scores between the instructor-led control and team-based learning intervention groups. The relationship between mean examination scores and both total online viewing time and number of log-ins to online lessons were examined for both groups using Pearson's *r* correlation or Kendall's tau statistics.

Use of parametric statistical tests requires an adequate sample size and a normal distribution of the dependent variable (Munro, 2005). The sample size in this study exceeded the power analysis requirement for both the instructor-led control group and the team-based learning group. The frequency distributions of percentage of total time possible spent in online lessons (Figure 4.1), total time spent in online lessons (Figure 4.2), total log-ins to online lessons (Figure 4.3), and mean examination scores (Figure 4.4) for the study sample were evaluated.

Figure 4.1

Frequency Distribution of Percentage Time Spent in Online Lessons (N=184)

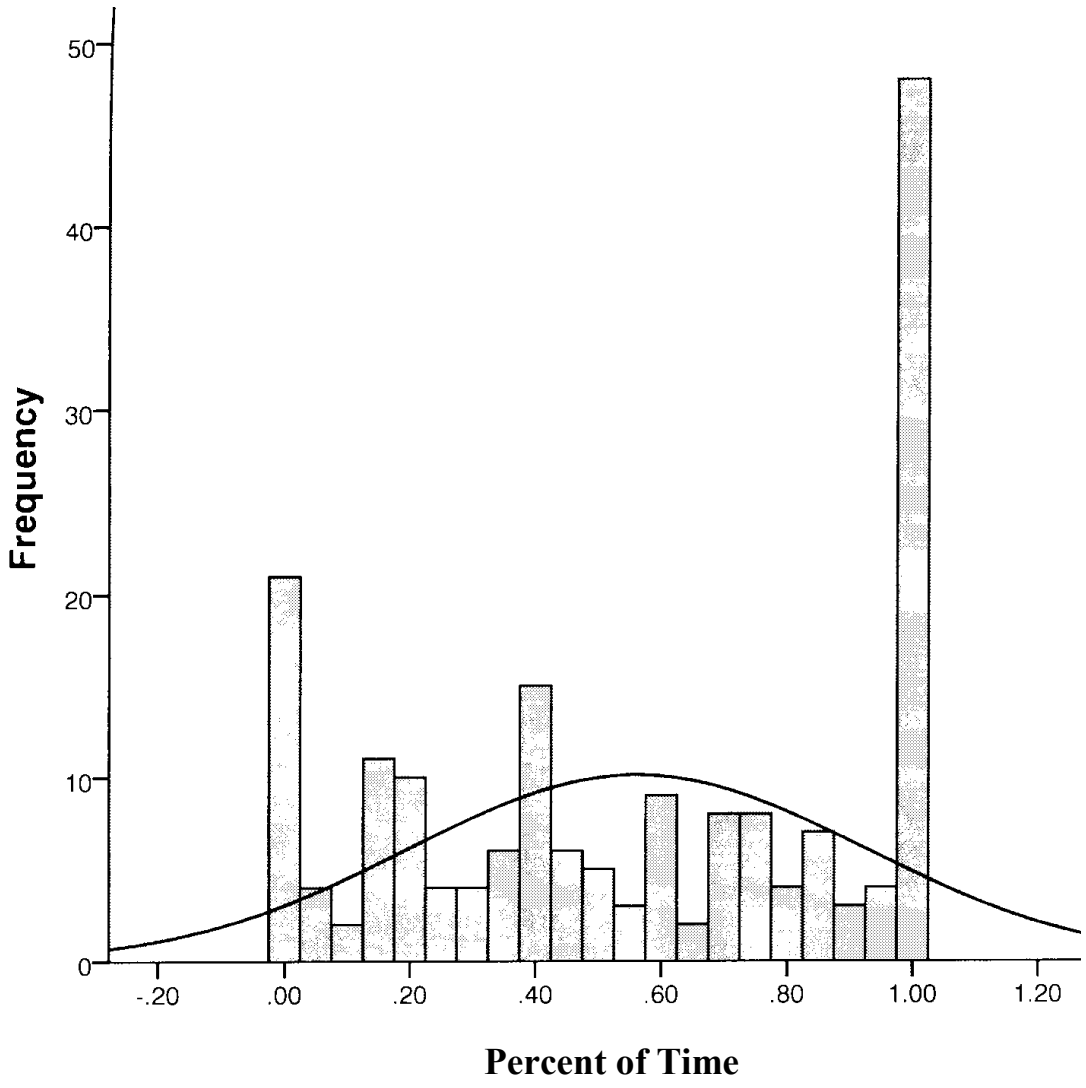


Figure 4.2

Frequency Distribution of Total Time Spent in Online Lessons (N=184)

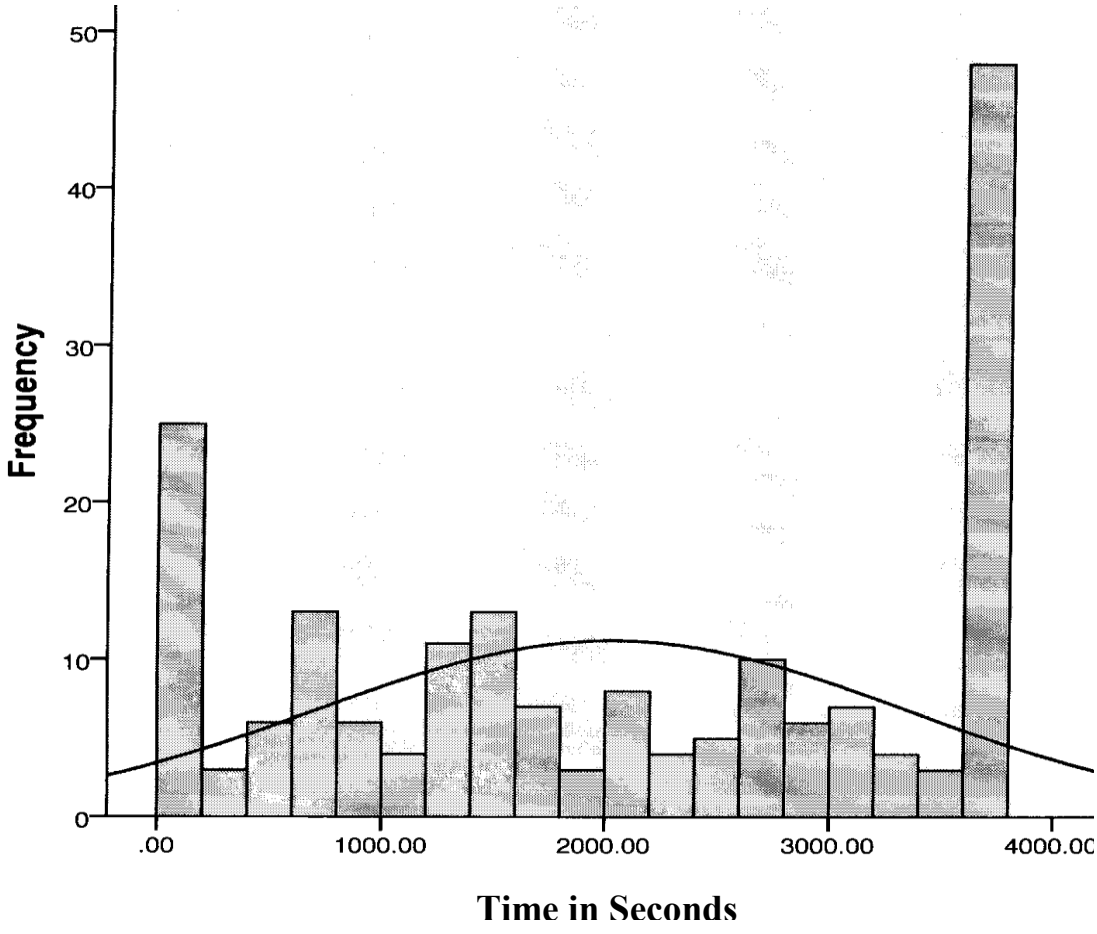


Figure 4.3

Frequency Distribution of Number of Online Log-ins (N=184)

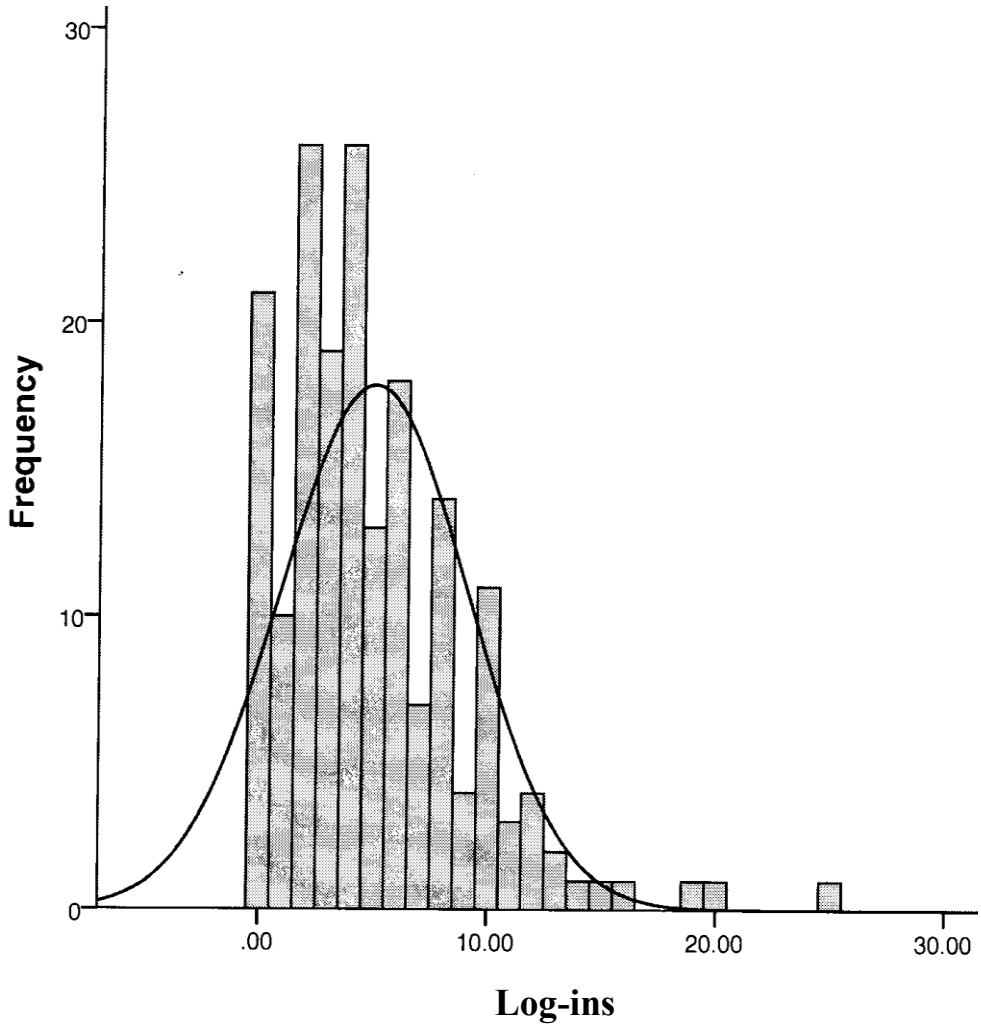
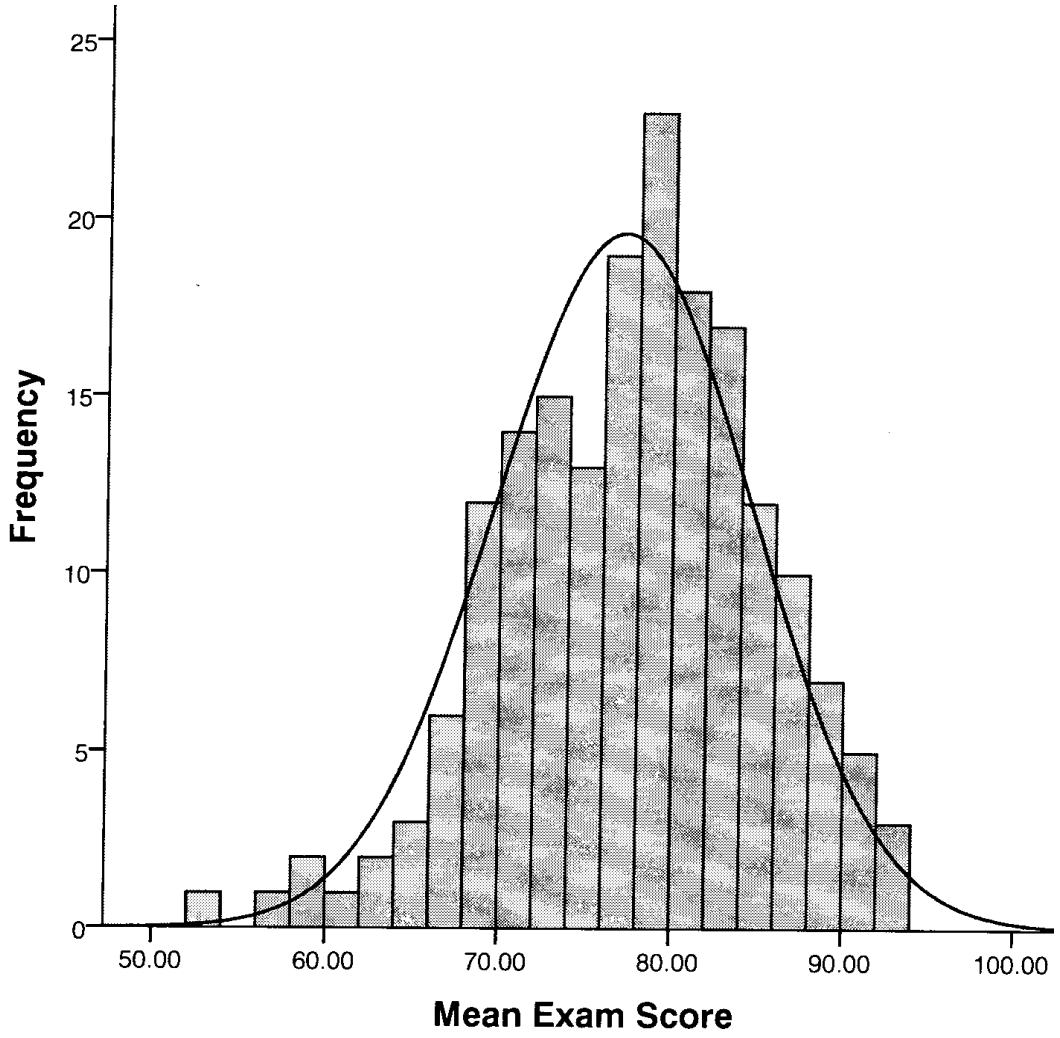


Figure 4.4

Frequency Distribution of Mean Examination Scores (N=184)



Normalness of the distribution was determined by comparing the mean, median, and mode for the variables of percentage of total possible online viewing time, online viewing time total time, and number of log-ins for the study sample (Table 4.1). The distribution of mean examination scores for the study sample was also evaluated. The total time, percentage of time, and number of log-in variables were found to have a large number of extreme values. Although the mean and median values were close in value, the mode reflected 38 (44.2%) team-based learning students who watched all of the online lessons. The instructor-led control group distribution revealed thirteen (13.3%) students who had zero online viewing time.

Fisher's skewness statistic was performed to determine if the distributions were significantly skewed (Table 4.2). Calculated z-scores were nonsignificant for the percentage of total time viewed, $z=-0.92$, $p=0.17$, and for the total online viewing time, $z=-0.73$, $p=0.24$. The calculated z score for mean examination scores, $z=-0.20$, $p=0.42$, was also not significant. Nonsignificant z-scores indicated that the skewness of these variables was small, which allowed the data to be considered as a normal distribution.

Fisher's skewness statistic for the number of log-ins indicated a significant moderate positive skewness, $z=8.11$, $p<0.001$ (Table 4.2). Because the assumption of normal distribution was violated, Pearson's *r* correlation could not be performed. Kendall's tau was used to analyze the relationship between number of log-ins and the mean examination learning outcome variable for both the instructor-led control group and the team-based learning intervention group. Kendall's tau is a nonparametric relational statistic that is considered to be distribution-free and is, therefore, useful when the assumption of normal distribution is violated (Munro, 2005).

Table 4.1

Descriptive Statistics of Online Viewing Characteristics and Mean Examination Scores of the Study Sample

Variable	Measures of Central Tendency and Variability	
Percentage of total online viewing time	Mean (S.D.)	56.0% (36.2%)
	Median	58.0%
	Mode	100%
Total online viewing time (in seconds)	Mean (S.D.)	2029.34 (1323.83)
	Median	2092.50
	Mode	3646.00
Number of online log-ins	Mean (S.D.)	4.99 (4.11)
	Median	4.00
	Mode	2.00
Mean examination scores	Mean (S.D.)	77.13% (7.47)
	Median	78.00 %
	Mode	80.00 %

Note. N=184

Table 4.2

Measures of Distribution Symmetry of the Study Sample

Variable	Skewness	Standard Error of Skewness	p Value
Percentage of total online viewing time	0.131	0.143	.17
Total online viewing time (in seconds)	-0.129	0.178	.24
Number of online log-ins	1.452	0.179	.0001*
Mean examination scores	-0.362	0.179	.42

Note. N=184

*p≤.05

Correlation coefficients measure both the direction and strength of the linear relationship between two variables. The correlation maybe classified as positive or negative. For purposes of this study, Munro's (2005) definition of strength of correlation was used. Munro (2005) defined correlations of 0.49 and below as low or weak. Coefficients between 0.50 and 0.69 indicate a moderate relationship, while correlations of .70 or greater are considered to be strong.

Statistical Results for Research Questions

The purpose of this study was two-fold. The primary purpose was to examine the effect of team-based learning on student self-regulated online learning activities. The percentage of the total possible online viewing time that the student spent in online learning activities was used as the measure of self-regulation. The second objective of the study was to investigate the effect of team-based learning on student learning outcomes. Learning outcomes were measured by the mean score on two 50-question examinations. In addition, the relationship between the amount of online learning activity and learning outcomes was explored.

Research question #1. Is there a significant difference in self-regulated online learning activities between baccalaureate junior nursing students who participated in team-based blended learning and junior nursing students who participated in traditional instructor-led blended learning in an undergraduate nursing research and evidence-based practice course at a Catholic Midwestern university?

The measure of self-regulated online learning activity used in this study was the percentage of total possible online viewing time. The percentage of total time yielded a standardized score that controlled for variations in the number and amount of online

lessons viewed by students. Table 4.3 presents a comparison of the descriptive statistics for percentage of total possible viewing time for the instructor-led control group and the team-based learning group. In the instructor-led control group, 13% (n=13) of the students recorded no time spent viewing the online learning activities across the entire semester. Twelve percent (n=12) of the instructor-led class viewed 90% to 100% of the online learning activities. The majority of students in the instructor-led control group (n=53) viewed between 40% and 60% of the online lessons. In contrast, fifty percent (n=43) of the team-based learning group viewed 90-100% of the online lessons.

Students in the team-based learning group demonstrated higher levels of self-regulated online learning activities. As shown in Table 4.3, the team-based learning group demonstrated a significantly greater percentage of time viewing the online lessons, t=-6.125, df=182, $p<0.001$, than did the instructor-led control group. The assumption of homogeneity of variance was met, since Levene's Test had a significance level of p=0.348. Although the team-based learning students significantly increased their self-regulated percentage of online viewing activity, it should be noted that five students recorded no online viewing activity during the semester. Overall, a 62% decrease in the number of students with no self-regulated online learning activity was observed in the team-based learning group.

Table 4.3

Comparison of Self-Regulated Online Lesson Activity for Instructor-led Control Group and Team-based Learning Intervention Group

Percentage of total possible online viewing time	Instructor-Led Classroom Control Group (n=98)	Team-Based Learning Intervention Group (n=86)	p Value
Mean (S.D)	42.05% (32.08%)	72.00% (34.2%)	<.001*
Median	41.00%	90.50%	
Mode	0.00%	100.00%	
Range			
Minimum	0.00%	0.00%	
Maximum	100.00%	100.00%	

*p≤.05

Research question #2. Is there a significant difference in student learning outcomes between baccalaureate junior nursing students who participated in team-based blended learning and junior nursing students who participated in traditional instructor-led blended learning in an undergraduate nursing research and evidence-based practice course at a Catholic Midwestern university?

The scores on the two course examinations were summed, and the mean examination score was used as the learning outcome measured in this study. Table 4.4 presents the mean examination scores for the instructor-led control group and the team-based learning intervention group. The Levene's Test for mean examination scores was p=0.514, which indicated that the assumption of homogeneity of variance was met.

The team-based learning group scored significantly higher on the course examinations, t =-2.961, df=182, p=0.003. The mean examination score for the team-based learning group was 3.32 percentage points higher than the mean examination score for the instructor-led classroom control group. The range of scores was 42 percentage points for the instructor-led control group and 36 percentage points for the team-based learning intervention group. The mean examination frequency distributions for the instructor-led control group and the team-based learning intervention group are presented in Figures 4.5 and 4.6. Analysis of the lowest quartile of mean examination scores indicated that fewer of the team-based learning intervention group scored lower than 70%. Seventeen (17.35%) of the instructor-led control group had a mean examination score of below 70%, as compared to nine (9.56%) of the team-based learning group. The interquartile ranges for both groups are presented in Table 4.4.

Table 4.4

Comparison of Mean Examination Scores for Instructor-led Control Group and Team-based Learning Intervention Group

Variable	Instructor-Led Control Group (n=98)	Team-Based Learning Intervention Group (n=86)	p Value
Mean (S.D)	75.63% (7.56)	78.84% (7.05)	.003*
Median	76.00%	79.00%	
Mode	76.00%	80.00%	
Range			
Minimum	53.00%	56.00%	
Maximum	95.00%	92.00%	
Interquartile Range			
25^{th} percentile	70.00 %	73.00%	
50^{th} percentile	76.00 %	79.00%	
75th percentile	81.00 %	84.00%	

*$p \leq .05$

Figure 4.5

Frequency Distribution of Mean Examination Scores for Instructor-led Control Group

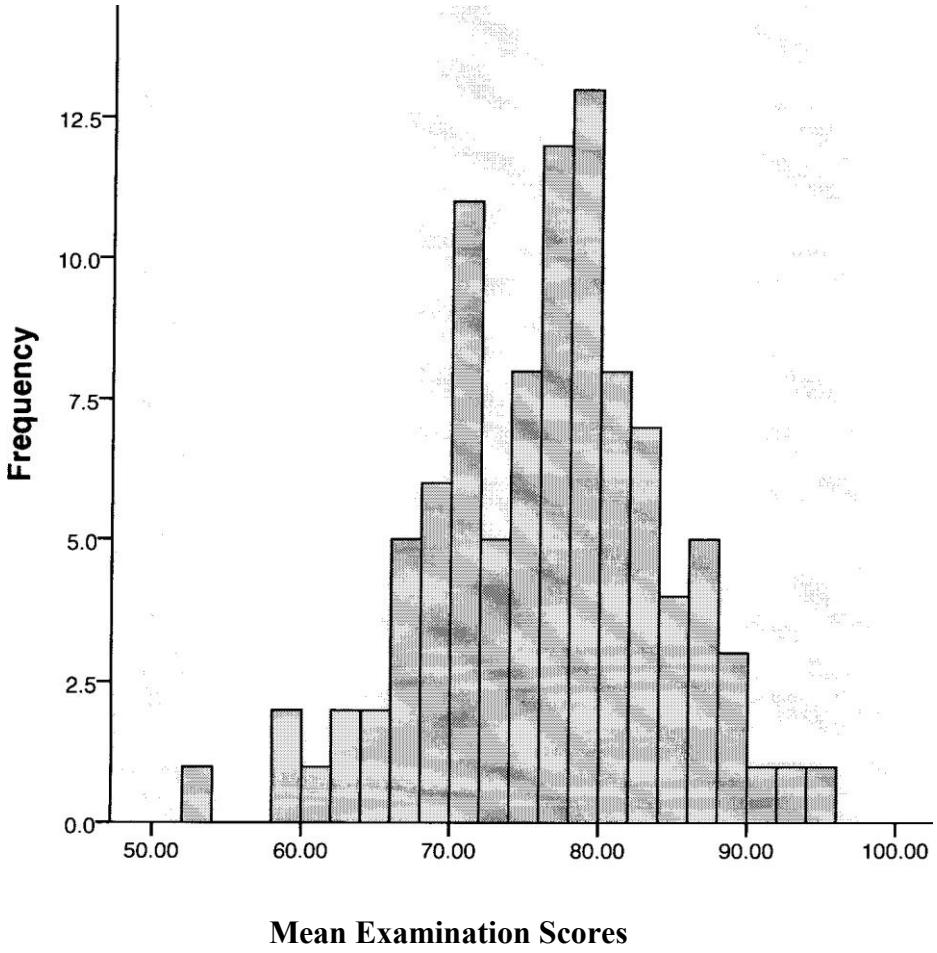
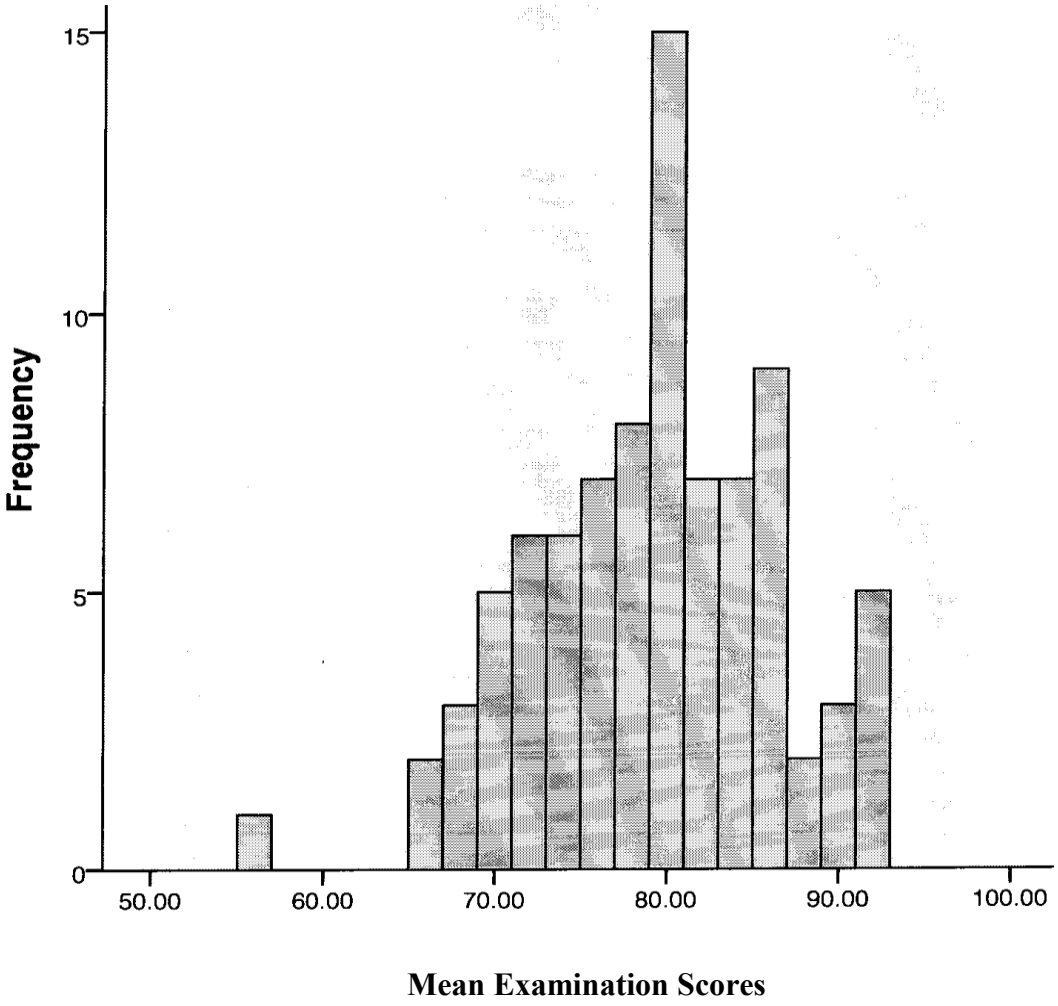


Figure 4.6

Frequency Distribution of Mean Examination Scores for Team-based Learning Group



Research question #3. What is the relationship between self-regulated online learning activity and student learning outcomes in baccalaureate junior nursing students who participated in team-based blended learning and for junior nursing students who participated in traditional instructor-led blended learning in an undergraduate nursing research and evidence-based practice course at a Catholic Midwestern university?

For this research question, the relationship between the amount of self-regulated online learning activity and learning outcomes was explored using the number of actual log-ins to the online lessons and the total amount of online viewing time. Use of both online learning activity measures provided a more complete view of student participation in online activities. The number of log-ins provided information on how many times the student actually logged on to the online lessons. The duration of log-ins ranged from 30 seconds through the completion of the lesson. The variability in log-in time is consistent with prior literature that suggested that total online viewing time is the best measure of online learning activity (Rogers, 2008; Ryabov, 2012). Total online viewing time (in seconds) was used for analysis, rather than the percentage of total possible viewing time, because it more accurately captured those students who viewed the online lessons multiple times as well as those who logged-in and out with minimal viewing time. Mean examination scores were used as the measure of student learning outcomes. Table 4.5 presents a descriptive comparison of the number on online lesson log-ins and the total online viewing time for the instructor-led control group and the team-based learning intervention group.

Table 4.5

Descriptive Comparison of Self-Regulated Online Lesson Activity for Instructor-led Control Group and Team-based Learning Intervention Group

Variable	Instructor-Led Classroom Control Group (n=98)	Team-Based Learning Intervention Group (n=86)
Number of online log-ins		
Mean (S.D)	2.94 (2.16)	7.34 (4.53)
Median	3.00	7.00
Mode	2.00	4.00
Range		
Minimum	0.00	0.00
Maximum	10.00	25.00
Total online viewing time (in seconds)		
Mean (S.D)	1533.77 (1170.36)	2610.89 (1247)
Median	1500.00	3267.00
Mode	0.00	3646.00
Range		
Minimum	0.00	0.00
Maximum	3646.00	3646.00

Data analysis revealed a significant relationship between the two measures of self-regulated online viewing time and learning outcomes in both groups of students. The correlation between number of log-ins and mean examination scores demonstrated a low positive correlation in the instructor-led control group (Table 4.6). Similarly, total time spent viewing online lessons demonstrated a low positive correlation with mean examination scores in the instructor-led control group. The team-based learning group also demonstrated small significant positive correlations between the number of online log-ins and mean examination scores (Table 4.6). The correlation between mean examination score and the total online lesson viewing time in the team-based learning intervention group was also significant, but was smaller than that of the instructor-led control group.

Although statistically significant positive correlations between self-regulated online learning activity and mean examination scores were obtained in both the instructor-led control group and the team-based learning intervention group, the correlation coefficient itself did not describe the meaningfulness of the relationship. To measure the importance of the correlation coefficients, the coefficient of determination, r^2, was calculated. The coefficient of determination is a measure of the amount of shared variability between the variables (Munro, 2005).

As shown in Table 4.6, total online lesson viewing time accounted for 16% of the variance in mean examination scores in the instructor-led control group. The total number of log-ins to online lessons accounted for only 9% of the variance in the instructor-led group scores. The coefficients of determination for the team-based learning intervention group were lower than those of the instructor-led control group.

Table 4.6

Relationship Measures of Self-regulation and Mean Examination Scores

Variables	Instructor-led Classroom Control Group (n=98)	Team-Based Learning Intervention Group (n=86)
Total number of log-ins to online lessons in relationship to mean examination scores	$r = 0.30$* $r^2 = 0.09$	$r = 0.33$* $r^2 = 0.11$
Total online lesson viewing time in relationship to mean examination scores	$r = 0.40$* $r^2 = 0.16$	$r = 0.26$* $r^2 = 0.07$

*$p < .01$

Total viewing time shared 11% of the variance with mean examination scores in the team-based learning group. Only 7% of the variability in team-based learning mean examination scores was accounted for by the total number of log-ins.

Summary

This chapter reported the data analysis and findings for this research study. Results of the study demonstrated that junior nursing students enrolled in the team-based learning nursing research and evidence-based practice course demonstrated significantly higher levels of self-regulated online learning activity than did students in the traditional instructor-led course. Student learning outcomes, as measured by mean examination scores, were significantly higher in the team-based learning intervention group. Finally, the relationship between self-regulated online learning activity and mean examination scores was examined. Significant small positive correlations were found between both total viewing time and log-in activity and mean examination scores in both the instructor-led control group and the team-based intervention group. The amount of variance explained by the relationships was very low for both groups.

Chapter V: Discussion and Summary

The purpose of this research study was to compare the effectiveness of team-based blended learning versus traditional instructor-led blended learning for baccalaureate nursing students enrolled in an undergraduate nursing research and evidence-based practice course. This chapter provides a discussion of the results of the data analysis, by research question, and implications for nurse educators. Limitations of the study and recommendations for future research are also discussed.

Research Questions and Interpretation

The primary purpose of this research was to examine the effect of team-based learning on student self-regulated online learning activities. The second study objective was to investigate the effect of team-based learning on student learning outcomes. Statistical analysis was conducted to compare the effect of team-based blended learning and traditional instructor-led blended learning on the self-regulated percentage of time baccalaureate nursing students expended on viewing online lesson activities. Student learning outcomes were evaluated by comparing differences in the mean examination scores between the team-based learning intervention group and the instructor-led control group. Comparisons were further defined by analyzing the relationship between the total online viewing time, total number of log-ins to online lessons, and the mean examination score learning outcome for each instructional strategy group.

Figure 5.1 presents the conceptual model guiding this study. Concepts supported by the study findings are indicated on the model. Concepts requiring further research, because they were not specifically included in the study or received limited support, are also noted in the conceptual model.

Figure 5.1 Whittaker Model of Self-regulated Learning in Blended Online Courses

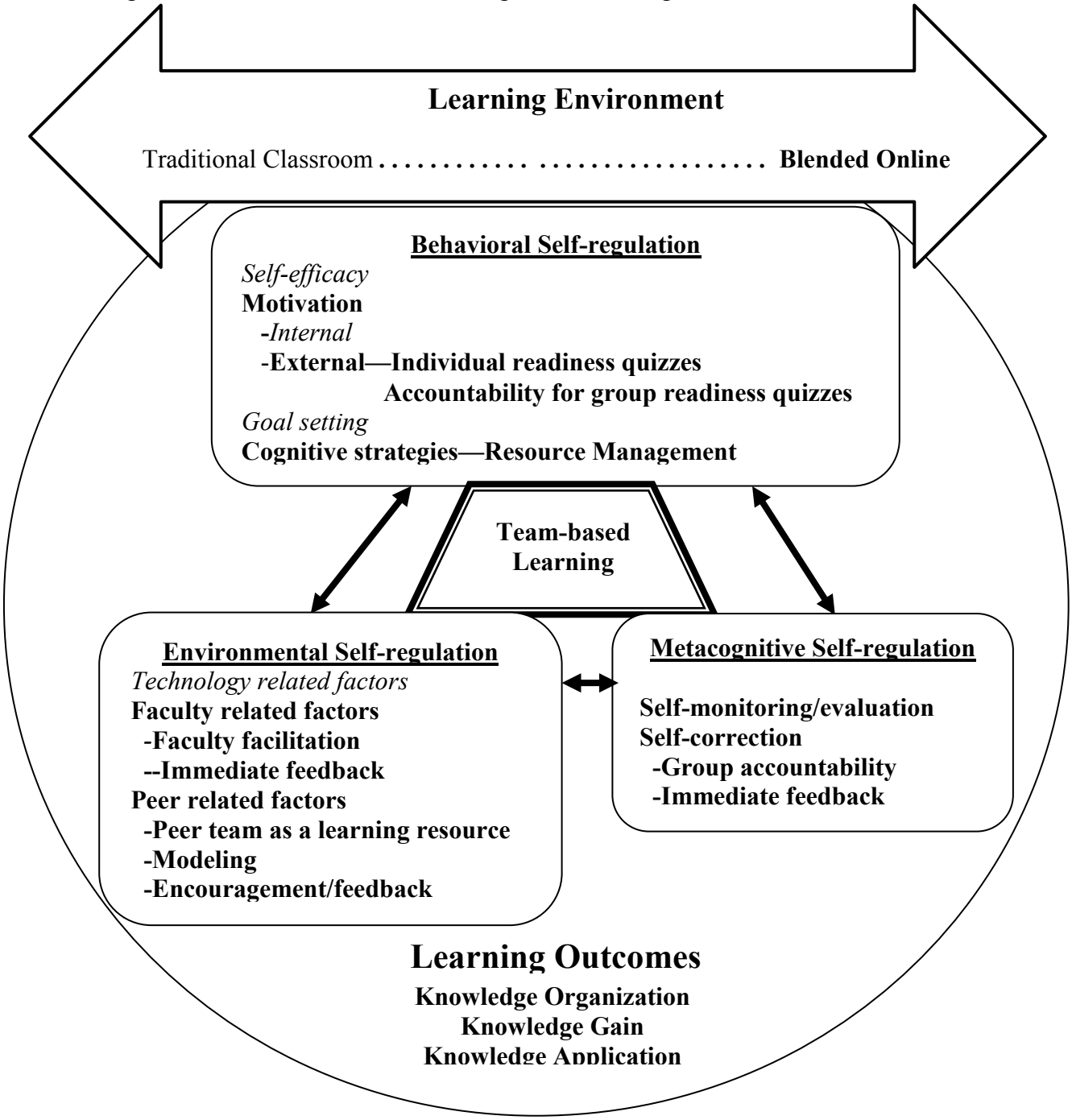


Figure 5.1 Bolded indicate concepts supported by findings of present research study. Italicized indicate concepts not addressed by study that require further investigation. Adapted from: Bandura (1986); Garrison et al., (2010); Kraiger et al., (1993); Kuiper (1999); Michaelsen et al., 1997; Winne (1996); Zimmerman (1998)

Research Question #1: Differences in self-regulated online learning activities. The findings of this research demonstrated a significant difference in self-regulated online learning activities between junior nursing students enrolled in a traditional instructor-led blended nursing research and evidence-based practice course and those junior nursing students who were enrolled in the same course that used team-based learning instructional strategies. Students in the team-based learning intervention group spent significantly more time in self-regulated online viewing activities than their instructor-led control group counterparts. The results of data analysis for the first research question supported the conceptual model on which this study was based and were consistent with the findings of previous team-based learning research.

Motivation. The findings of this study supported the thesis that team-based learning provided motivation for students to increase self-regulated learning behaviors in order to come prepared to class and to engage effectively in group projects (Feingold et al., 2008; Freeman et al., 2006; Parmelee & Michaelsen, 2010). Students in the team-based learning class viewed more of the online lessons than did their counterparts in the traditional instructor-led class. The total percentage of time spent in online lessons was significantly greater in the team-based learning intervention group. As found in previous research studies, students in the team-based learning group demonstrated an increase in pre-class preparation for the individual and group readiness assessment quizzes (Freeman et al., 2006; Gomez et al., 2010; Gopalan et al., 2013).

Cognitive strategy of resource management. The results of analysis of the first research question indicated that team-based learning strongly supported the behavioral component of self-regulation by encouraging the use of the cognitive strategy of resource

management. Michaelsen et al., (1997) posited that group accountability increased individual student's utilization and management of available learning resources. This is also consistent with Shunk and Zimmerman's (2007) premise that use of the cognitive strategy of resource management played a key role in self-regulated learning. Resource management includes all the teaching/learning strategies and resources available to the student (Shea & Bidjerano, 2010). The current study found that the percentage and pattern of online lesson viewing activity was significantly greater in the team-based learning intervention group indicating that team-based learning did have a positive impact on use of learning resources, and therefore, on self-regulated learning.

Research Question #2: Differences in student learning outcomes. Analysis of student learning outcomes revealed that the team-based learning intervention group had significantly better academic outcomes than did their counterparts in the instructor-led control group. Mean scores for the two examinations were significantly higher in the team-based learning group. The findings of research question two are consistent with the results of previous team-based learning research and support the conceptual model guiding the study.

Self-monitoring/evaluation. Multiple studies, in medical education, have demonstrated beneficial increases in learning outcomes for those students enrolled in team-based learning courses (Koles et al., 2010; Willet et al., 2011). Group accountability was postulated to be the foundation for increased motivation, as well as a scaffold for metacognition (Parmelee et al., 2012). The findings of this study were consistent with prior studies that found team-based learning encouraged the student to engage in self-regulated actions such as self-monitoring, self-evaluation, and self-

correction as they prepared for class and participated in group quizzes and discussion (Feingold et al., 2008; Parmelee et al., 2012; Rawekar et al., 2013).

The effectiveness of immediate feedback during group testing on metacognition was also supported in this study. The findings are consistent with Peck, Werner, and Raleigh (2013) who demonstrated evidence of enhanced critical thinking, increased self-regulated preparation, and improved exam performance in senior nursing students who participated in group testing and received immediate feedback. Koriat et al., (2006) suggested that regulation of information processing and behavior is dependent upon the accuracy of metacognitive self-monitoring and evaluation. Team-based learning enhanced self-monitoring through the use of immediate instructor feedback, and more importantly, through group feedback during the group readiness assessment quizzes and group project discussions. In the present study, increased mean examination scores in the team-based learning group supported the positive impact of team-based learning on the role of metacognition in self-regulated learning.

Learning outcomes. Use of team-based learning instructional strategies alters how students learn (Michaelsen et al., 1997). Rawekar et al., (2013) suggested that team-based learning fostered an environment where medical students could teach and learn together; thereby improving knowledge gain, knowledge organization, knowledge application, and academic performance. Active engagement in team learning assisted students to master and apply more complex content. In the current study, the examination questions used as student learning outcomes were primarily knowledge application-based. It is reasonable to suggest that students who were used to application-based team learning would score higher on knowledge application examinations than

their instructor-led counterparts who were more used to traditional didactic lecture instructional methods (Mennenga, 2013; Okubo et al., 2012).

Learning environment. The conceptual model guiding this study posited that team-based learning supports learning outcomes across a continuum of traditional classroom and blended learning environments. The findings of this study supported and contributed to the emerging literature related to the effectiveness of team-based learning in nursing education. Several nursing research studies have investigated the impact of team-based learning on the outcomes of traditional face-to-face classroom nursing education. The majority of these studies found no significant differences in examination scores between nursing students in traditional classrooms and those in team-based learning classrooms (Kniewel, 2012; Mennenga & Smyer, 2010; Mennenga, 2013). In another recent study, Taiwanese nursing students in team-based learning classes scored significantly higher than their traditional classroom counterparts (Cheng et al., 2013). The current study investigated the effects of team-based learning in a blended nursing research and evidence-based practiced course. The findings of improved student learning outcomes, in this study, affirmed the conceptual model's thesis that team-based learning is effective in the blended online learning environment.

Research Question #3: Relationship between self-regulated online learning activity and student learning outcomes. The study findings demonstrated that self-regulated participation in online learning activities had a positive relationship with student learning outcomes in both the instructor-led control group and the team-based learning intervention group. The strength and meaningfulness of the relationships

between self-regulated online learning activity and student learning outcomes, however, were weak.

In the instructor-led control group, there was a statistically significant weak relationship between the total time of self-regulated online learning activity and student learning outcomes. In addition, the total number of log-ins also demonstrated a small significant positive correlation with mean examination scores. The low coefficient of determination for both the total time and number of log-ins indicated that the online lessons played a minor role in student exam performance. The team-based learning group also demonstrated significant correlations between self-regulated online learning activity and student learning outcomes. The relationships were similar to those of the instructor-led control group, and explained a minimal amount of the variance in student performance on the examinations.

The lack of meaningful association between increased self-regulated online learning activities and improved student learning outcomes in the team-based learning intervention group is surprising. The findings for the third research question provided positive support for some aspects of the conceptual model, while other attributes require further study. The significant positive relationships between self-regulated time spent in online learning activities and enhanced student learning outcomes supported the conceptual model's thesis that team-based learning increased self-regulation resulting in improved learning outcomes. The significant relationships were also consistent with other studies which reported positive correlations between greater use of self-regulated online learning activities and positive academic performance (Burnette et al., 2009; Hershkovitz & Nachmias, 2011; Michinov et al., 2011; Ryabov, 2013). It should be

noted, however, that the cited studies did not utilize team-based learning as an instructional methodology. The findings of the third research question suggest that other factors, associated with team-based learning, affected student learning outcomes in the study nursing research and evidence-based practice course.

Peer related factors. Prior research has suggested that group accountability and student use of the peer team as a learning resource may be the major contributors to improved student learning outcomes in team-based learning (Gopalan et al., 2013; Michaelsen et al., 1997; Parmelee &Michaelsen, 2010). The peer group or team is the critical component of resource management (Michaelsen et al., 1997; Parmelee & Michaelsen, 2010). For this reason, the cognitive strategy of resource management has a close mutual relationship with the peer related component of environmental regulation.

The findings of the present research study supported the beneficial effects of team-based learning on peer related factors of self-regulated learning. Student teams engaged in vigorous discussion during group readiness quizzes and group application project discussions. This is consistent with previous research that demonstrated similar effects of using peer groups as a learning resource (McCabe, 2011; Peck et al., 2013; Rawekar et al., 2013; Zimmerman, 1998). The findings of these studies indicated that self-regulated students functioned as models to less self-regulated students, and they also provided feedback to motivate fellow students to manage their time and resources more effectively (Freeman et al., 2006; Gomez et al., 2010; Shea & Bidjerano, 2010).

Faculty related factors. The conceptual model posited that faculty related factors contribute to self-regulated learning. Multiple faculty related factors have been demonstrated to enhance student self-regulation of learning in students in online courses,

including faculty expertise, faculty direction, and faculty facilitation factors (Shea & Bidjerano, 2010; 2012). In the present study, there were major differences in the face-to-face faculty teaching strategies utilized. The traditional instructor-led control group utilized a traditional lecture format in addition to faculty-led group discussion. Students in the instructor-led control group may have acquired course content from traditional lecture, since they received weekly face-to-face lectures that reinforced much of the online content (Fujikura et al., 2013; Parmelee & Michaelsen, 2010). In the team-based learning intervention group, the instructor functioned more as a content expert and facilitator of group discussion (Haidet et al., 2012; Michaelsen et al., 1997; Michaelsen & Sweet, 2008; Shea & Bidjerano, 2010; 2012). The instructor provided feedback and clarification of content following group quizzes and during group application discussions. It is not known what other faculty related direction and facilitation factors play important roles in blended team-based learning classrooms.

Technology related factors. The findings of this study also supported the contention that actual time-on-task was a more consistent and accurate predictor of online self-regulated learning than the number of log-ins (Rogers, 2008; Ryabov, 2012). Although online viewing time was demonstrated to be a better predictor of student learning outcomes, it must be recognized that there are at least two technology related factors that may have influenced the findings related to the third research question. One well-researched limitation of online usage data was student use of media distracters while viewing online lessons (Rosen et al., 2013). Students may have started to view the online lesson but were distracted by social media while still being logged-in to the online lesson. This factor could account for the small number of students who had large viewing times,

but scored poorly on their examinations. To address this issue, methods of learning assessment that can be incorporated into the actual online lessons need to be developed. Technology is now available, in commercially produced online nursing courses, which terminates the online learning program if the learner is not actively participating in the program (L. Rogan, personal communication, September 7, 2013).

A second issue, not addressed in the literature, was that students anecdotally reported watching the online lessons in small groups. Viewing habits of team-based learning students were surveyed as part of the midterm team evaluation process. Eight percent (n=7) of team-based students reported viewing online lessons in groups of two or more. In this situation, only one student logged in to the online lesson. Although a second or third student viewed the online lessons, they were never logged in to the learning management system, and therefore, were not credited with viewing time. This technology related factor requires consideration in future investigations.

Group online learning would explain some of the study outliers who did well on their examinations but had little or no online viewing time. In blended team-based learning courses, it is possible that technology related factors combined with student accountability and use of peer resources may extend learning beyond the classroom resulting in increased numbers of students studying together. These relationships further support the reciprocal nature of the conceptual model.

In conclusion, the findings of this research study supported the conceptual framework's depiction of self-regulated learning as being a dynamic, cyclical process. Michaelsen et al. (1997) suggested that team-based learning fosters development of self-regulated learning in a reciprocal manner by increasing individual student's utilization

and management of available learning resources. Group accountability is viewed as a foundation for increased motivation, metacognition, and heightened peer related environmental factors (Freeman et al., 2006; Parmelee et al., 2012; Shea & Bidjerano, 2010). The current study's findings of increased self-regulated online viewing time and improved learning outcomes provided further support for the beneficial impact of team-based learning in a blended nursing course.

Implications and Recommendations for Nursing Education

The findings of the current research study present a number of implications for nursing education. The study provides support for the use of team-based learning as an instructional strategy to achieve the AACN (2008) essential outcomes for baccalaureate nursing education. Specifically, team-based learning encouraged students to become self-regulated learners as they function within teams (Clark et al., 2008; Michaelsen et al., 1997). The results of the present study demonstrated significant increases in the use of self-regulated online learning activities in the team-based learning intervention group. Students were more prone to self-regulate their pre-class preparation through increased viewing of the online lessons. Student learning outcomes in the team-based learning intervention group also showed significant improvement over the traditional instructor-led control group.

Team-based learning is a learner-centered instructional strategy in which student teams engage in meaningful problem-focused tasks (Michaelsen et al., 1997). Students are assigned into small teams in a manner that equally distributes student characteristics and resources across all groups. Team-based learning promotes both individual and group accountability through the use of individual and group readiness assessment

quizzes and group projects that apply the content learned in preparation for the class. There is minimal lecture in the team-based learning classroom; rather, the role of the instructor is to provide immediate and frequent feedback related to the quizzes and group application problems.

Team-based learning focuses heavily on application of learning that increases the student's ability to critically think about and solve problems (Okubo et al., 2012; Parmelee et al., 2012; Rawekar at al., 2013). The application focus of team-based learning has raised questions about the appropriateness of using standardized examinations as a measure of learning outcomes. Standard examinations have been widely used as an outcome measure in the team-based learning literature across both medical and nursing education. Team-based learning has consistently been found to be more effective, or at least equally effective, on student examination performance as compared with other traditional instructional strategies (Cheng et al., 2013; Kniewel, 2012, Koles et al., 2010; Mennenga & Smyer, 2010; Willet et al., 2011). Mennenga (2013), however, questioned whether standard examination questions are adequate measures of the effectiveness of team-based learning. She suggested that application learning may be better evaluated using clinical scenarios or simulations in nursing education. A number of studies of team-based learning in medical education have also appraised student outcomes using alternative methods along with standard examinations. Okubo et al., (2012) measured clinical decision making using clinical scenarios in Japanese medical students enrolled in a team-based learning course. Rawekar et al., (2013) used qualitative methods as well as a standard examination to assess student outcomes in a medical physiology course. These studies proposed that the substantive

instructional changes required by implementation of team-based learning should also be accompanied by appropriately selected evaluation methodologies.

Nurse educators may need to determine which methods of evaluation best measure student outcomes when implementing team-based learning as an instructional strategy. Different measures of learning may be required in each nursing course where team-based learning is implemented. Clinically focused courses may find that simulation and case study evaluation formats are the preferred methods of learning outcome evaluation (Mennenga, 2013; Okubo et al., 2012).

Nurse educators teaching in didactic courses may find it beneficial to develop more application-based examination questions in order to more accurately reflect the student learning outcomes in team-based learning classrooms. The current research study utilized a majority of application-type examination questions. Use of research and evidence-based practice vignettes measured the student's ability to apply the lecture content to actual research studies and evidence-based practice situations. The increase in examination scores seen in the team-based learning group indicated that they were better able to apply the knowledge gained in the course than were their instructor-led control group counterparts. Therefore, the current study's findings support the use of application-based evaluation strategies in didactic nursing courses using team-based learning.

A second implication that nurse educators must consider is the effect of team-based learning on academically at-risk students, as well as, those students who are academic high-achievers. A number of medical education research studies have demonstrated that team-based learning is particularly beneficial for weaker students

(Anwar et al., 2012; Chung et al., 2009; Koles et al., 2010). A recent nursing research study, however, found that team-based learning did not have significant positive effects on exam performance in either the upper academic quartile or lower academic quartile nursing students (Kniewel, 2012). The current study did not specifically identify students in the lower academic quartile; however, the findings do support the beneficial effect of team-based learning on academically weaker students. In comparison with the instructor-led control group, the team-based learning intervention group demonstrated a 47% decrease in the number of students with mean examination scores falling below 70%.

The needs of both academically at-risk students as well as academic high-achievers must be taken into account when planning a nursing course using team-based learning. The process begins when assigning students into teams. The student teams must be as diverse as possible including balanced numbers of academically gifted students and academically at-risk students. Michaelsen et al., (1997) suggested that the educator review the function of the teams throughout the semester. Midterm and final evaluation of team members' performance are necessary to identify low performing teams, and to increase team member accountability. High achieving students may need to be discouraged from taking responsibility for low performing team members. In this study, team leadership was rotated on a weekly basis to equally distribute team leadership responsibilities. High-achieving students may also benefit from additional challenging, thought-provoking feedback questions posed by the instructor. The effects of team-based learning on academic high-achievers is an area that requires further research

Successful application of team-based learning to an entire nursing course is challenging, and requires faculty time and commitment (Anderson et al., 2011; Myers et

al., 2011). Time and expertise is required for development of the individual and group readiness assurance quizzes as well as the group application problems. This may be an intimidating task for faculty new to the team-based instructional strategy (Myers et al., 2011; Mennenga, 2013). Likewise, the inconsistent use of team-based learning throughout a course may have negative student consequences. As Kniewel (2012) and Mennenga (2013) pointed out, students became confused and uncertain of the course expectations when they were exposed to numerous instructional strategies within one nursing course.

The nursing education literature describes the implementation of team-based learning in a variety of courses, using a number of implementation models. Cheng et al., (2013) and Mennenga (2013) implemented team-based learning in entire nursing courses, while Kniewel's (2012) study utilized it in a more limited format. All three studies indicated that multiple faculty members, some of whom were inexperienced in teaching with team-based learning, were involved in teaching the courses. The current research study presented 75% of the content using team-based learning. The two modules that were lecture-based also included group discussion components consistent with team-based learning. One strength of this research study is that the course was taught by only one instructor who had two prior semesters experience using team-based learning as an instructional strategy. Consistency in implementation and instructor experience may have contributed to the significantly better student learning outcomes compared to the results of previously cited nursing studies.

Regardless of the variances in implementation, the research literature demonstrates that team-based student learning outcomes are equivalent to or better than

traditional instructor-led classroom learning (Cheng et al., 2013; Koles et al., 2011; Mennenga, 2013). The current study extends the body of knowledge related to team-based learning in nursing education to include blended online courses. As the use of blended learning rapidly expands in nursing education, nurse educators will need to evaluate and implement varied instructional strategies (Hsu & Hsieh, 2011; Sowan & Jenkins, 2013). The findings of the present study indicate that team-based learning is a feasible and effective instructional strategy to use in a blended online nursing course. The results should encourage nurse educators to implement team-based learning in a variety of both face-to-face classroom and blended online nursing courses.

Limitations of this Study

There were several limitations to this research study. Although the sample size was adequately powered, generalizability of the findings was limited by the homogeneity of the student sample. The great majority of the students were young Caucasian females from upper middle class families. Less than ten percent of the sample population identified themselves as non-Caucasian. Generalizability of the findings may also have been limited by nonrandom assignment to the instructor-led control group and the team-based learning group.

Although both groups were randomized into teams to provide for the greatest diversity of student characteristics, the difference in group size could present a potential limitation to the study. The instructor-led control group teams consisted of four students. The team-based learning student teams were randomized to teams of six in accordance with the research literature recommendations (Chung, Rhee, Baik, & A, 2009; Koles et al., 2010; Michaelsen et al., 1997; Okubo et al., 2012). The size difference may have

resulted in disparate team diversity, thereby influencing team function and the findings of the study.

A third limitation of the study was related to data mining techniques used to determine the amount of online lessons viewed by each student. At midterm, students were asked to evaluate team function and describe their online viewing preferences. Seven of the 86 team-based learning intervention students indicated that they frequently viewed the online lessons in pairs or as a group. The online viewing time of these students was not recorded by the University Learning Management System, and therefore was missing from data analysis in this study. It is not known how many of the instructor-led control group students viewed the online lessons in pairs or as a group; however, the lack of statistically significant demographic and academic achievement differences between the two groups suggests that the viewing habits may have been similar in both groups.

A final limitation of the study was that only six of eight course modules were taught using the team-based learning strategy. The two additional course modules included introduction to research ethics and data analysis. These modules were taught by the same instructor, and utilized a lecture format. Although the present study attempted to control for this limitation by incorporating team-based group projects into these two modules, exposure to both types of instructional strategies may have limited the study's ability to differentiate learning outcomes between the two groups.

Recommendations for Future Research

This study has identified a number of recommendations for future research in the area of team-based learning in nursing education. The effect of team-based learning on

self-regulated learning has been studied in healthcare student populations worldwide (Anwar et al., 2012; Cheng et al., 2013; Koles et al., 2010; Mennenga, 2013; Okubo et al., 2012; Parmelee et al., 2012; Rawekar et al, 2013). The majority of these studies have investigated the effects of team-based learning in medical students. Further research on team-based learning in nursing education needs to be conducted across a broad range of didactic and clinical nursing courses. In addition, the effectiveness of team-based learning needs to be investigated in nursing student populations from different racial, ethnic, and sociocultural backgrounds. Recent research indicated that cultural differences in individual and group orientation play an important role in self-regulated learning (Shi, Frederiksen, & Muis, 2013). Cultural expectations may impact the effectiveness of collaborative learning strategies such as team-based learning, and therefore, should be included in future research.

The medical education literature has demonstrated the positive benefits of team-based learning in academically at-risk students (Anwar et al., 2012; Koles et al., 2010). Neither the medical or nursing studies have addressed the effect on high academic achievers. There is a need for nurse educators to study the impact of team-based learning in academically high achieving nursing students.

The present study has also identified several technology related factors associated with measurement of self-regulated learning. It is recommended that future studies investigate measurement of self-regulated learning in the blended online learning venue. The data mining techniques of current learning management systems are capable of capturing both log-in and time on task activity. They cannot, however, account for student distractors and for group online learning activities. Likewise, data mining

techniques cannot measure self-regulated learning activities in those students who eschew online learning and prefer to learn from printed sources (Tempelarr, Niculescu, Rienties, Gijselaers, & Giesbers, 2012). There is a need to develop and study alternative methods of measuring self-regulated learning that circumvent the limitations of current data mining techniques.

The conceptual model also includes several concepts that were not specifically addressed in this research study and had minimal mention in the team-based learning literature. Further investigation of the effects of team-based learning on self-efficacy and goal setting is required. Likewise, there is a need for further research to identify which faculty related factors are most important in blended team-based learning classes.

Team-based learning is an application-focused instructional strategy. One of the strengths of the current study is that the examinations used to measure learning outcomes contained primarily application questions. There is a need to develop and evaluate other methods of application learning assessment strategies across a variety of nursing undergraduate courses.

Summary

The purpose of this study was to compare the effectiveness of team-based blended learning with traditional instructor-led blended learning on self-regulated online learning activities and learning outcomes for baccalaureate junior nursing students enrolled in a blended nursing research and evidence-based practice course. Nursing education is charged with producing graduates who are self-regulated, life-long learners (AACN, 2008). Self-regulated learning is a multifaceted concept that involves behavioral,

metacognitive, and environmental components. Nurse educators are challenged to incorporate teaching/ learning strategies that support self-regulated learning.

Team-based learning is an instructional strategy that promotes active student learning through small group discussion and activities (Michaelsen & Sweet, 2008). The conceptual model guiding this study posits that team-based learning supports self-regulated learning across a continuum of classroom and blended online classes. Team-based learning has been shown to enhance self-regulated learning by increasing motivation and by improving peer resource management (Michaelsen et al., 1997; Freeman et al., 2006).

The results of the research study were consistent with existing literature on team-based learning in medical and nursing education. The findings upheld the conceptual model's thesis that team-based learning supports self-regulated learning in a dynamic process composed of reciprocal relationships between behavioral, metacognitive, and environmental components. These relationships influence learning outcomes across the continuum of traditional classroom and blended online classroom.

The results of the first research question demonstrated a significant increase in self-regulated online lesson time in the team-based learning group. The findings supported the positive impact of team-based learning on the motivation and cognitive resource management components of behavioral self-regulation as well as the reciprocal relationship with peer related environmental factors.

The results of the second research question revealed significant improvement in student learning outcomes in the team-based learning group, supporting the beneficial impact of team-based learning on metacognitive self-regulation. The finding of improved

student mean examination scores was consistent with prior studies that demonstrated that team-based learning produced equivalent or better learning outcomes in comparison with traditional instructor-led educational strategies.

The findings for the third research question were partially consistent with previous studies of self-regulation and student learning outcomes. There were small significant relationships between self-regulated online learning activities and student learning outcomes; however, the coefficients of determination were so small that they rendered the associations meaningless. The team-based learning literature provided an explanation for these seemingly contradictory findings. Team-based learning is an application-based instructional strategy. During group quiz discussions and group application projects, students became more proficient in applying the basic didactic content to actual research and evidence-based practice problems. Subsequently, students in the team-based learning intervention performed better on the knowledge application-based examinations. Thus, the current study supports the beneficial effect of team-based learning on self-regulated online learning and student learning outcomes.

This study supported and contributed to the limited research on team-based learning in nursing education. This research was the first study to demonstrate that the team-based learning can be successfully used in a blended online nursing course. The findings provided additional support that team-based learning is an effective instructional strategy that can be used to promote self-regulated learning and improved learning outcomes in nursing students.

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Appendix A

From: ADMIN [admin@aahea.org]
Sent: Friday, June 07, 2013 8:16 PM
To: Whittaker, Ali A.
Subject: RE: Permission to use adaptation from AAHE Bulletin

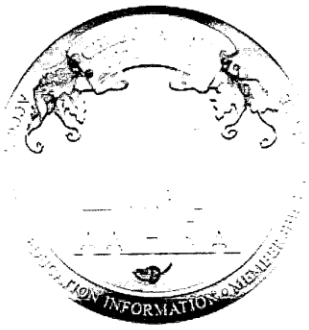
Greetings...as CEO of the AAHEA, consider this note as permission to use our publication. We wish you the best in your studies and your project.

We did receive your phone request as well.

Regards,

Dr. Stephen R. Barnhart, AAHEA CEO
Internationally recognized consultant, educator and author..
www.AAHEA.org www.IBEConline.org
*2010-2011 Recipient "**The President's Call to Service Award**"*
Awarded by the President's Council on Service & Civic Participation
A Founder of the Presidential Prayer Team: http://presidentialprayerteam.com

Alternate / Backup E-Mail: DOCSRB@gmail.com



Dear Sir/Madam:

I am a doctoral student completing my dissertation work. I am requesting permission from you, as copyright holder, to adapt Chickering and Ehrmann's "Implementing the seven principles: Technology as a lever" that was published in the 1996 October AAHE Bulletin. I plan to use the adaptation of this work as part of a table in my dissertation.

Please advise me as to how I can request permission to use this material.

Sincerely yours,

Ali Whittaker, MS, RN
Assistant Professor Nursing
Creighton University
School of Nursing
Hastings, Mary Lanning Campus
402 461-5281
402 705-3555 (cell)
aliw@creighton.edu

Appendix B

April 3, 2013

Dr. Eleanor Howell
Dean School of Nursing
Creighton University
2500 California Plaza
Omaha, NE 68178

Dear Dr. Howell:

I am currently working on my dissertation for a doctorate degree from the College of Saint Mary, and am requesting approval to conduct research at Creighton University School of Nursing. The title of my research study is: *Comparison of Team-Based Learning with Traditional Classroom Strategies on Self-regulated Learning Outcomes in a Blended Online Nursing Research Course.* The purpose of this letter is to obtain site approval to conduct research as a requirement of the Institutional Review Board from the College of Saint Mary.

The study will be used to test the effect of team-based learning, as an instructional strategy, on student learning and student participation in online learning activities at Creighton University School of Nursing. I will obtain approval of the Institutional Review Board at both the College of Saint Mary and Creighton University prior to conducting the research. My study is attempting to answer the following research questions:

1. Is there a significant difference in self-regulated online learning activity between baccalaureate junior nursing students who participated in team-based learning and junior nursing students who participated in an instructor-led classroom in a blended online undergraduate nursing and evidence-based practice course?
2. Is there a significant difference in examination scores between baccalaureate junior nursing students who participated in team-based learning and junior nursing students who participated in an instructor-led classroom in a blended online undergraduate nursing and evidence-based practice course?

7000 Mercy Road • Omaha, NE 68106-2606 • 402-399-2400 • Fax 402-399-2341 • www.csm.edu

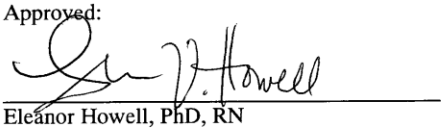
I will need to obtain demographic information and examination scores for students enrolled in Nursing 377 during the Fall 2012 semester and the Fall 2013 semester. In addition, I will need to access the BlueCast statistics for viewing time for Nursing 377 online Panopto recordings during the same two semesters. All student identifiers will be removed from data prior to downloading for use in my study. I will not be administering any questionnaires to students. The data collection procedures are entirely retrospective records review.

If you have any questions concerning this study, please feel free to contact me or my dissertation chair Dr. Lois Linden.

Sincerely yours,

Ali Whittaker, MS, RN
Doctoral Student
College of Saint Mary
7000 Mercy Road
Omaha, NE 68106
402 705-3555
awhittaker33@csm.edu

Approved:



Eleanor Howell, PhD, RN
Dean
School of Nursing
Creighton University

May 2, 2013
Date

Addendum to Letter of Approval

The following clarification/changes are made to the letter to obtain site approval to conduct research, signed May 2, 2013.

1. Demographic information to be obtained from student records includes:

   -age

   - gender

   - ethnicity

2. Academic demographic information to be obtained from student records includes:

   -Cumulative grade point average

   -Final grade from Nursing 252 Human Pathophysiology

Requested by:

Ali Whittaker, MS, RN
Doctoral Student
College of Saint Mary
7000 Mercy Road
Omaha, NE 68106
402 705-3555
awhittaker33@csm.edu

Approved:

Eleanor Howell, PhD, RN
Dean
College of Nursing
Creighton University

Date July 15, 2013

Appendix C

September 26, 2013

Dear Ali,

Congratulations! The Institutional Review Board at College of Saint Mary has granted approval of your study titled *Team-based versus Traditional Learning: Effect on Self-regulated Outcomes of Nursing Students.*

Your CSM research approval number is **CSM 1307**. It is important that you include this research number on all correspondence regarding your study. Your study is in effective through October 1, 2014. If your research extends beyond that date, please submit a "Change of Protocol/Extension" form which can be found in Appendix B at the end of the College of Saint Mary Application Guidelines posted on the IRB Community site.

Please submit a closing the study form (Appendix C of the IRB Guidebook) when you have completed your study.

Good luck with your research! If you have any questions or I can assist in any way, please feel free to contact me.

Sincerely,
Vicky Morgan
Dr. Vicky Morgan
Director of Teaching and Learning Center
Chair, Institutional Review Board * irb@csm.edu

7000 Mercy Road • Omaha, NE 68106-2606 • 402.399.2400 • FAX 402.

Creighton
UNIVERSITY

CERTIFICATE OF COMPLETION

PRESENTED TO

Alice Whittaker

RESPONSIBLE AND ETHICAL CONDUCT OF RESEARCH CITI COURSE

This certifies the successful completion of the requirement for Creighton University Responsible and Ethical Conduct of Research Training through the Collaborative Institutional Training Initiative (CITI).

The CITI "Social Behavioral Responsible Conduct of Research" course includes the following elements:

- Research Misconduct
- Data Acquisition, Management, Sharing and Ownership
- Mentor/Trainee Responsibilities
- Responsible Authorship and Publication Practices
- Peer Review
- Collaborative Relationships
- Conflict of Interest and Commitments

Certified by: Kathleen Diaz Taggart

Kathleen Diaz Taggart
Associate Vice President for Research and Compliance

05-02-2013
Date of Completion

05-02-2017
Date of Expiration

Appendix D

Creighton
UNIVERSITY

September 27, 2013

Alice A. (Ali) Whittaker, MS, RN
College of Nursing
Hastings Campus

RE:
IRB #: 13-16871
TITLE: TEAM-BASED VERSUS TRADITIONAL LEARNING: EFFECT ON SELF-REGULATED OUTCOMES OF NURSING STUDENTS

Dear Ms. Whittaker,

Thank you for submitting the above mentioned proposal to the Institutional Review Board office for review. This project has been determined to be exempt from Federal Policy for Protection of Human Subjects, as per 45CFR46.101 (b) 1. This IRB approval is for a 3 year period. The following documents were received, reviewed, and approved:

1. Application for Review of Exempt Status (per 45CFR46.101 (b) 1): Educational Research signed September 26, 2013

Continued approval is conditional upon your compliance with the following requirements:

1. Compliance with the Creighton University IRB policies and procedures
2. Problems must be reported using the Reporting Form for Reportable New Information. Problems requiring report can be found in the IRB Policy 134 "Reportable New Information".
3. All protocol amendments and changes to approved research must be submitted to the IRB and not be implemented until approved by the IRB. Please use the modification form when submitting changes to protocol or consent documents.
4. This study cannot continue after the expiration date, which is September 27, 2016. You are required to submit a renewal/termination prior to this date. If you wish to continue the project, the renewal must be in the IRB office on week prior to the expiration date.

If you should have questions during the course of this project, please call the IRB office at (402) 280-2126 and one of the administrators will assist you, or you may email the office at irb@creighton.edu.

Sincerely,

Patricia Nowatzke RN, MHSA, CIP

Patricia Nowatzke, RN, MHSA, CIP
Director, Institutional Review Board

Appendix E

January 22, 2014

Ali Whittaker, Ed.D.(c), M.S., R.N. has requested an external research audit on Team-based versus Traditional Learning: Effect on Self-regulated Outcomes of Nursing Students. The purpose of this audit was to determine if experimenter expectancy bias may have altered learning outcomes of the student subjects. The external research audit was conducted from August to November 2013, and concluded on November 20, 2013. The external research audit was conducted by taking the following steps:

1. Watched live classes taught by researcher by transmission.
   a. Looked for evidence of interventions that were more enthusiastic or vigorous.
   b. Looked for evidence of other deviations from intervention fidelity.

2. Reviewed researcher's notes and materials:
   a. Institutional Review Board application and approval
   b. Researcher's reflexive notes
   c. Dissertation draft
   d. Class materials including individual and group readiness quizzes and group projects

In my opinion, the study, Team-based versus Traditional Learning: Effect on Self-regulated Outcomes of Nursing Students, followed established processes for quantitative research using an educational intervention. Procedures for maintaining treatment fidelity were followed as outlined in the dissertation proposal. There was no evidence of researcher expectancy bias. In summary, the study remained consistent with its intended purpose statement, Institutional Review Board approval, and proposal as approved by the Dissertation Committee.

Attested to this 22nd of January of 2014.

Sincerely,

Ann Harms Ed.D., M.S.N., R.N., PMHCNS-BC
Assistant Professor
Creighton University College of Nursing
Hastings-Mary Lanning Campus
715 North St. Joseph
Hastings, Nebraska 68901
402-461-5057